


2023  
**Task Force on  
Climate-Related  
Financial  
Disclosures  
Report**

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# Introduction



This report follows the recommendations provided by the Task Force on Climate-Related Financial Disclosures (TCFD) and is structured around four thematic areas: governance, strategy, risk management, and metrics and targets. This report complements our 2023 Purpose & Impact Report and additional disclosures available on our corporate website.



## 1A. Welcome letter

We are pleased to present our annual TCFD report, which provides insight into our climate-related activities over the past year.

In 2023, the unprecedented scale of weather and climate-related disasters and extremes<sup>1</sup> emphasized the critical role of property and casualty insurers, and the importance of companies like Liberty Mutual in helping individuals, businesses and communities understand and manage climate-related risks. The UN Climate Change Conference (UNFCCC COP28) Global Stocktake and other policy initiatives further highlighted insurers' importance in fostering resilience and advancing the transition for all stakeholders.

Liberty Mutual began 2023 by articulating our climate ambition to support our customers as they transition to a lower carbon economy. We focused our climate strategy on three core areas: (1) advance data and discovery, (2) support adoption of new and alternative solutions and (3) inform and advocate on adaptive solutions. These areas are informed by our business objectives and our climate insights, shaped by systems-level thinking, and take into account evolving geopolitical risks and societal impacts in the energy transition landscape. Our strategy is designed to meet the needs of our customers, partners and stakeholders by engaging them early on in their transition to provide climate risk identification, risk mitigation and risk transfer services.

To support the implementation of this strategy, our climate journey this year included:

- Furthering business integration across the enterprise and enhancing climate literacy through our Climate Activation Program (CAP), providing climate-related training to approximately 300 senior leaders across Liberty Mutual.
- Supporting the energy transition by offering insurance products for renewable and green technologies and through our investments in early-stage energy transition-related opportunities.

- Influencing the global conversation on sustainable finance through the Liberty Mutual Climate Transition Center by engaging with government leaders and representatives from different sectors, hosting a climate transition workshop with the Institute of International Finance (IIF) for regional peers in Boston and facilitating critical conversations around COP28 in Dubai.
- Amplifying Liberty Mutual's impact by strengthening our relationships with key cross-sector stakeholders, including partners at the United States Department of Energy, the Massachusetts Governor's Office and the Monetary Authority of Singapore.

In 2024, we will continue to enhance and evolve our climate program by: 1) exploring system-level topics such as grid stability, recyclability and the environmental impact of renewables as we assess energy innovation and new technologies; 2) enhancing our climate risk governance and management; 3) expanding climate literacy initiatives; and 4) advancing the global climate conversation through the Climate Transition Center and partnerships with leading associations like the Geneva Association and academic institutions.

In the face of a changing global landscape marked by elections, shifting policies and geopolitical concerns, we remain steadfast in our commitment to transitioning to a lower carbon economy and building resilience – for our customers, across our business and within the insurance sector. There is a lot of work to do, and we are excited about the possibilities for the year to come. We have strong conviction in our approach, and we are confident that our collective commitment and actions will continue to advance a more sustainable future.

### Francis Hyatt

Chief Sustainability Officer

### Leonid Rasin

Chief Actuary and Chief Risk Officer

### Rakhi Kumar

Senior Vice President of Sustainability Solutions and Business Integration; Chair, Climate Council

<sup>1</sup>Smith, Adam B. "2023: A historic year of U.S. billion-dollar weather and climate disasters." NOAA Climate.gov, 8 January 2024.



# Governance



We continue to enhance our governance structure to support communication, collaboration and effective decision-making, ensuring that climate-related financial risks and opportunities are understood by our Board of Directors and across every level of our business.



## 2A. Describe the Board's oversight of climate-related risks and opportunities.

At Liberty Mutual, the Board of Directors oversees the ongoing development of our enterprise-wide business strategy and the management and implementation of our climate strategy, with specific responsibilities for oversight, implementation and operationalization delegated to the Risk Committee and Governance and Sustainability Committee. Our governance structure is detailed below, in graphic A.

**Graphic A. Liberty Mutual's governance structure for climate-related risk and opportunity**



Roles and responsibilities for these groups are detailed on page 7.

Liberty Mutual's senior leadership and subject matter experts provide updates to the Board on risk and sustainability-related matters, including climate change. These updates include annual briefings from the Chief Risk Officer (CRO) and Chief Sustainability Officer (CSO) and regular updates from experts across Liberty Mutual Investments (LMI), Global Risk Solutions (GRS) and U.S. Retail Markets (USRM).

## Board committee oversight of climate-related risk and opportunity

In 2023, we continued to strengthen our Board and governance to better address the evolving sustainability landscape, inclusive of climate-related risks and opportunities. Our former CEO continues to serve as Chairman of the Board and Chair of our Governance and Sustainability (G&S) Committee. The G&S Committee and Risk Committee have designated climate-related responsibilities and oversight as detailed below. A full breakdown of our Board of Directors and its committees can be found on our [corporate website](#).

### Governance and Sustainability Committee

The Governance and Sustainability Committee meets at least four times annually and provides strategic oversight and performance evaluation of our sustainability practices and priorities, including climate-related topics. As part of its duties, the Committee considers current and emerging sustainability trends and makes recommendations to the Board of Directors for approval as appropriate. It oversees corporate governance disclosures, including the annual Purpose & Impact Report and Corporate Governance Annual Disclosure. The G&S Committee includes membership from the Risk, Investment, Audit and Compensation Committees of the Board of Directors, allowing for representation and interconnectivity across the Board.

In 2023, the G&S Committee received updates on Liberty Mutual's climate strategy, the Climate Activation Program (CAP), and the company's progress toward our commitment to reduce Scope 1 and 2 greenhouse gas (GHG) emissions by 50% from a 2019 baseline by 2030, alongside other climate-related metrics and targets.

### Board Risk Committee

The Board Risk Committee (BRC) also has an important role in climate-related oversight. The BRC is responsible for overseeing and reasonably assuring that Liberty Mutual maintains adequate policies, controls and practices within our enterprise risk management (ERM) framework to continuously identify, measure, manage and mitigate critical risks. In 2023, the BRC conducted quarterly reviews of risk indicators and received updates on ERM key risks, including those related to climate, meeting four times throughout the year.



## 2B. Describe management's role in assessing and managing climate-related risks and opportunities.

Liberty Mutual continues to evolve our sustainability-related governance and organizational structure to ensure that we have the best system in place to collaborate and act on climate-related risks and opportunities.

Liberty Mutual's CEO and President serves as the executive sponsor for sustainability priorities. The CEO and President works closely with our Chief Sustainability Officer (CSO), the Chair of our Climate Council and our Enterprise Risk Management and Public Affairs teams to stay informed and engaged on climate-related issues. Regular briefings equip the CEO and President to drive our climate strategy and risk management efforts forward and ensure that we're taking meaningful steps to promote climate action and mitigate risk.

We maintain cross-functional teams and committees across executive levels and geographies to ensure that management is coordinated in assessing and managing climate-related risk and opportunity across our business. Our climate-related management structure includes the Executive Leadership Team, ESG Executive Committee, Office of Sustainability, Climate Council, Enterprise Risk Management (ERM) Executive Committee, ERM Operating Committee and corporate ERM function, further detailed below.

- **Executive Leadership Team**

Chaired by the CEO, the Executive Leadership Team manages Liberty Mutual's strategic response to climate change.

The team receives quarterly reports and, when necessary, additional timely updates on sustainability and climate-related risks and opportunities. These reports and updates facilitate strategic discussions and permit us to coordinate activities across departments and stakeholders to achieve sustainability goals.

- **ESG Executive Committee**

The ESG Executive Committee is responsible for setting global standards and guidelines across Liberty Mutual and developing recommendations and plans to address emerging risks and opportunities related to sustainability. The committee includes representation from senior members of strategic business units such as Global Risk Solutions (GRS), U.S. Retail Markets (USRM) and Liberty Mutual Investments (LMI), and functions such as Enterprise Risk Management (ERM), Investor Relations, Finance, Strategy, Legal and

Public Affairs. In 2023, the Committee met five times and discussed topics such as Liberty Mutual's Climate Strategy and implementation, global reporting and disclosure governance.

- **ERM Executive Committee**

The ERM Executive Committee, chaired by Liberty Mutual's CEO and President, has oversight responsibilities to define organization-wide ERM roles and responsibilities, establish accountability, guide the ERM implementation process, set group-wide risk tolerances, approve risk mitigation plans and monitor ERM effectiveness. This committee is composed of executive leaders responsible for business units and corporate functions.

- **The Office of Sustainability**

The Office of Sustainability, headed by the CSO, directs the company's sustainability strategy and ambition to promote resilience and inclusive growth. Our climate strategy is a fundamental part of the overall sustainability approach. The team aligns climate-related efforts across the company, gathers and oversees climate data and disclosures and facilitates climate-related strategic engagement and informed decision-making across the enterprise. The CSO also chairs the ESG Executive Committee, with a senior office member chairing the Climate Council.

- **The Climate Council**

The Climate Council is a cross-functional group responsible for advancing the company's climate strategy and overseeing the Climate Transition Center. It aids in information exchange on emerging climate-related issues and advancing internal climate-related policy and business initiatives.

The Council, which includes members from all business units as well as the Office of Sustainability and ERM, Public Affairs and Finance, meets monthly to assess strategic progress and suggest adjustments. Climate Council members contribute to annual climate-related reporting and form sub-groups for specific issues. In 2023, the charter was expanded to include nature, and the council structure evolved to reflect company priorities. Monthly discussions covered regulatory impacts and opportunities, public policy considerations, geopolitical impacts, emerging reporting frameworks, ESG integration efforts, the launch of the Climate Activation Program (CAP), the development of Climate Transition Center thought leadership, and product innovation updates. This year, through ongoing assessment of key risk themes, the Council also evaluated climate liability as a transition risk and the rising concern of nature risk.



- **ERM Operating Committee**

Chaired by the Chief Financial Officer, the ERM Operating Committee prioritizes issues and develops recommendations and actionable contingency plans for review by the ERM Executive Committee. Furthermore, the ERM Operating Committee maintains processes to aggregate, evaluate and manage group-wide exposures. This committee comprises officers and employees directly managing risks that have the potential to materially impact the financial or operational viability of the company.

- **Corporate ERM function**

Led by the Chief Risk Officer, the Corporate ERM function is responsible for group-wide ERM reporting, conducting stress testing and scenario analysis, facilitating the ERM committees and coordinating ERM initiatives across the business units.


The Chief Risk Officer also chairs the Catastrophe Underwriting Risk Committee (CatCo), overseeing the responsibilities for catastrophe underwriting risk across the organization, and the Emerging Risks Committee (ERC), responsible for emerging risks that may materially threaten Liberty Mutual's operations, financial results, objectives and strategic priorities.

Our comprehensive governance approach focuses on integration and collaboration across business units and enables the establishment of integrated working groups as needed. Some of our subsidiaries and branches also have designated sustainability teams. We continue to bolster the enterprise-level team focused on business unit integration and climate-related risk and opportunities to address business needs.





# Strategy



We leverage the latest science to continue to advance our understanding of the actual and potential impact of climate-related risk and opportunities and have developed a climate strategy to drive action and integration across our business, and to enhance resilience and readiness for our company, customers and communities.



### 3A. Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.

We have adopted a pragmatic approach to identifying and analyzing the climate-related risks and opportunities impacting Liberty Mutual's business in the short-, medium- and long-term, analyzing systems-level insights alongside a portfolio-level assessment. As climate-related science continues to evolve, we continue to monitor scientific developments and refine our processes for identifying and managing climate-related physical and transition risks. We aim to leverage the latest credible and peer-reviewed sources to better understand the scientific, social, economic and technological trends embedded in climate models and to identify interconnections, understanding feedback loops and dynamic behavior.

We recently updated our systems-level climate scenario framework with the November 2023 Network for Greening Financial System (NGFS) long-term climate macro-financial scenarios. These scenarios reflect recent GDP impacts across Europe, Asia and the United States, population trends and national climate pledges, including responses to the energy crisis following the war in Ukraine and policy delays.

Through our systems-level analysis, we have identified policy change as the most imminent source of transition risk and opportunity in the short term, with rising economic and technology risks in the medium and long term, as the primary energy mix shifts at different rates across geographies. The transition to a low-carbon economy is dependent on both global and regional climate policies, regulations and agreements. Risk stemming from potential clashes between policy actions taken by governments and their implementation timelines can impact local and global economies. As a result, it becomes crucial for organizations to consistently assess and integrate the risks arising from divergent public policies. This dynamic environment demands a proactive approach, where businesses continuously adapt to the changing circumstances associated with climate policies.

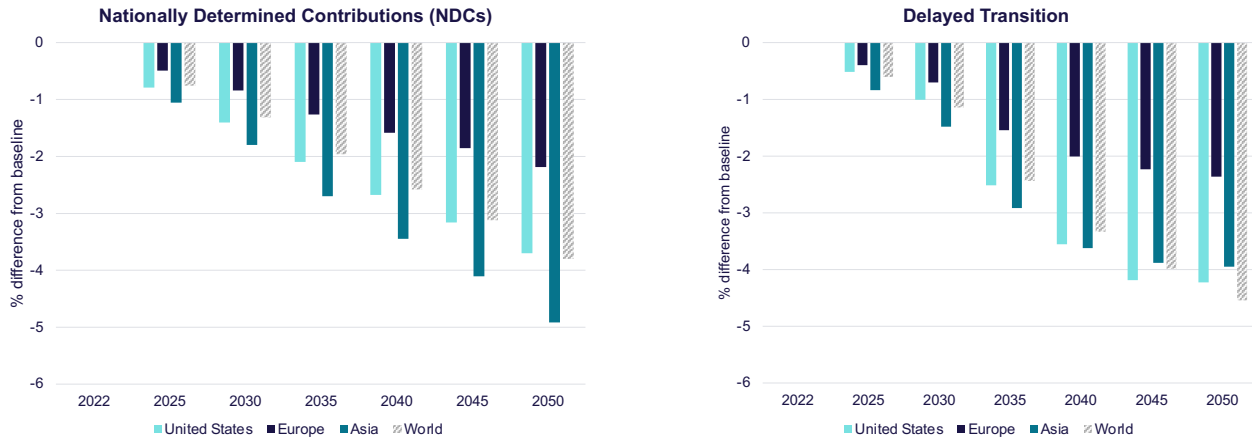
By comparing NGFS scenarios – specifically the Nationally Determined Contributions (NDCs) scenario and Delayed Transition – (see more detail of our analysis on [page 21](#)) we can infer significant insights that highlight the likelihood of transition risk for our business and our customers, including:

- Our analysis indicates that distinctive regional and sector specific pathways for the energy transition are likely as climate transition and physical risks will impact each economy uniquely. The formulation of global policies will be contingent upon the specific requirements of regional economies, as is exemplified by the plausible impact to regional GDP under different scenarios in Figure 1. Policymakers will take steps to alleviate the regional impact on their economy, resulting in diverse approaches to policy development across regions.
- Global climate policy alignment will be challenging due to varying national economic needs, and regional coordination will be key. The pace of policy progress will depend on economies' readiness to transition from fossil fuels. NGFS models suggest a continued mix of energy sources, including fossil fuels, renewables and other low-carbon alternatives. Primary energy mix is impacted by geopolitical dynamics that compromise energy security and affordability. Governments will continue to prioritize reducing dependencies on foreign energy sources and limiting negative impacts to their citizens, challenging a "one-size-fits-all" approach. Additionally, based on our analysis over the years of the data portrayed in Figure 2 and other key variables, many technology-related risks may become more pertinent at scale in the medium term (2030-2040), if the world aligns to an ambitious climate scenario.



**Figure 1. Impacts of Gross Domestic Product (GDP) change compared to baseline**

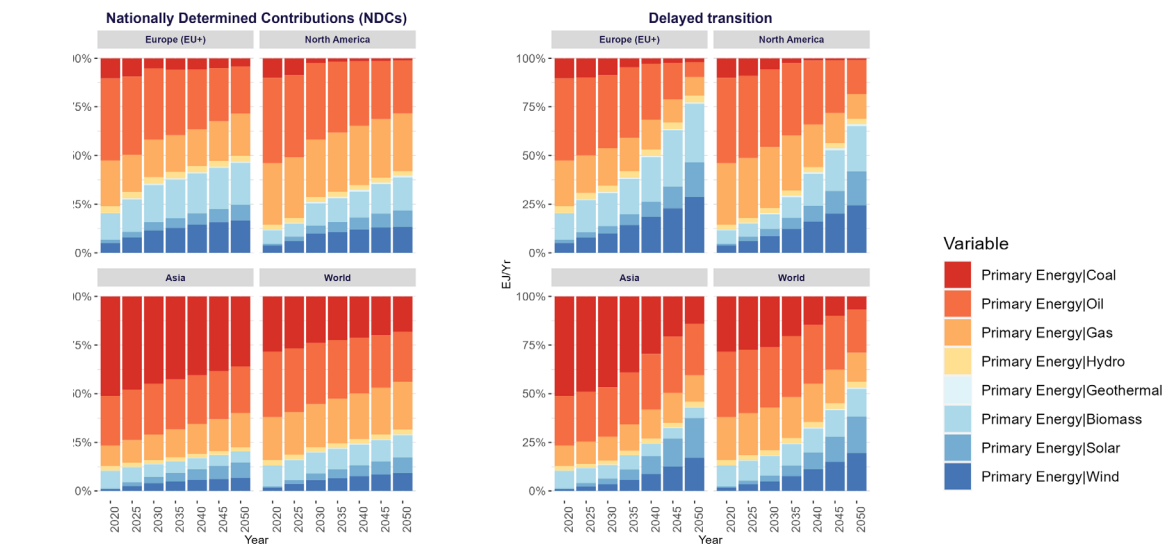
The represented GDP impact across regions portrays how market and energy system changes, in addition to the consequences of chronic physical risk impacts, may translate to macro-economic impacts. The relative magnitude of GDP impact in different scenarios helps provide an initial signal as to which regions may be more exposed to transition and physical climate risks. In the NDCs scenario, which has higher physical risk, Asia sees the highest GDP impact from climate change, while in the Delayed Transition scenario, where there is higher transition risk, the largest change is the United States.



Source: NiGEM Model with GCAM 6.0 Inputs, NGFS V4.0

**Figure 2. Primary energy mix**

Primary energy mix is an important indicator for the pace and scale of the transition across regions, as energy consumption across sectors is currently the main driver of emissions. Across society, we heavily depend on energy to power our day-to-day activities, from transportation to electricity for homes and businesses. The mix and scale of primary energy, as referenced in the NGFS graph below, indicates how difficult the transition may be for specific regions. More information on our analysis using primary energy and other key scenario variables can be found in our published [Climate Transition Center research](#).



Source: NiGEM Model with GCAM 6.0 Inputs, NGFS V4.0

Further details of our analysis on transition and physical risks, including an analysis of acute physical risks and mitigation strategies, can be found in the Risk Management section (see [page 20](#)).



### 3B. Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy and financial planning.

Our business provides insurance coverage for both retail and commercial customers, including individuals of all ages and backgrounds and companies of all sizes. To serve all of our customers and their communities, we have developed a comprehensive climate strategy that builds on the risks and opportunities identified through our climate scenario analysis and ongoing climate-related insights, and advances towards a low-carbon economy for all.

Ultimately, our objective is to support our clients and advance action and dialogue on the transition to a low-carbon economy in three key areas:

- **Advancing data and discovery**  
Helping manage climate risk and advancing global understanding and conversation on data and risk discovery and application.
- **Supporting adoption of new and alternative solutions**  
Accelerating the adoption of innovative technology and alternative energy solutions through risk identification for clients and customers, innovation, underwriting and investments.
- **Informing and advocating on adaptive solutions**  
Supporting and advocating for systems and policy solutions that advance resilience and promote sustainability at scale.

### Establishing Liberty Mutual's Climate Transition Center

The Liberty Mutual Climate Transition Center was founded in 2022 to empower insurance professionals, customers, policymakers and decision-makers globally to adapt to and mitigate one of the biggest challenges of our time – climate change. The industry's world-class capabilities of assessing risks and developing solutions to mitigate them will be critical to how the climate transition unfolds.

2023 was a big year for the Climate Transition Center, releasing its first proprietary research papers to advance the collective understanding of climate-related risks, impacts, and resilience and bringing together subject matter experts to advance cross-industry discussion and collaboration. During this year, the Climate Transition Center activities focused on three themes:

- **What pragmatic transition planning looks like**, evidenced through two published papers, "[A case for a systems-level approach to pragmatic transition planning](#)" and "[The big shift: Navigating the interconnected complexities of the energy transition.](#)"
- **The role of the insurance sector (and financial sector at large) in the climate transition**, evidenced through a [full-day workshop](#) with the Institute of International Finance (IIF) to bring together private and public sector leaders on the energy transition, with presentations from industry peers, the U.S. Department of Energy, the Massachusetts Governor's Office and the Geneva Association.
- **The need to advance climate data and tools for greater resiliency**, evidenced through a Climate Risk Data 101 [video series](#) with our Director for Catastrophe R&D, a climate scientist by training, to inform policymakers, partners and the general public.

[Climate Transition Center website and resources](#)



## Advancing data and discovery

At Liberty Mutual, we recognize the importance of reliable and accessible data, and are committed to advancing climate and energy transition-related data accessibility and quality for our business, our customers and our industry.

Property and casualty insurers look at climate change impacts differently than other types of financial service companies. We are experts in using science and data to understand physical risks – particularly natural catastrophe risks that could impact our customers' assets. We use these data insights to price risk and, based on that expertise, have a better understanding on how natural catastrophe risks are changing and evolving due to climate risk. This gives us a unique perspective to help the insurance industry understand the various financial and economic impacts of climate change. We continue to deepen understanding of physical and emerging risks through research projects and partnerships, as detailed in the Risk Management section on [page 22](#), expanding on our work around hurricane frequency in the United States, flood risk in Central Europe and wildfire risk.

As climate science continues to evolve, we recognize the need for continued education, partnership and information-sharing to collaborate on advancing climate data and to ensure that good data is accessible to all. We do this by:

- **Contributing to research and frameworks**

Liberty Mutual continues to explore ways to drive more effective use of climate data in the private sector with our academic partners. We participated in research studies with the National Center for Atmospheric Research (NCAR) and Columbia University focused on the efficient use of climate data and information in the insurance sector. We also engaged in a partnership with consortia of the Massachusetts Institute of Technology (MIT), including the MIT Climate & Sustainability Consortium (MCSC), the MIT Energy Initiative (MITEI) and the MIT Center for Energy and Environmental Policy Research (CEEPR). We also contributed to the field of climate scenario assessment for financial and business analysis through engagement with key scientific organizations leading this work, including the Network for Greening the Financial System.

- **Engaging with the scientific community**

Liberty Mutual regularly sends delegates to scientific conferences to keep up-to-date on emerging climate research, which this year included participation at the American Geophysical Union (AGU) and American Meteorological Society (AMS) annual meetings. Climate change is a key focus for both meetings, covering topics related to Liberty Mutual's own areas of interest including event attribution, changes in

flood risk, integrating climate models and catastrophe models, emerging perils like post-wildfire debris flows and other impacts of anthropogenic and natural climate drivers.

- **Partnering with our industry**

We actively collaborate with industry bodies like the National Association of Insurance Commissioners (NAIC), American Property Casualty Insurance Association (APCIA) and Institute of International Finance (IIF) to provide feedback on proposed legislation and regulatory frameworks, informed by data, and to align on climate scenario analysis and climate risk metrics for our industry. We also worked alongside the International Association of Insurance Supervisors (IAIS) to inform the climate risk workstream, sharing our approach to climate scenario analysis and climate modeling.

By engaging in strategic partnerships, we have been able to advance our collective understanding of climate data and modeling.

## Supporting adoption of new and alternative solutions

We recognize that the transition to a low-carbon economy is happening rapidly. We are evolving our team, our products and our investments to advance the adoption of innovative technology and alternative energy solutions, and to ensure that we can continue to provide leading risk advisory services for our customers wherever they are on their sustainability journey.

### Alternative solutions in our insurance business

We are focused on capacity building to ensure that we have the best talent and insights to advance alternative solutions for our insurance business. We have expanded and equipped our Commercial Energy Transition Risk team to bring strategic focus to the global energy transition affecting current and potential clients across industries. In 2023, we continued to strengthen our Energy Transition Risk team, introducing the Global Head of Strategic Partnerships to work with clients on addressing their risks and opportunities as it relates to the energy transition and the Director of Strategy and Performance to engage with leaders globally to ensure that local strategies are aligned with the evolving market.

We are proactively discovering and mitigating new risks and opportunities and investing in enhanced data and analytics that allow us to better understand risk and support a low-carbon future for our clients. We have been training underwriters, broker relationship managers and client relationship managers on new energy technologies for which our clients need coverage.



Paired with our support for our customers, we embed climate risk training initiatives, such as our Climate Activation Program (see [page 17](#)), within the business to further empower our underwriters to navigate emerging challenges and opportunities.

We are developing new products to advance the energy transition. As an example, in response to the United States' 45Q income tax credit, which came into effect in 2021 to incentivize the capture of carbon dioxide from qualifying industrial facilities and its disposal in permanent geological storage, Liberty Mutual introduced coverage for site pollution liability and environmental protection through the US Environmental Liability group's Contractors and Environmental Legal Liability product (CELL). In Europe, through a collaboration across regional teams, we developed tailored underwriting for an offshore wind farm that demonstrated our trustworthiness and expertise in the sector.

We believe that to scale the transition and provide the confidence and trust needed in the evolving market, we need to work in partnership with our insurance peers to further understanding of new technologies and early involvement in large-scale renewables projects. We are doing so through active involvement in industry association working groups. For example, as a member of the Geneva Association, an international association of 80 (re)insurance CEOs, Liberty Mutual is helping to clarify the role insurers play in the transition and supporting the development of new insurability readiness frameworks for emerging technologies, including green hydrogen and Carbon Capture, Utilization and Storage (CCUS). More recently, we provided inputs in the [Climate Tech for Industrial Decarbonisation: What role for insurers?](#) report published by Geneva Association in January 2024.

### Investing in disruptive innovation

We are also committed to supporting innovation and alternative solutions through Liberty Mutual Investments (LMI). While our investing philosophy is guided by driving strong financial returns and ensuring that we have adequate capital to protect our policyholders, we are a long-term global investor committed to innovation and driven by the belief that capital can serve as a force for good.

We believe catalyzing innovation and accelerating the deployment of new technologies is crucial to addressing climate change. This is enhanced by our dedicated Energy Transition & Infrastructure (ET&I) team that has historically emphasized innovative climate-related opportunities as exemplified through our investment in Nexus PMG.

## Scaling sustainable aviation fuel production

Liberty Mutual participated in Nexus PMG's \$50 million growth equity round in 2023 to enable the company to expand its services and accelerate in-house development platforms focused on renewable natural gas and sustainable aviation fuel production.

Nexus PMG is a waste-to-value and low-carbon infrastructure leader that has supported various stages of development and execution on over \$35 billion worth of low-carbon infrastructure projects to date. This investment will allow the company to expand its existing core services business by increasing its offering and relationships with companies seeking to meet their sustainability targets. Additionally, the capital will support the company's development subsidiaries focused on (1) the conversion of organic waste streams into renewable natural gas, compost products and biochar, and (2) the production of ultra-lower-carbon intensity sustainable aviation fuel by leveraging carbon sequestration.

LMI has been actively supporting the global transition to a low-carbon economy for more than a decade. Our ET&I team has a strong track record of generating attractive returns, including across many low-carbon technologies. Through ET&I, Liberty Mutual has invested in:

- The development and construction of some of the world's largest renewable energy and storage resources.
- The circular economy through projects that remove waste byproducts and transform them into valuable energy resources.
- Energy transition onshoring by financing new manufacturing facilities that support both job growth and expansion of the domestic renewable energy value chain.

In addition to the more than \$1.23 billion in renewable energy-generation investments across LMI's fixed income and alternative investments, our ET&I team has invested approximately \$810 million in emerging energy transition opportunities and strategic investments in climate technology. This diversified portfolio underscores our dedication to supporting a broad spectrum of sustainable solutions. Across more than four decades, we have intentionally made significant allocations to venture capital and early-stage investments with notable exposure to clean-tech, deep-tech and other strategies that are focused on solving critical social challenges.





## Advancing the energy transition through investments: Q&A with Charley Poole and TJ Gaylord, ET&I

Established in 2015, the ET&I team at Liberty Mutual was born out of a need for dedicated expertise in power, renewables and infrastructure investments. Today, ET&I invests across asset classes that are essential for the energy transition, including renewable power and low-carbon infrastructure. With the market opportunity set growing rapidly, the team has expanded and now collaborates with over 20 partners and manages more than 80 individual investments.

### Q: How does ET&I support Liberty Mutual's ambition to transition to a low carbon economy?

**Charley:** As part of Liberty Mutual Investments (LMI), we are tasked with investing Liberty Mutual's portfolio for the best long-term return on investment. As a mutual company, we can grow, retain and compound our capital, a factor which allows us to continually invest in innovation. As such, we see tremendous investment opportunity in alternative energy solutions, infrastructure and innovative technologies that are critical to facilitating the energy transition.

The ET&I team takes a pragmatic approach to ensure we're investing in efforts to build energy and infrastructure resilience for both the short and long term while remaining focused on our core mission of growing capital for Liberty Mutual. Many innovative technologies needed for a low-carbon economy are still in the preliminary stages of development, require significant capital to build at scale, or both. Our team's mandate is driven by subject matter expertise, which allows us to evaluate opportunities across verticals, asset classes and geographies. We consider the energy trilemma of scalability, affordability and reliability, and invest where we see the appropriate balance of risk and opportunity. We evaluate investments both for what lower-carbon solutions exist today and for what may be developed further in the future. For example, we see biomethane as an attractive investment theme with additional circular economy benefits, although waste-to-value remains an emerging asset class.

**TJ:** We also see a significant opportunity to enhance the power grid's reliability, though this will take time and significant capital. Currently, complete divestment from natural gas isn't feasible as it would compromise the grid's stability, reliability and affordability. We're exploring bridge fuels and innovative solutions to ensure the grid's reliability now and in the future, as evidenced during the 2021 Texas Winter Storm Uri, which led to massive power outages. In response, ET&I invested in a company that operates large backup generators which can be used to keep essential services operational, including hospitals, dialysis centers and community centers. These generators, while currently gas-powered, are designed for potential future use of alternative fuels.

### Q: What are the key challenges and opportunities that you've identified as investors in the energy transition?

**TJ:** We consider regulation and policy to be both key challenges and opportunities. Liberty Mutual was intentional in building a team of subject matter experts that can evaluate and leverage the risks and opportunities of the global policy and regulatory landscape related to the energy transition and infrastructure. We also apply a risk-oriented framework to our decisions and investments to ensure we're reflecting and managing these complexities. Today, compared to three or five years ago, policy is generally favorable towards investing in the energy transition, but this may change. As investors, we need downside protection. Right now, this is provided through policy and regulation in both the United States and European Union, which has created tailwinds for low-carbon related investments.

Notably, the Inflation Reduction Act provides significant support for energy innovation in the United States. However, relative risk and capital requirements for some sectors still pose a barrier to entry, as we see with the buildout of the hydrogen value chain, for example. We continue to monitor and evaluate the landscape and our investments to ensure that we are maximizing opportunity and minimizing risk.

**Charley:** We also must address market adoption and affordability related to the energy transition. There have been considerable cost reductions and resulting adoption of proven renewable technologies to help tackle power sector decarbonization, and that's where we've seen the most positive progress to date. Attention now needs to be paid to carbon-intensive industries like transportation, agriculture, steel and cement, where scalable solutions are lacking. These represent difficult and potentially expensive challenges to address, but we're excited about the resulting investment opportunity and innovation potential to transform these industries.



## Informing and advocating on adaptive solutions

As a global property and casualty insurer, we aim to enhance resilience for our customers, our employees and our communities by using data, science-based models and expertise to shape climate adaptation strategies and improve outcomes.

We aim to support resiliency at the individual level by serving as a risk advisor and developing innovative products and services for our customers, ranging from individual home and auto owners to small businesses and large multinationals. Through our retail business, we launched WeatherReady on Liberty+, a digital platform that provides advice, recommendations and tools to enable homeowners to care for their homes. WeatherReady guides customers through how to build resilience against severe weather. This includes a short assessment and customized science-backed recommendations, informed by the Insurance Institute for Business and Home Safety (IBHS) research. Over 10,000 policyholders have used this tool, and we continue to expand the content to include topics such as disaster preparedness, unexpected weather changes and wildfire resilience.

Amongst our employees, we are promoting resilience and enhancing sustainability through education and empowerment. We continue to expand the Climate Activation Program, providing foundational climate-related education to all leaders across the business. Liberty Mutual's Sustainable Environment Alliance (SEA), an internal employee group, also supports Liberty Mutual's sustainability efforts by promoting education and positive action to protect the environment in which we live and work.

We also believe that we have a responsibility to advance weather and climate-related resiliency in our communities. Through a partnership with [SBP](#), a national disaster recovery and resilience organization, we are leveraging our technical expertise and combined resources to help low-income communities access federal funds for disaster preparedness and recovery. Additionally, in 2023, the Liberty Mutual Foundation partnered with the Massachusetts Farm Resiliency Fund to support farms in Central and Western Massachusetts impacted by flooding.

To advance resiliency at scale, Liberty Mutual supports and advocates for systems and policy solutions globally, both on behalf of our business and through the Climate Transition Center, with governments and industry groups. We also continue to engage with policy leaders in priority markets to share data and help develop science-informed laws and programs. In January of 2024, we partnered on a FEMA webinar for local and state governments to educate on the importance of building codes. Through the Climate Transition Center, we have also developed papers and videos to amplify experts from Liberty Mutual, as well as from across our industry and other sectors, to ensure that learning is accessible to everyone.

The Liberty Mutual team is proud of having engaged in the annual UN Climate Conference (COP28) in Dubai, advancing cross-sector collaboration and influencing the role of insurance in the transition. We sponsored leading COP28 events for business leaders, the Climate Innovation Summit and Innovation Zone, hosting an important conversation on how finance partners can help de-risk the transition, further detailed below. Liberty Mutual leadership, including our Chief Sustainability Officer, our Global Head of Strategic Partnerships for the Energy Transition and our SVP for Sustainability Solutions and Business Integration also engaged in official COP28 cross-sector conversations, including with the International Chamber of Commerce (ICC), who participated in the UN negotiations on behalf the business community.

## Creating actionable outcomes from COP28

At the Climate Innovation Summit, the largest convening of business leaders alongside COP28 in Dubai, Liberty Mutual convened the mainstage panel "[More Than Funding: How your finance partners can help de-risk your transition journey.](#)" Alongside Liberty Mutual's Head of Energy Transition Partnerships, the discussion brought together leaders from McKinsey, KKR, JP Morgan and the International Institute of Finance (IIF).

Key takeaways and actionable outcomes from the discussion included:

- There is a clear imperative for climate action, but the policies and technologies available do not yet support a rapid transition to a low-carbon economy.
- Companies can leverage their financial partners in ways beyond project funding to holistically balance risk and remove roadblocks in transition planning – ultimately, with more confidence and security in their plans, companies can accelerate progress.
- Different financial partners have distinct roles to play in transition planning. There is great benefit to companies to include their financial partners, particularly insurers, in early discussions to help reduce risks through the lifecycle of a transition project.
- There is an opportunity to leverage finance partners' relationships with government agencies focused on technology risk to de-risk the energy transition for all businesses.

Insights from this panel have helped inform the collaborative work undertaken by the Geneva Association (See [page 14](#)).





### 3C. Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios including a 2°C or lower scenario.

To ensure business resilience amidst an evolving climate landscape, our approach to managing climate-related risks and opportunities encompasses fundamental aspects expanded on throughout this report: strong governance (see [page 5](#)), risk management which includes data discovery (see [page 26](#)), and business integration and innovation.

We regularly update our climate scenario framework to ensure that we are assessing our strategy and business operations against all possible outcomes (also see 3a on [page 10](#) and 4a on [page 20](#)). We examine a range of scenarios, including three that fall well below a 2°C world, from the Network for Greening the Financial System (NGFS) and Intergovernmental Panel on Climate Change (IPCC). These scenarios include the Net Zero 2050 and Delayed Transition scenarios (focusing on transition risk) and the (Shared Socioeconomic Pathways Radiative Concentration Pathways) SSP-RCP scenario, SSP1-1.9 (focusing on physical risk). These pathways help us understand how transition and physical risks may directionally impact the world and economic setting in which we operate.

#### Focus on business integration and innovation

Business integration is key to our sustained resilience. Liberty Mutual is continuing to evolve our business structure to best meet the needs of our customers and the market, and we are proud to have developed robust sustainability and risk governance structures that have evolved to ensure we collaborate and bring the right expertise to each risk amidst business changes. Our emphasis on a sustainable underwriting risk framework and addressing sensitive topics underscores our commitment to managing risks today while assisting customers in navigating opportunities for a more sustainable future. The Office of Sustainability also continues to partner with Global Risk Solutions (GRS) sustainability and other business leaders to ensure that Liberty Mutual's Climate Strategy is reflected within individual business strategies. As detailed further in risk management, our Enterprise Risk Management team also continues to advance research in partnership with our business, to ensure that our products and services are informed by the latest science and aggregated data available.

As we navigate this dynamic landscape, we're driven by innovation. Solaria Labs, Liberty Mutual's innovation incubator, combines the mindset of a startup with our core capabilities and expertise to develop new products that address unmet customer needs and expand Liberty Mutual's protection offerings, to include the risks and opportunities posed by climate change, such as WeatherReady, detailed on [page 16](#).

#### Continued learning through Climate Activation Program

The impacts of climate change will touch every aspect of our business and operations. Integral to keeping our strategy resilient is expanding internal climate-related learning through the Climate Activation Program (CAP) to ensure that employees understand how their role intersects with the energy transition. In 2023, we rolled-out the Climate Activation Program (CAP) to create a common understanding across the organization of what climate change looks like, and the impact it has to our industry, our business and our customers. CAP goes beyond climate literacy, engaging Liberty Mutual employees through awareness, alignment and activation. Our objectives are twofold: to spark intrinsic motivation within our team to learn and grow, and to promote a growth mindset. We believe that through collaboration and innovation, we can navigate this complex landscape and contribute to a more sustainable future for generations to come.

Throughout the year we worked to extend CAP across levels and geographies, tailoring the three-module program to provide foundational training to approximately 300 senior leaders within Liberty Mutual across eight countries. We also educated external partners at the MIT Climate and Sustainability Consortium, which focuses on collaborative academia-industry initiatives to drive transformative solutions addressing real-world climate and sustainability challenges.

This program solidified individual understanding and empowered action, by focusing on:

- Making connections between policy and geopolitics on climate transition pathways**  
 Participants engaged with real-world examples and data, transforming abstract concepts into tangible realities.
- Promoting cross functional learning**  
 Collaborative discussions fostered deeper comprehension and facilitated the development of shared solutions.
- Identifying how individuals can play a role in supporting the transition**  
 Clarified how each employee contributes to Liberty Mutual's climate goals, fostering a sense of ownership and responsibility.



- **Moving beyond compliance**

Emphasized leveraging climate challenges to gain a competitive advantage, promoting proactive and strategic action.

- **Accessing resources and support**

Directed participants to available tools and expertise within Liberty Mutual, empowering them to tackle climate challenges effectively.

- **Personal learning journeys**

CAP encouraged ongoing knowledge acquisition and championed climate action within each individual's area of expertise.

By establishing buy-in and ownership of climate knowledge, CAP seeks to translate learning into concrete action, building on our strategy pillar "Inform and Advocate on Adaptive Solutions" (see [page 16](#)). Looking ahead to 2024, our focus is on scaling CAP organization-wide, embedding climate considerations into day-to-day interactions and activities. We aim to evolve the program with a focus on underwriting for key communities within GRS to continue to advance the resilience of our strategy.



# Risk management



As a property and casualty insurer, risk management is at the core of our business. By focusing on both physical and transition risks, our organization identifies, manages and monitors ongoing and potential impacts on our business.



### 4A. Describe the organization's processes for identifying and assessing climate-related risks.

As a property and casualty insurance company, analyzing, preparing for and responding to risk is at the heart of what we do every day. Our business serves to help our policyholders understand and mitigate material risks, including climate-related risk.

Liberty Mutual has twenty-seven established Enterprise Risk Management (ERM) key risks, which are grouped into seven categories for the purpose of ERM reporting: (1) Capital / Economic, (2) Market, (3) Catastrophe (CAT) Underwriting, (4) Attritional Underwriting, (5) Credit, (6) Operational and (7) Talent. These key risks are defined and organized in a manner that is consistent with how management views and manages risks across the organization.

Climate change is a cross cutting risk impacting different areas of an organizations' risk profile. As such, in assessing how climate-related risks affect the seven key risk categories, Liberty Mutual is aligned to the recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD) and considers physical and transition risks as the two main drivers of financial impact for climate-related risk. While climate-related physical and transition risks may affect multiple of these categories and key risks, CAT Underwriting — specifically covering natural catastrophes — presents the greatest potential severity for realized financial loss within a calendar year.

#### Physical risks

Physical risks resulting from climate change can be event driven (acute) or longer-term shifts (chronic) in climate patterns.

##### Examples:

- Acute: Increased severity of extreme weather events
- Chronic: Long term shifts like sea level rise or chronic heat waves

#### Transition risks

Transitioning to a lower-carbon economy may entail policy and legal, technological and market changes to address mitigation and adaptation requirements related to climate change.

##### Examples:

- Policy: Litigation risk, policies related to carbon pricing or energy efficiency
- Technology: Emerging technologies like renewable energy, battery storage and carbon capture
- Market changes: Shifts in supply chain and demand for certain commodities, products and services

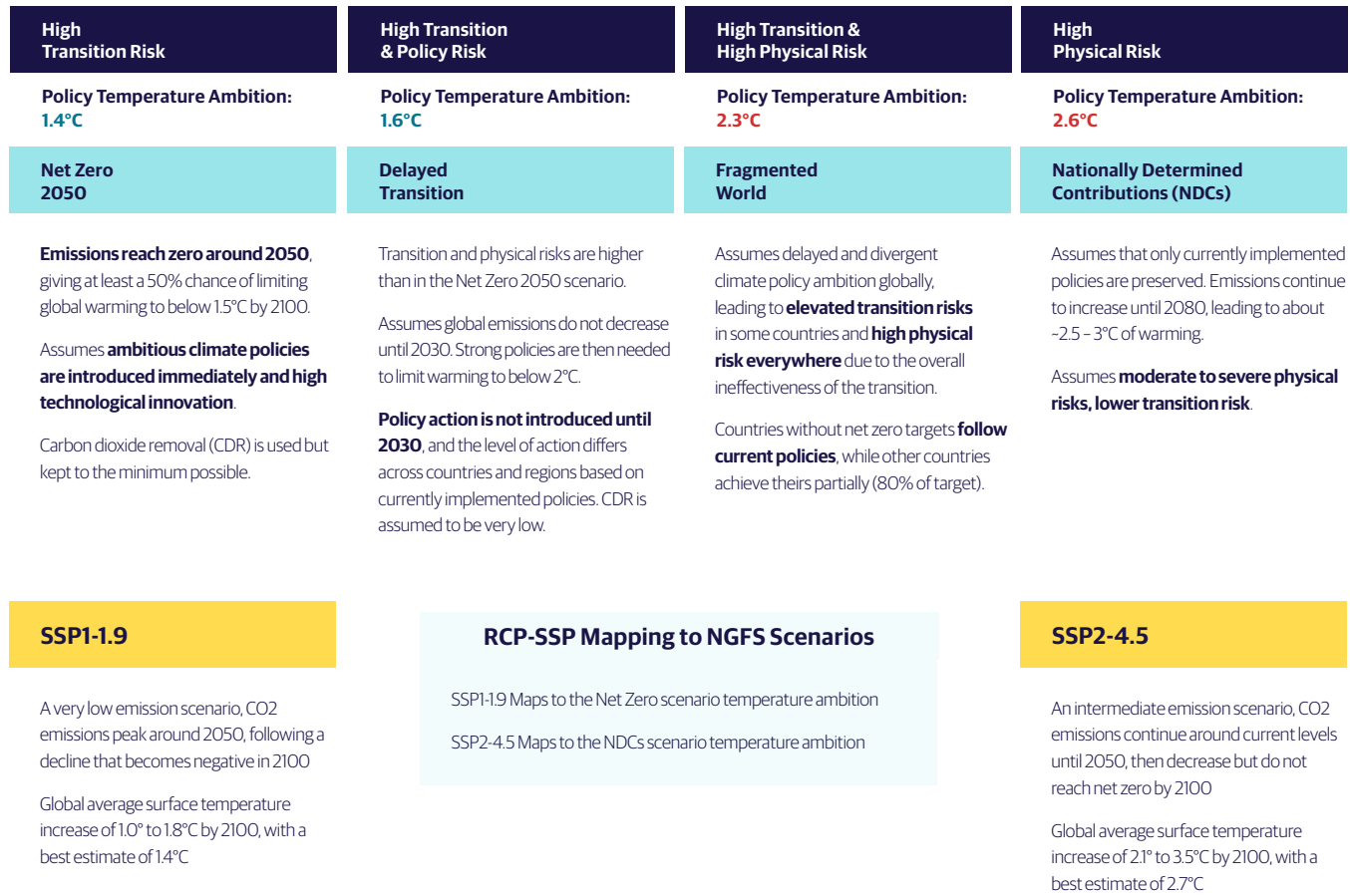
#### Updating climate scenario analysis

In 2023, we updated our climate scenario framework to include four of the seven scenarios published by Network for Greening the Financial System (NGFS) including Net Zero 2050, Delayed Transition, Fragmented World and Nationally Determined Contributions (NDCs) portrayed in Figure 3. We've chosen to concentrate on these four scenarios due to their diverse transition narratives and impacts, offering realistic routes for an orderly or disorderly shift to a low-carbon economy and illustrating potential outcomes if global climate goals are not achieved.

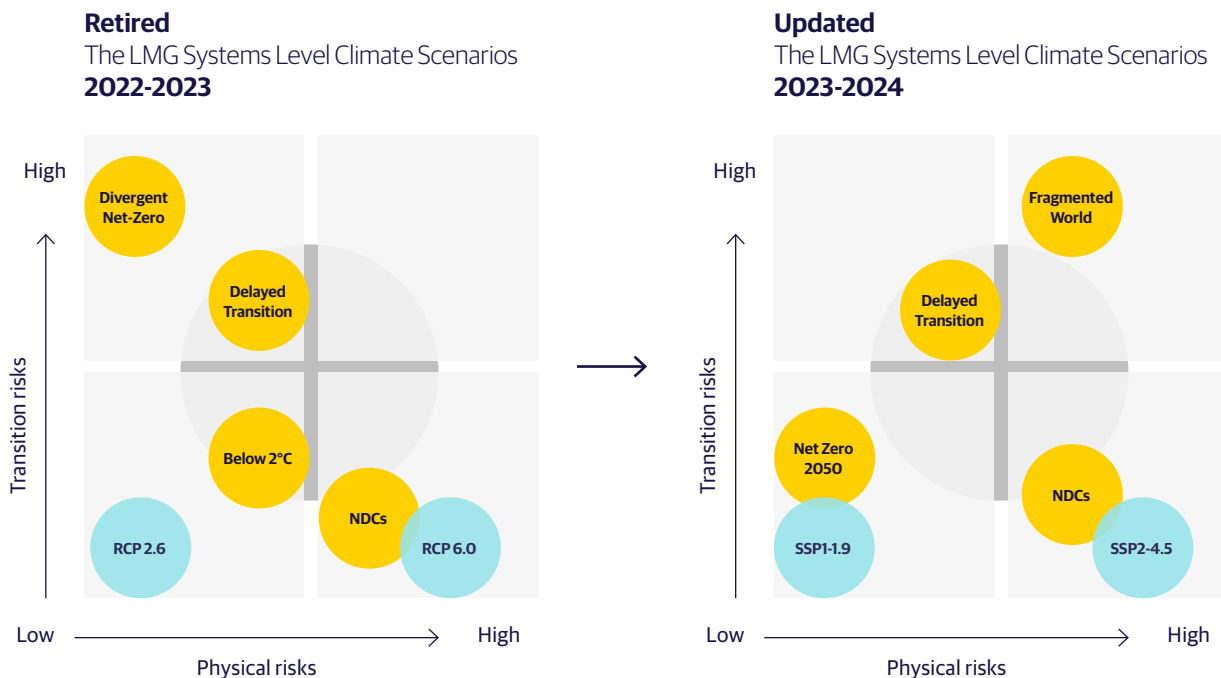
In our analysis, we focus on system-level results from two "stress scenarios" that reflect policy temperature ambitions below 2°C: Delayed Transition and NDCs. The Delayed Transition scenario depicts the impacts of minimal global coordination and delayed climate ambition, while the NDCs scenario reflects the current trajectory based on existing climate policies and targets. However, as catastrophic physical hazards relevant to property insurers are not adequately captured by existing models, we supplement these models with our view of climate physical risks, as our business is primarily impacted by physical catastrophe risks.



Figure 3. Liberty Mutual Climate Scenario Framework



Sources: Scenario framework based on the NGFS 4th scenario vintage and IPCC 6th Assessment.



Note: Network for Greening the Financial System (NGFS) Framework used as a foundation. Graphic is for illustrative purpose only.



## Approach to identifying and assessing physical risk

As a property and casualty insurer, identifying and assessing extreme physical risks are core functions for Liberty Mutual. We take a data-driven approach, and ensure our data is aligned with the latest and most robust research available. We follow a four-pillar strategy to enable continuous progress toward capturing and quantifying climate risk to our organization:

### 1. Prioritize by science and materiality

Climate change impacts introduce a range of risks that directly affect property. To assess these risks, we use a prioritization framework that is guided by underlying science and accounts for potential repercussions for our book of business. Liberty Mutual's high-priority perils are hurricanes, floods and wildfires. Beyond these, we monitor scientific literature regarding other perils, like tornadoes, hail, extratropical storms and winter storms, to prepare to act should they attain a higher level of combined risk and impact.

### 2. Invest in data quality to differentiate from peers

Liberty Mutual has made substantial investments in geospatial analytics to assess the characteristics of our underlying exposure data. High quality location information is a critical part of catastrophe management, particularly for high resolution perils like flood that are experiencing climate-related changes in risk. We also continually invest in upgrading our understanding of hazards. A notable example of this is the ongoing progress in upgrading our hazard tool (see [page 23](#)).

### 3. Focus on sub-perils that drive loss

Our approach to risk management extends beyond merely identifying hazards influenced by climate shifts. Not all changes in hazard result in material loss impacts, so we place a deliberate emphasis on the specific components of a hazard that drive loss. By focusing on components of the hazard that drive impact, we not only identify targets for deeper scientific research, but also prioritize specific sub-perils for action. For example, an emerging body of literature has found that wind-driven fire drives a disproportionate amount of wildfire losses, so assessing that subset of fire risk is particularly useful.

### 4. Develop actionable metrics for the business

We recognize the imperative of translating climate risk assessments into tangible actions. One of the ways we do this is by integrating operational project outcomes into metrics used for gauging risk appetites within the business. For example, this year we updated our view of hurricane risk

assessment, incorporating the latest scientific insights on climate change. This will be integrated across the business through the Liberty View of Risk and our standardized catastrophe modeling process and metrics. Catastrophe model adjustments are incorporated into Liberty Mutual's routine internal financial reporting schedule at a minimum of twice annually.

To bolster our understanding of climate-related physical risks, we collaborate with expert organizations such as the National Oceanic and Atmospheric Administration (NOAA), Massachusetts Institute of Technology (MIT) and the National Center for Atmospheric Research (NCAR). For more detail on partnerships, see our response to Strategy on [page 13](#).

## Advancing research on high-priority perils

We continue to invest in research on high-priority perils, to ensure that our risk management tools are informed by the best available data. In 2023, we advanced new insights on tropical cyclone, flood and wildfire risk to shape our current models.

### Hurricane frequency

We partnered with Colorado State University to reevaluate our perspective on hurricane frequency in the United States. We incorporated last century's climate variability into our catastrophe model, focusing on aerosol impacts. Studies show that late 20th-century human-caused aerosol emissions reduced Atlantic hurricane activity during that period. As catastrophe models leverage the historical record and this trend is unlikely to reoccur, we established a climate-conditioned historical baseline to provide a more accurate representation of today's risk landscape.

### Flood risk

We conducted analysis of peer-reviewed literature, which showed changing flood risk across Europe, both in data observed from river gauges and in projections driven by climate models. Given that our existing model was based on static data, we saw the need to adjust the model to account for the impact of climate change. Based on the literature, we developed frequency adjustment factors to reflect the regional impacts, which are now incorporated into our catastrophe modeling as part of the Liberty View of Risk for Central European floods.



### Wildfire risk

We enhanced wildfire risk tools to assess exposure in areas prone to catastrophic-scale wildfires, particularly those driven by wind. Despite constituting only 12% of the burned area, wind-driven wildfires account for 60% of property loss in the western US.<sup>2</sup> The existing wildfire hazard tools that are used for underwriting and pricing identify areas with high potential for wildfires originating from combustible vegetation. By including meteorological factors like high winds, we can enhance our capabilities in managing portfolio-scale wind-driven wildfire risk. By acknowledging the link between rising temperatures, drier vegetation environments and wildfire occurrence, we have conducted forward-looking tests to understand where our exposure concentrations could be susceptible to catastrophic-scale wildfires both in the present and the future.

### Tropical cyclone frequency in Australia

We are undergoing an update for the Australia Tropical Cyclone model to incorporate a new climate change-induced view of risk. The guidance provided by the IPCC AR6 report suggests a diminishing frequency of tropical cyclones in the Australian region. However, the interpretation of these trends is complicated by significant inhomogeneity in the observed record and climate model biases in regions strongly influenced by the El Niño-Southern Oscillation. The complexity of modeling this peril is intensified by the sparse distribution of exposure along Australia's northern coastline with localized high-value industrial facilities. While large loss events are anticipated to be infrequent, their potential severity necessitates exceptional caution to ensure our view is scientifically rigorous, relying more on scientific data than on our own loss history.

### Chronic physical risk

To further understand chronic physical risks, we utilize advanced modelling tools following a variety of Shared Socioeconomic Pathways – Radiative Concentration Pathways (SSP-RCP) scenarios, included in Figure 4 below, to analyze regional changes in temperature and precipitation. These models couple different policy and economic decisions with their downstream effects on chronic risks, allowing us to understand Liberty Mutual's exposure. Physical risk scenarios were selected to pair with transition risk modelling to understand possible drivers in GDP impacts in various NGFS scenarios within higher physical risk or higher transition risk stress scenarios. While the Integrated Assessment Models (IAMs) used to generate the NGFS pathways offer a more granular view of energy system and economic changes, the SSP-RCP scenarios based on CMIP6 data allow us to examine physical risk variables not directly included in the NGFS data set, such as precipitation. By pairing the observations from both analyses, we are better able to comprehend the totality of impacts that may be experienced under different climate conditions.

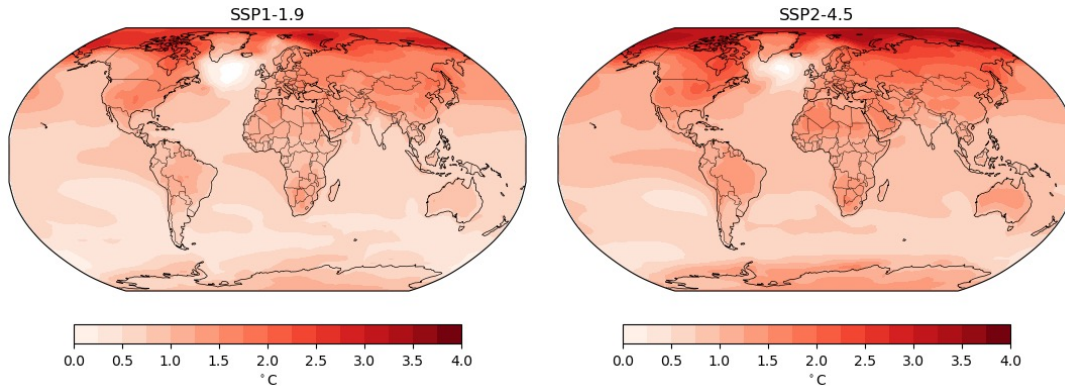
<sup>2</sup> Abatzoglou et al., 2023



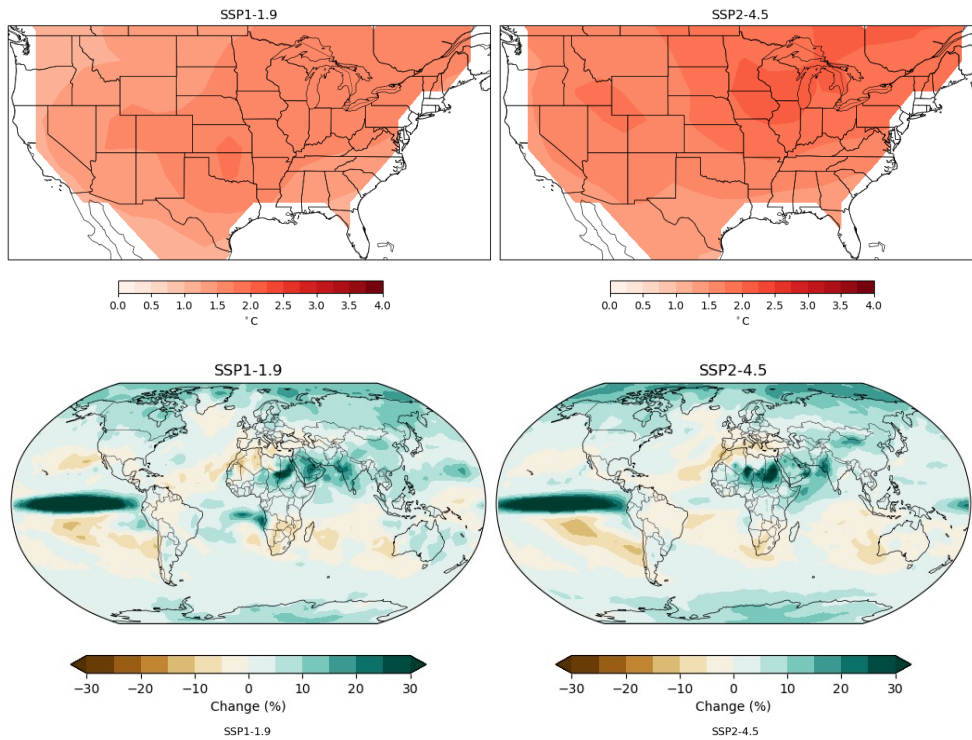


**Figure 4.**  
**Analyzing regional changes in temperature and precipitation**

Coupled Model Intercomparison Project Phase 6 (CMIP6) multi-model mean temperature change (°C) in two different Shared Socio-economic Pathway (SSP) scenarios (2030 – 2050) relative to a historical baseline (1990 – 2010). Scenarios were selected to reflect higher physical risk (SSP2-4.5) and higher transition risk/lower physical risk (SSP1-1.9).



Coupled Model Intercomparison Project Phase 6 (CMIP6) multi-model mean precipitation change (% change in mm/day) in two different Shared Socio-economic Pathway (SSP) scenarios (2030 – 2050) relative to a historical baseline (1990 – 2010).



We expect that changes in chronic physical risks can directly affect acute physical risks. Rising global average temperatures can have considerable impacts on current weather patterns, presenting opportunities for us to assess the uncertainties associated with climate-related risks. As an example, the combination of altered rainfall patterns and escalating temperatures is transforming environments conducive to

wildfires, amplifying the risk in regions already susceptible to such disasters. In particular, increases in temperature may drive increased burn areas in wildfires. While wildfires are challenging to directly model in global climate models due to their limited spatial and temporal extents, identifying chronic temperature changes can help us target where wildfire hazard may be sensitive to changes in the future.





### Physical risks in our investments

In assessing climate-related physical risks within Liberty Mutual's investment portfolio, we are working to combine our in-house natural catastrophe modeling expertise with our unique investment perspective and asset management goals.

This approach leverages our physical risk modeling expertise from the insurance side of the business to pilot guidance datasets encompassing Liberty Mutual's key perils which can be used to augment traditional data sources that are used within investment portfolio management. By incorporating a more comprehensive understanding of physical risks across our investment portfolio, we have taken an initial step toward ensuring that our investment portfolio is well-positioned for future physical climate impacts.

### Approach to transition risk

Liberty Mutual's approach to identify and assess climate-related transition risks combines a systems and a portfolio level approach.

- **Systems-level approach**

We assess macroeconomic, policy and legal, reputational and technological risks (with regional and sector insights) over five-, 10-, 15-, 20- and 30-plus-year time horizons, recognizing that quantitative approaches do not yield meaningful insights between 30- and 50-year time horizons. In 2023, we updated our enterprise climate scenario framework to reflect the updated NGFS scenarios (see [page 21](#)).

- **Portfolio-level approach**

In 2021, we conducted a climate scenario analysis which found that climate transition risk has low impacts on Liberty Mutual Investment's portfolio holdings over the near-term, and it increases moderately over a 15-year time horizon. Notably, these results assume that there is no active management of the portfolio over a 15-year period. LMI actively manages our portfolio and would seek to reposition it over time to address evolving climate risks.

Since our seminal portfolio-level analysis in 2021, we have tailored the analysis to jurisdiction-specific portfolio-level climate stress tests to comply with local regulatory reporting requirements. Our approach computes climate stress profit and loss (P&L) annually based on updated NGFS scenarios. We utilize an external vendor's climate stress models and data in this exercise, covering public corporate bonds and equity, which focuses on scenario-conditioned carbon price to imply transition risk. We process illiquid investments' climate risk by proxying to public equivalents.

These more granular portfolio-level analyses have informed additional insights for identifying and assessing climate-related transition risks associated with our portfolio holdings. We also continue to research ways in which we can advance our climate risk analytics capabilities. We are aiming to fill a gap in existing research by looking at insurance portfolio impacts from the climate transition. We have developed a science-based methodology based on academic and industry sources to map and measure transition risk impact to our underwriting portfolios and are currently working to scale our pilot across the global enterprise.

### The importance of keeping up with the latest scientific advancements.

Transition planning is a dynamic exercise that relies on a constant refresh of data and analysis, incorporating real-world developments. Staying up-to-date with the latest scientific advancements and understanding how leading scenario narratives and their underlying models have changed is critical to the pragmatic integration of this work into business strategy. For example, in 2023, the Network for Greening the Financial System (NGFS) revised its scenario framework, introducing 'Low Demand' and 'Fragmented World' scenarios, while removing 'Divergent Net Zero' due to its improbability. The 'Net Zero 2050' scenario now accounts for increased emissions and the complexities of achieving a 1.5°C warming limit, classifying it as disorderly.

Since we first conducted our climate scenario analysis exercise in 2020, Liberty Mutual has been dedicated to regularly updating our understanding of climate scenarios. In addition to staying current on scientific developments, we are also actively contributing to the development of climate scenario assessments, collaborating with leading organizations like NGFS.



### 4B. Describe the organization's processes for managing climate related risks.

We believe that insurance is a force for good and serves a dual role as both a mechanism for risk transfer and risk signaling. We understand the dynamic environment and stay risk-aware

#### Understanding the intersection of catastrophe management and climate risk: Q&A with Amy Wixon, Director of Corporate Catastrophe Management, Corporate ERM

**Q:** How does the Corporate Catastrophe Management team use climate data and insights to inform decision-making and ensure that Liberty Mutual is managing climate-related risk?

**Amy:** As part of Liberty Mutual's Enterprise Risk Management team, we view catastrophe risk holistically, and consider climate change as a key component of the risk that can impact our business and our customers. At a high level, we are focused on interpreting the evolving science, educating our organization and customers and devising methods and tools to test and assess likely impacts to inform overall exposure management and decision-making across the organization.

We participate in climate-related training, as part of the Climate Activation Program (CAP), to help advance company-wide understanding of the impact of climate change on our business and our customers.

rather than risk-averse. This belief shapes the way we proactively manage risks by using catastrophe models, integrating risk management into our business and monitoring emerging risks.

Several research projects were highlighted earlier in this document that represent the approach of following the science and adjusting our View of Risk accordingly. This knowledge is used to build risk management tools to assess developing risk and to help the business shape innovation and product design.

**Q:** How does your team ensure that you are using the latest science and understanding of climate change to shape Liberty Mutual's understanding of risk?

**Amy:** As part of catastrophe management and ERM across the organization, we have built an R&D function that is led by a climate scientist and that includes climate, atmospheric and environmental science and engineering expertise that provides the foundation for our understanding of climate change impacts, both physical and transition. These experts are engaged with the scientific and academic community through ongoing education and partnerships to stay up to date on the latest research and to advance our own initiatives. We also partner with internal experts, ranging from public policy to specific product lines, to ensure we are leveraging broad knowledge from across the organization.

The catastrophe management function across Liberty Mutual works collaboratively to evaluate third-party tools and develop or adjust them for use with a critical eye for what is reasonable given the state of the science and what will work for Liberty Mutual. We recognize that climate risk and our own understanding continues to evolve, and that it is an ongoing balancing act of keeping up with but not front-running the science that's available.



### Managing risks through catastrophe models

We conduct assessments to evaluate the vulnerability of our portfolios, geographic locations, business divisions and product segments to natural disasters like hurricanes, earthquakes and severe weather phenomena. To manage the potential adverse impact of catastrophes, whether natural or man-made, on our underwriting and financial results, we employ a strategy that incorporates diverse modeling techniques, stringent underwriting controls and strategic reinsurance placements. This involves analysis of historical weather data and an assessment of the vulnerability of our assets and operations to such events.

To manage climate-related physical risks, we implement disaster response plans and transfer risk through insurance and reinsurance. Our primary tool for assessing the potential financial impact of natural catastrophe-related risks is catastrophe modeling. We utilize the latest catastrophe loss simulation models from reputable third-party specialists like Verisk Extreme Event Solutions and Moody's Risk Management Solutions, in addition to internally developed modeling and analysis tools, supplementing them regularly with up-to-date scientific information on severe weather perils and our own loss experience.

For the acute risks that are captured in catastrophe models, we apply a flexible toolbox of strategies depending on the level of confidence in forward-looking impacts on the peril. Where confidence is highest, such as sea level rise, we run forward-looking scenarios. For example, a project examining the effects of sea level rise on storm surge in our portfolios used NOAA's Intermediate sea level scenario to project coastal flood risk out to 2035 and 2050. However, for many of our hazards, uncertainty is higher within scenarios or time frames prior to 2050. In those cases, such as hurricane frequency, we leverage alternative approaches, such as reverse stress testing, that allow us to identify and monitor a wide range of impacts to our book of business, rather than relying on a single point estimate or range from a scenario.

Catastrophe loss simulation models play a crucial role in our underwriting process, aiding in the development of risk selection guidelines and contributing to the establishment of pricing differentials for individual risks and program rate structures. We integrate the output from these models into our ongoing risk management efforts, ensuring an effective management approach for our natural catastrophe exposure portfolio. As part

of our ERM program, we can conduct stress testing to facilitate understanding of the capital or liquidity impacts of various deterministic stress scenarios or combinations thereof, ensuring that our current portfolio adheres to established tolerances.

At Liberty Mutual, we establish both gross and net tolerances for natural catastrophe risk, managing both direct underwriting exposure and group-wide retention of risk. Occurrence tolerances help manage exposure concentration related to a single large event, while aggregate tolerances manage the potential exposure to an accumulation of losses from various events throughout the year. Utilizing measures such as Probable Maximum Loss (PML) and Conditional Tail Expectation (CTE), which are Value-at-Risk (VaR) and Tail Value-at-Risk (TVaR) measures, respectively, we assess and model our natural catastrophe exposures. These assessments are conducted semi-annually, with modeled losses evaluated relative to respective tolerances. We monitor and evaluate the limits for specific exposures, such as regional-level exposures, and, when necessary, develop mitigation plans to align with tolerance levels and address adverse trends.

### Managing risk through integrating climate related issues in the underwriting process

Insurance protects and prepares for the unexpected through keen risk awareness and mitigation. At Liberty Mutual, we've been entrusted to insure the most complex assets on the globe, and the most influential enterprises sustaining local communities. We are embedding sustainability, including climate issues, into our decision-making processes and underwriting strategy to ensure that we remain a stable, adaptive insurer, always risk aware and looking ahead. Being proactive will keep us ahead of the evolving risk landscape, supports developing a robust portfolio with improved business performance, and better positions us to help our customers de-risk their business and build resilience.

Through our commercial insurance business, we:

- Apply a sustainable underwriting risk framework, a consistent set of material environmental, social and governance considerations relevant across our portfolio, including climate. This year we bolstered this framework with insights from a line of business specific materiality assessment and built tools to bring relevant insights to our underwriters so that they can better assess risks and opportunities.



- Manage a set of enhanced and expanded sensitive topics that warrant additional guidance where we perceive elevated reputational, commercial and regulatory risks, including those linked to climate-related factors. We formed a council to oversee this work, which includes key underwriting, risk, sustainability and legal leaders. Topics are identified through diverse sources including product boards, underwriting referrals, public affairs, legal, investments and our own proprietary analysis.

### Managing risks in our investments

Liberty Mutual Investments integrates sustainability, including climate-related issues, into the investment process to provide investors with an expanded information set to aid investment research, support portfolio returns and lessen volatility over time. Our sustainable integration efforts span both our global fixed income and private investments and utilize internal and external resources to supplement our robust investment process.

### Further understanding climate litigation risk

In response to the escalating number of climate-related lawsuits globally, we are monitoring and exploring litigation risks associated with climate change.

In 2023, we enhanced our organizational understanding of climate-related litigation. We developed an internal framework for identifying types of climate litigation and potential impact on business lines. We socialized this through our risk management and sustainability governance structures and are including this topic in our Climate Activation Program. We are also working with partners to understand the evolving potential impacts on our business and our customers.

At Liberty Mutual, we view climate-related litigation as being, at least in part, driven by climate-related transition and physical risks. Further, third-party, climate-related litigation may be categorized by disputes related to: (1) Alleged contribution, causation and/or failure to mitigate climate change; (2) Alleged physical consequences of climate change and/or failure to adapt to those consequences; and/or (3) Alleged breaches of laws, regulations and/or legal duties associated with climate change.

## 4C. Describe how processes for identifying, assessing, and managing climate related risks are integrated into the organization's overall risk management.


Through Liberty Mutual's Enterprise Risk Management (ERM) teams and the Climate Council, we consider the impact of climate-related risk at both the enterprise level and within individual business units.

Liberty Mutual's ERM approach emphasizes the identification and quantification of material exposures, effective communication and management of these exposures throughout the company, and the development and implementation of strategies to mitigate identified risks when deemed necessary. Strong governance ensures that there is an open-line of communication with the highest levels of management for identifying, assessing and managing climate-related risks.

The ERM Executive Committee, chaired by the CEO, holds the responsibility for overseeing the development of processes to aggregate, evaluate and manage group-wide exposures across the organization, and provides guidance on the implementation of ERM processes. A more detailed overview of Liberty Mutual's ERM function is included in the Governance section (see [page 8](#)).



# Metrics & targets



In our commitment to transparency and accountability, we present the key metrics we use to assess and manage relevant climate-related risks and opportunities. These include both financial and non-financial metrics and encompass our underwriting and investment portfolios, as well as our operational footprint. Our disclosures are informed by TCFD, Sustainability Accounting Standards Board (SASB) framework for the insurance industry, regulatory surveys and industry benchmarking.



## 5A. Describe metrics used by the organization to assess climate-related risks and opportunities.

We believe that quantifiable metrics and targets are crucial for tracking our progress and ensuring our commitment to advancing the energy transition and Liberty Mutual's climate strategy. In addition to reporting our data annually through the TCFD report, we regularly review and update these metrics to reflect evolving best practices and disclosure frameworks, regulatory requirements and our own strategic objectives.

### Energy transition investments

In 2023, Liberty Mutual Investments managed approximately \$100 billion in capital<sup>3</sup> across global fixed income and private investments, including asset classes such as private equity, venture capital, real estate and private credit. Liberty Mutual is a UNPRI signatory and maintains a responsible investment policy. Its overall asset allocation framework reflects multiple considerations including, but not limited to, compounding capital, maintaining adequate liquidity and minimizing risk. Within our overall investment approach we have been making a more pronounced focus on supporting emerging investment opportunities and going beyond traditional renewable energy projects, as noted in Table 1.

|   | 2021            | 2022            | 2023            |
|---|-----------------|-----------------|-----------------|
| Total investments in renewable energy <sup>4</sup>            | \$1,468 million | \$1,274 million | \$1,231 million |
| Total investments in energy transition solutions <sup>5</sup> | \$287 million   | \$388 million   | \$810 million   |

<sup>3</sup> As of 12/31/2023

<sup>4</sup> In 2023, fixed maturities and public equities of US\$383 million, LP, LLC and other equity method investments of US\$583 million and unfunded commitments of US\$265 million were included. In 2022, fixed maturities and public equities of US\$461 million, LP, LLC and other equity method investments of US\$446 million and unfunded commitments of US\$368 million were included. In 2021, fixed maturities and public equities of US\$506 million, LP, LLC and other equity method investments of US\$406 million and unfunded commitments of US\$556 million were included.

<sup>5</sup> Includes unfunded commitments of US\$358 million (2023), US\$247 million (2022), US\$221 million (2021).

## Measuring progress against our 2019 Coal Policy

In 2019, Liberty Mutual established a global policy on coal underwriting and investing. We have met the investments goals for this policy and have nearly met those related to global underwriting.

As detailed throughout this report, we recognize that the energy mix and demands for every region and community may look different, including the continued need for traditional energy sources, and we are committed to making sure the climate transition includes everyone. We continue to take a pragmatic approach and believe that as new energy sources are developed at scale, demand for new and expanded traditional energy projects will decline based on market forces and the evolution of public policy.

**Table 2  
Coal Policy Progress**

|                    | Underwriting   | Investments   |
|--------------------|--|---|
| Commitment         | No longer underwrite risk for companies that have >25% of exposure from coal extraction and/or produce energy from thermal coal.   | No longer make new investments in companies that generate more than 25% of their revenues from thermal coal mining or utility companies generating more than 25% of their electricity production from thermal coal.<br><br>Divest existing investments in companies that exceed this threshold by 2023. |
| Progress / results | Since establishing our global coal policy, we have nearly met our goals related to global underwriting. For the remaining handful of insurance policies necessary to meet this goal, we are actively managing the non-renewals or the phase-out plans for multi-year contracts, which we are bound to uphold until their expiration dates. | LMI successfully exited all positions above our policy thresholds since September 2023 and established appropriate compliance and portfolio management practices to maintain continued adherence to the policy.   |





## Environmental risk exposure metrics

In the assessment of climate-related risks and opportunities, Liberty Mutual employs a comprehensive set of environmental risk exposure metrics. These metrics are crucial to understanding the exposure to potential climate-related losses.

Liberty Mutual closely monitors changes to the frequency and severity of weather-related natural catastrophes, as well as changes in exposure in our insured portfolio, in evaluating the company's exposure to climate risk. These factors along with a range of assumptions beyond those embedded in standard models (using Liberty Mutual's historical data, third party tools, new scientific research and technologies and input from expert consultants) enables the company to build a custom modeled view of loss, the Liberty View of Risk.

One key aspect of this catastrophe management approach is the regular monitoring of catastrophe exposures through metrics such as Probable Maximum Loss (PML). This metric, among others, enables the company to assess vulnerability and exposure to climate related risks, allowing for the refinement of risk management strategies proactively. The table below provides the probabilities that estimated catastrophe losses from a single hurricane or earthquake event, occurring in a one-year timeframe, will equal or exceed the indicated loss amounts after reinsurance and net of tax based on the company's view of risk using proprietary and third-party catastrophe models as of December 31, 2023. Estimated losses comprise claims and allocated claim adjustment expenses (but exclude unallocated claim adjustment expenses), net of reinsurance recoveries and reinstatement premiums.

**Table 3**  
Probabilities that estimated catastrophe losses from a single hurricane or earthquake event, occurring in a one year timeframe, will equal or exceed the indicated loss amounts after reinsurance and net of tax based on the company's view of risk using proprietary and third-party CAT model as of Dec 31, 2023

| Likelihood of Exceedance (Occurrence) <sup>6</sup> | Dollars (in millions) North America |                | Percentage of total policyholders equity as of 12/31/2023 North America <sup>7</sup> |                |
|--|-------------------------------------|----------------|--|----------------|
|  | Hurricane Net                       | Earthquake Net | Hurricane Net  | Earthquake Net |
| 1 in 50 Year PML (2.0%)                            | 915                                 | 796            | 3.3%   | 2.8%           |
| 1 in 100 Year PML (1.0%)                           | 1,009                               | 938            | 3.6%   | 3.3%           |
| 1 in 250 Year PML (0.4%)                           | 1,452                               | 1,213          | 5.2%   | 4.3%           |

**Table 4**  
Estimated Ultimate Catastrophe Losses, Net of Reinsurance and inclusive of reinstatement premium, by Accident Year evaluated as of December 31, 2023. (in \$ millions)

| Peril Category                            | Accident Year 2023 | Accident Year 2022 | Accident Year 2021 |
|---|--------------------|--------------------|--------------------|
| Tornado, Hail and Wind                    | 3,982              | 1,646              | 1,259              |
| Winter Storm                              | 195                | 699                | 843                |
| Tropical Storms/Hurricanes                | 131                | 457                | 767                |
| Europe Floods                             | 85                 | 103                | 309                |
| Wildfires                                 | 129                | 9                  | 124                |
| Earthquake                                | 129                | -                  | -                  |
| Other <sup>8</sup>                        | 34                 | 481                | -                  |
| <b>Net Catastrophe Losses<sup>9</sup></b> | <b>4,685</b>       | <b>3,389</b>       | <b>3,046</b>       |

<sup>6</sup> The probabilities in the table represent the likelihood of losses from a single event equaling or exceeding the indicated loss amount in a one-year timeframe. The 1 in 100-year PML refers to a 1% chance of a loss equaling or exceeding the indicated amount. Also, the modeled loss represents the single event occurrence perspective and does not reflect the aggregation of multiple events that can occur in a single year timeframe.

<sup>7</sup> The percentage of total policyholders' equity is calculated by dividing the indicated loss amounts by the total policyholders' equity less unrealized gains and losses on certain investments in debt securities, net of tax and related deferred acquisition costs, as of December 31, 2023.

<sup>8</sup> Other location includes the Sudan conflict and Turkey/Syria earthquake for AY 2023.

<sup>9</sup> Net Catastrophe Losses include recoveries on the CAT aggregate covers in AY 2021 and AY 2022.



Table 4 above details estimated ultimate catastrophe losses, net of reinsurance and inclusive of reinstatement premium, incurred in accident years 2021, 2022 and 2023 as of December 31, 2023. Table 5 shows the estimated ultimate catastrophe losses as initially reported for those accident years in Liberty Mutual’s MD&A. Additionally, subsequent favorable development, which represents the difference between the initial reported loss and the current estimated ultimate, is displayed. Table 6 details the estimated ultimate catastrophe losses by major geographic region.

Liberty Mutual defines a catastrophe as natural events, civil unrest or terror events exceeding \$25 million in estimated ultimate losses, including loss adjustment expenses, net of reinsurance, and before taxes, aggregated across the business for both U.S. and international events. Catastrophe losses, where applicable, include the impact of accelerated earned catastrophe premiums and earned reinstatement premiums.

Liberty Mutual recognizes that catastrophe modeling continues to evolve and available models reflect varying levels of maturity and sophistication. As a result, Liberty Mutual regularly evaluates and incorporates the most up to date scientific advances in the estimation of the company’s natural catastrophe loss exposure.

**Table 5**  
**Estimated Ultimate Catastrophe Losses, Net of Reinsurance and inclusive of reinstatement premium, by Accident Year evaluated as initially reported. (in \$ millions)**

| Peril Category   | Accident Year 2023 | Accident Year 2022 | Accident Year 2021 |
|--|--------------------|--------------------|--------------------|
| Net Catastrophe losses as originally reported at the end of each accident year | 4,685              | 3,552              | 3,057              |
| Favorable development in subsequent calendar years                             | -                  | (163)              | (11)               |

**Table 6**  
**Estimated Ultimate Catastrophe Losses by Region, Net of Reinsurance and inclusive of reinstatement premium, by Accident Year evaluated as of December 31, 2023. (in \$ millions)**

| Region                                     | Accident Year 2023 | Accident Year 2022 | Accident Year 2021 |
|--|--------------------|--------------------|--------------------|
| North America                              | 4,327              | 2,652              | 2,993              |
| Europe                                     | 101                | 640                | 309                |
| Latin America                              | -                  | -                  | -                  |
| Asia Pacific                               | 93                 | 103                | -                  |
| Other <sup>10</sup>                        | 163                | -                  | -                  |
| <b>Net Catastrophe Losses<sup>11</sup></b> | <b>4,685</b>       | <b>3,389</b>       | <b>3,046</b>       |

<sup>10</sup> Other Category includes losses for Ukraine invasion in AY 2022 and Sudan conflict in AY 2023.

<sup>11</sup> Net Catastrophe Losses include recoveries on CAT aggregate covers in AY 2021 and AY 2022.





## Operational footprint

We have continued to reduce our operational carbon footprint and expand our waste management efforts, while office occupancy and business travel increased in 2023. To reduce our operational emissions, we leverage efficiencies and a data-driven approach to real estate portfolios, fleet usage and business travel.

### Building operations

We are making our buildings more efficient by focusing on reducing energy consumption and optimizing operations.

**Table 7**  
**Energy Consumption**

|                   | 2023    | 2022    | 2021    |
|-------------------|---------|---------|---------|
| Electricity (MWh) | 104,914 | 126,027 | 149,975 |

Our Boston headquarters was awarded the First Place 2024 American Society of Heating, Refrigerating and Air-Conditioning Engineers Technology Award in recognition of outstanding achievement in the design and operation of energy efficient buildings. The campus also won the 2023 Massachusetts Save Climate Leader Award for efforts to increase energy efficiency and reduce emissions. Additionally:

- In the U.S., three of our owned buildings have LEED certifications and two have Energy Star certifications.
- Our Plano, Texas building has reduced its energy consumption by 8% by installing an energy-efficient cooling system and making continuous energy efficiency improvements. It also sources a majority of its electricity from renewable power generation.
- In Singapore, our team conducted a detailed workplace scenario analysis to optimize and reduce space. As a result, we shifted from a six-story building to a single floorplan.
- Our Asia-Pacific region selects high-efficiency buildings for its operations that have a National Australian Built Environment Ratings System (NABERS) rating for sustainability performance.
- In China, we lowered emissions significantly by reducing our office space footprint while simultaneously redesigning the spaces to enhance the employee experience.
- Our London office is BREEAM-certified complete with life cycle assessment and green energy supply.

## Waste reduction and recycling

We are taking action to lessen our environmental footprint by reducing the waste generated across our operations. Specific actions include:

- **Printing conservation:** Through Liberty Mutual's Print\$mart initiative (which captures printing activities both in-office and through remote work), total printed page volume in 2023 was 68% lower than 2019 levels. As a result, employees conserved 23 million gallons of water, saved 27,457 trees, and reduced GHG emissions by 1,144 tons.
- **Furniture reuse:** We donated 74,722 pounds of office furniture, which had a fair market value of \$220,815, to local social service agencies, nonprofits and schools.
- **Landfill diversion:** With most employees back in an office, our centralized waste programs in U.S.-owned buildings have significantly diverted significant waste from landfills. As employees are asked to sort waste into bins for recycling, compost and landfill bins, we're fostering a conscious disposal culture. In 2023, we diverted 65 tons of compost and 191 tons of mixed-recycling from our U.S.-owned facilities as well as 190 tons of electronics and 593 tons of office paper from our global operations.

### Fleet highlights

Around the world we work to ensure claims adjusters and other employees are mindful of their carbon emission by using fuel efficient vehicles. Our impact in 2023 over 2019 baseline levels includes:

- 47% reduction in miles driven
- 14% decrease in gallons consumed
- 9% reduction in CO2 emissions



## 5B. Describe Scope 1, Scope 2 and, if appropriate, Scope 3 Greenhouse Gas (GHG) emissions, and related risks.

Greenhouse gases (GHG) stemming from the utilization of fossil fuels stand as the primary catalyst for climate change. Our ongoing commitment involves actively contributing to the reduction of our environmental footprint by diminishing our reliance on these GHG-emitting resources and meticulously monitoring our progress.

At present, we systematically measure and disclose data on both Scope 1 and Scope 2 GHG emissions. Additionally, we track two distinct categories of Scope 3 emissions, namely waste generated from operations (pertaining to U.S. owned and operated facilities) and emissions resulting from business travel.

| Scope 1 CO2e emissions (MTCO2e)                |        |
|--|--------|
| 2023   | 30,162 |
| 2022   | 29,236 |
| 2021   | 29,699 |
| Scope 2 CO2e emissions (MTCO2e) location based |        |
| 2023   | 36,474 |
| 2022   | 40,530 |
| 2021   | 48,358 |
| Scope 2 CO2e emissions (MTCO2e) market based   |        |
| 2023   | 31,731 |
| 2022   | 36,791 |
| 2021   | 44,760 |
| Scope 3 CO2e emissions (MTCO2e) <sup>12</sup>  |        |
| 2023   | 46,240 |
| 2022   | 29,518 |
| 2021   | 8,638  |
| Total Scope 1&2 CO2e emissions (MTCO2e)        |        |
| 66,636   |        |

## 5C. Describe targets used by the organization to manage climate-related risks and opportunities and performance against targets.

We continue to work towards meeting our Scope 1 and 2 global greenhouse gas (GHG) reduction target of 50% by 2030 from 2019 levels. In 2023, we achieved a 4.5% reduction from 2022 levels, resulting in a cumulative 46% reduction from the 2019 baseline, contributing toward a low-carbon future.

To fulfill our GHG reduction objectives, we are actively reducing our operational carbon footprint. This includes enhancing operational efficiencies, identifying renewable energy opportunities across our real estate portfolio and leveraging key learnings from 2020 to increase emission reduction rates during the return-to-office transition. Furthermore, we are adapting to changing work dynamics, with a continued focus on the reimagination of the workplace as employees globally connect and collaborate in hybrid, in-office or work-from-home formats. This adaptability plays a crucial role in our overall reduction of GHG emissions. Our commitment to sustainability remains steadfast as we work towards a resilient and environmentally responsible future.

<sup>12</sup> In 2023, Scope 3 emissions is limited to Category 5 – Waste Generated in Operations for US owned and operated facilities, and Category 6 – Business Travel for global commercial air and ground travel, and employee mileage reimbursement for US and Canada based employees.



## Contact us

**For questions or comments regarding this report, please contact:**

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