

The State of Climate Adaptation and Resilience Investment:

Where We Are, Current Investor
Views, and Paths Forward

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GARI Global Adaptation &
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Notice

This paper is not intended to reflect a comprehensive view of adaptation and resilience investment landscape, nor to recommend specific solutions, but rather to serve as a report out of discussions of the GARI working group that may serve as content and context for other discussions in this emerging area of investment. The respondent population for the 2022 GARI survey reflects GARI participants and other stakeholders who demonstrated interest and commitment of time and effort to engage on this topic, and may not reflect the broader private investment community. Comments can be sent to: Chair@GariGroup.com

Disclaimer

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Foreword

Climate resilience and adaptation investment is an urgent and critical priority. Climate risks and impacts in 2022 alone have devastated Pakistan, California, Puerto Rico, and more, disrupting lives and livelihoods as well as natural resources and biodiversity. Climate “shocks” have become so frequent and severe that they call the question of whether “shock” can be applied to events that are becoming increasingly commonplace and seemingly inevitable. In addition to the unfolding humanitarian tragedy of climate change, impacts to physical assets, infrastructure, and business operations around the world are also challenging investors to accurately measure and manage these risks. At the same time, investors possess enormous financial resources that can be applied to scale up solutions and technologies to address the need for climate resilience and adaptation. Consequently, investors have an important role to play in helping to build resilience in the face of climate impacts and to incorporate climate risks in their investment decisions.

Investors can also drive a “Climate 2.0” perspective that integrates climate resilience and adaptation considerations into the drive toward Net Zero – making commitments to “Resilient Net Zero.” The future we all face will need to be both low carbon and resilient and adapted to the effects of climate change.

The Global Adaptation & Resilience Investment Working Group (GARI) was conceived at COP21 in conjunction with the UN Secretary General’s A2R Climate Resilience Initiative to bring together private investors and a range of other stakeholders to focus on investment in climate adaptation and resilience. The idea was to bring together interested investors, climate experts, and other stakeholders to focus on how to practically invest in adaptation and climate resilience and address the need for both impact and financial return.

Since its launch in 2015, GARI has met upwards of 50 times and engaged over 500 private investors and other stakeholders in open and dynamic forums. GARI is now institutionalized as a non-profit and is fulfilling our original vision for how this group of stakeholders can help drive our mission to catalyze private sector investment in resilience. Today GARI is an international peer-to-peer learning community that provides a forum for discussion, engagement and networking among practitioners, experts and other stakeholders to help forge partnerships and spark new solutions for private sector investment in adaptation and resilience.

Thanks to all GARI working group members and participants. GARI and this Investor Update would not be possible without the support of The Kresge Foundation, The Lightsmith Group, Nixon Peabody, State Street Global Advisors Foundation, and other institutions that provided in-kind support as well as a number of dedicated individuals, including most specifically Ernie Chung, Lois DeBacker, John Chow, Serena Shi, Carlos Sanchez, Nick Shufro and Stacy Swann for their dedication and engagement with GARI in addition to the lead author and contributors named above.

We hope you find this investor update useful. Comments or questions can be sent to Chair@GariGroup.com.



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II. Executive Summary

What does climate resilience look like? It is the conundrum of resilience investing to determine how to measure the value of the disaster that didn't happen, the crops not lost to drought, the operations not devastated by hurricanes, the buildings not destroyed by wildfire. Yet more and more, climate shocks are hitting with brutal force, laying bare the investment exposure and reactionary spend that sets a price on waiting to respond.

Every community, every business, every sector seems to have a different vision of resilience in terms of timeframe, cost and requirements. Without clear metrics for impact and financial return, many investors are stymied to move more aggressively into this murky landscape. Is investing in resilience a dedicated investment in impact solutions, or is resiliency mainstreamed into all forms of financing, or both?

Purpose Of This Update

Within this emerging landscape of financial exposure, need and opportunity driven by climate change, GARI participants in 2022 decided to take stock of the state of investments in climate resilience. GARI looked at the global progress on understanding physical climate risk and resilience, assessed the developing market for investors, studied feedback from stakeholder surveys and discussions, and now brings forth a set of recommendations and potential paths forward for resilience investments to shape GARI activities in the coming year.

This assessment and set of recommendations build on previous GARI discussion papers on adaptation and resilience that GARI has released to the public:

- GARI (2019). *2019 Investor Briefing: Physical Climate Risk and Resilience, December 2019.*
- GARI (2017). *An Investor Guide to Physical Climate Risk & Resilience: An Introduction, December 2017.*
- GARI (2016). *Bridging the Adaptation Gap: Approaches to Measurement of Physical Climate Risk and Examples of Investment in Climate Adaptation and Resilience, Nov. 2016.*

Current Investor Views - Highlights Of GARI 2022 Survey And Discussions

In 2022 GARI conducted a survey of its members that was designed to revisit a similar 2016 GARI survey to assess how sentiment in the industry has evolved. The 2022 survey was expanded to include questions recognizing the evolution of impact investing and the growing importance of Environmental, Social and Governance (ESG) and Diversity, Equity and Inclusion (DEI) factors in shaping investment decisions. This paper details the GARI survey findings, with key themes and responses highlighted below:

Clear metrics are important to driving more investment in resilience:

- 57% attracted by investable products
- 57% interested in climate tech
- 60% interested in climate solutions
- 53% enabled by clear metrics for resilience impacts
- 67% recommended developing metrics for resilience

Adequate decision-making tools are important to driving more investment in resilience:

- 50% need adequate decision tools, such as pricing for climate risks in project return calculations
- 67% recommended pricing climate risk into investments

Creating a practical framework for risk screening would potentially offer a high-level strategic pathway to investment:

- 87% desire a practical framework

Social impact has emerging importance as a driver for attracting capital:

- 30% motivated by attracting capital from ESG/ Impact investors
- 37% motivated by ESG/DEI goals
- Other motivations centered on social impact

In addition to the survey, GARI held four convenings in 2022 and launched a virtual speaker series. GARI events offer ongoing opportunity to exchange current insights from the market and help practitioners stay in tune with what investors are thinking. Highlights from 2022 GARI convenings include:

- “Resilient net-zero” is an important vision to achieve resilience in tandem with mitigation goals. Participants emphasized resilience as central to business strategy and prosperity, materializing in financial statements as expected performance and creditworthiness.
- The “net-zero” concept has helped advance the conversation on mitigation, and a clear standard metric for resilience similar to CO2e for mitigation would ease communication across investors and stakeholders, helping to stimulate investment.
- De-risking private sector financing can be pursued through a mix of metrics, climate data, clear return objectives and forward-thinking design criteria. Robust engineering design to stress-test for climate scenarios can also help protect investments in infrastructure.
- The insurance industry has an importance role to play in delivering resilience by removing risk through underwriting, providing capital for infrastructure investments and creating incentives and price signals. These mechanisms can help create a market transition rather than exit in key investment sectors.
- Vision and storytelling are as critical as metrics to gaining investor support. We need to boldly rethink what we construct and how we manage cities, economies, and landscapes in a 21st century of huge volatility.

Paths Forward For Resilience Investment

Given these insights, GARI participants concluded that paths forward for resilience investments may include:

- Developing metrics and standards for risk management and opportunity assessment;
- Pricing climate risk into investments as a key decision tool;
- Creating a practical framework, potentially through a macro view looking at a long-term vision by key sectors such as food, transport, buildings, energy;
- Incorporating resilience into net-zero initiatives and goals; and
- Focusing on social impact, environmental justice and inclusive equity in investments.

These potential paths forward are large, long-term efforts that will require participation from all financial actors and climate resilience stakeholders. GARI will focus on these critical areas in ongoing efforts including convenings of experts, sharing information and continuing to develop a peer-to-peer learning community to help shape progress on adaptation and resilience investment.



III. State of Adaptation and Resilience Investments in 2022

Adaptation and resilience investing defined

In the most general sense, resilience is the ability to bounce back from disaster, and adaptation is the long term modification of systems and structures to help avoid disaster. The terminology around adaptation and resilience has been defined by various actors in government and non-governmental agencies, including IPCC, FEMA, U.S. Department of Defense and U.S. Department of Agriculture to name a few.¹ In addition taxonomies have been created specific to investing in adaptation and resilience to help define opportunities and needs.

These taxonomies help determine what can be considered an investment in climate resilience. For example, infrastructure is an obvious investment opportunity, whereas nature-based solutions are an emerging field. Environmentally sustainable solutions in a broad sense are defined in the European Union taxonomy which entered into force in July 2020.² Climate adaptation solutions offered by investable private sector companies are defined in the non-binding taxonomy developed by The Lightsmith Group for their Adaptation Small to Medium Enterprise (SME) Accelerator Project, known as ASAP.³

Adaptation and resilience investing is an emerging landscape of new technologies and enterprises that offer solutions to climate impacts. At the same time, understanding and managing climate risks allows investors and asset managers to take on a stronger mantle of resilience across all their investments, bolstering overall portfolio values long term.

Resilience:

Ability to bounce back from disaster

Adaptation:

Long term modification of systems and structures to help avoid disaster

Climate Risks Are Clear

Despite undeniable need for solutions to address increasing global climate disasters and impacts on infrastructure and business operations, resilience investing is an emerging market. In 2022 the U.S. Office of Management and Budget reported that estimated damages from climate-related events in the U.S. alone had reached roughly \$120 billion per year since 2017.⁴ The financial risk for corporations was estimated at \$1 trillion in 2019 by GDP, with expected losses in five years through 2024.⁵ The baseline for action accelerated in 2021 with United Nations' Intergovernmental Panel on Climate Change (IPCC) sixth assessment report (AR6), which warned that global warming is expected to hit 1.5C within the next ten years in almost all scenarios. The risks are clear and their reality is becoming more accepted.

How these climate risk translate to financial system vulnerabilities is outlined in **Figure 1**, which shows how the risks hit key elements of the financial system, resulting in potential deterioration of asset valuation, borrowing, leverage and funding.

Given this array of risks, financial actors have a fiduciary duty to understand and manage these climate risks. Recent regulatory actions in U.S. and globally (see Appendix) are driving corporations and investors to identify climate risks and look for ways to invest in solutions, as financial regulators and central banks have pointed to the physical impacts of climate change as a material and potentially systemic risk for financial markets. The Network for Greening the Financial System (NGFS), a network of over 115 central banks and financial regulators focused on climate risk in financial markets globally, has played a crucial role in the dissemination of state-of-the-art analysis and models, and supported research to

deepen our understanding of exposure and potential costs.⁷ In the insurance sector, climate change is now the top risk - higher than cybersecurity - according to the 12th Annual Survey of Emerging Risks.⁸ Institutional investors, insurance companies, pension funds and other asset managers are keen to understand these climate risks as well as where the opportunities are to improve investment performance.

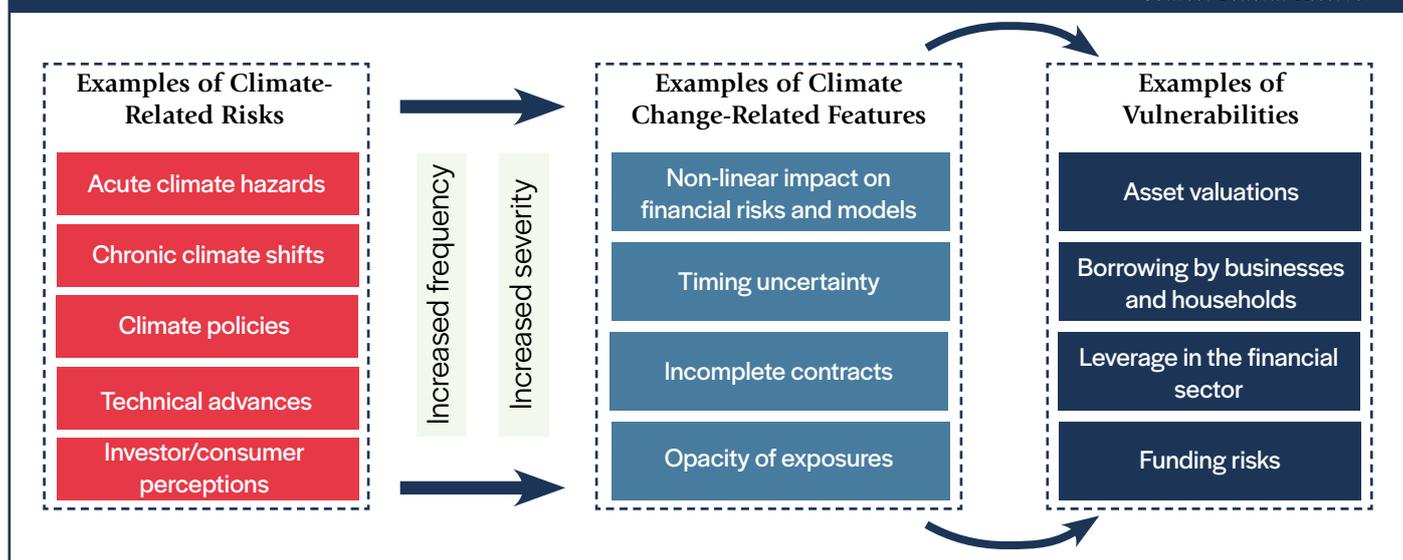
This attention from regulators has shed light on the need to better disclose and report climate risk for both financial and non-financial corporations. Over the past few years, a large shift toward climate disclosures has been seen in the corporate world and at major asset managers. As of October 2021, adoption of the Task Force for Climate-related Financial Disclosures (TCFD) had grown to over 2,600 supporters globally, including 1,069 financial institutions responsible for assets of \$194 trillion and G7 countries agreed to mandate TCFD reporting. TCFD supporters now span 89 countries and jurisdictions and nearly all sectors of the economy, with a combined market capitalization of over \$25 trillion – a 99% increase over 2020.⁹

Major asset managers are using their influence to move companies towards TCFD adoption. State Street Global Advisors required companies to provide TCFD-aligned climate disclosures in January 2022¹⁰ and BlackRock has put pressure on their investments since early 2021, steadily increasing their expectations.¹¹ The 2021 update to TCFD recommendation included guidance on how to report physical climate risk and opportunities - a big development to help implement meaningful reporting.¹²

In parallel, strides have been made in the ability to understand projected risks and their financial implications. A diverse offering of climate risk analytics has emerged

Figure 1: Possible Transmission from Climate-Related Risks to Financial System Vulnerabilities

Source: Federal Reserve⁶



and many of the early movers in this field have been acquired by large financial data providers or ratings agencies, with the explicit intent to integrate physical climate risk considerations into mainstream products and develop offerings to respond to client demand. Rating agencies S&P Global and Moody's have both acquired climate data companies and plan to incorporate risk data into ratings and pricing. BlackRock has brought in a team for in-house data analytics, creating their branded Aladdin suite of specialized risk management products.¹³

Still more, a new generation of climate data analytics companies is emerging, often with substantial VC backing, helping expand models of the financial impact of climate risk, delve into the nuances of downstream and indirect impacts (such as infrastructure failure and migration) or calculate impacts on the corporate value chains and financial portfolios. Contenders include Cervest, Climate Alpha, ClimateCheck, Climate X, DeltaTerra Capital, One Concern, RiskThinking.ai, Sust Global, to name just a few, aiming to compete both with global data companies and well-established boutique climate analytics firms like Fathom Global, Jupiter Intelligence or XDi. Efforts to make this data available to the public have also accelerated, in the U.S. under the leadership of First Street Foundation, and through the global open-source data non-profit OS-Climate. Catastrophe modelers have also entered the fray, working to incorporate forward-looking climate data into their granular, bottom-up, current-day models. The intent is to model with the highest possible levels of precision how changing climate will affect extreme weather events, in particular hurricanes, flood events and windstorms, and drive departure from known historical patterns and financial impacts to future expectations, in particular on insurance premiums. Yet despite the growing consensus that future risk must be factored into current decisions, immense challenges remain in terms of implementation and marrying climate data into investment decision processes. Estimating financial impacts from climate risk remains work-in-progress.

Opportunity Is Increasingly Visible

While risk and the fear of loss may be entry points to get attention from investors, the flip side is the potential opportunity. The scale of need for resilience solutions and technology are the upside story to create motivation for investment. The need for investment in adaptation and resilience is greater than ever, with the latest UNDP Adaptation Gap Report estimating the need at \$300 billion by 2030 and \$500 billion by 2050.¹⁴

The market opportunity for resilience and adaptation investing is coming into focus. The Climate Policy Initiative estimated \$632 million of private climate finance flowed in 2019/2020¹⁵, of which \$46 billion was adaptation financing (an increase from \$30B in 2017/2018). While

mitigation has historically received the bulk of investment, the interest from investors in resilience is growing. BlackRock has stated that investing in mitigation is not enough and recognized that the need for resilience investing is now, not a 2050 problem or opportunity to address. BlackRock sees a compelling market for resilience solutions and is convinced there is demand for exposure to the resilience theme.¹⁷

Evidence of increased climate-related investor interest can also be found in the growing popularity of green bonds. The green bonds market will hit \$1 trillion in 2022 alone, and the Climate Bond Initiative has set its sights on helping catalyze a \$5 trillion market by 2025.¹⁸ Further momentum will come from the new U.S. climate bill, which includes \$369 billion for resilience and sets up a framework to encourage investment and foster the intersection between decarbonization and adaptation.

Investments in pure play adaptation are also growing, although remain nascent compared to the market



potential and overall global needs. Several investors, small and large, have put adaptation at the heart of their investment strategies. Early in 2022, The Lightsmith Group announced it closed \$186M for the first private equity fund entirely dedicated to adaptation. JP Morgan Chase, Nuveen, Wellington and other large financial institutions have adaptation plays within their dedicated Climate or Impact funds, which together largely top \$1 billion dollars, and BlackRock recently announced it is working on a product focused on adaptation. On the venture capital front, few if any funds explicitly claim a focus on adaptation, but in 2021 venture investors poured \$56 billion into climate tech opportunities across energy, agriculture, and transportation sectors – an 80% increase over the prior year.¹⁶ The rapid growth in companies

Spotlight on Emerging Markets

Communities and businesses in emerging markets are highly vulnerable to climate impacts due to a confluence of geographical and socioeconomic factors, as demonstrated in the IPCC Working Group II – Impacts, Adaptation and Vulnerability 6th Assessment report. In the face of ongoing threats to water, food systems, human health, and infrastructure, entrepreneurs in emerging markets are developing solutions to climate impacts effecting their communities.

The Adaptation SME Accelerator project (ASAP) has mapped over 400 companies across Africa, Asia, and Latin America which represent only a fraction of the Small and Medium Enterprises (SMEs) actively developing solutions to help customers better understand climate impacts in a localized context, enable them to address risk and enhance climate resilience. In emerging markets, there is a heavy focus on managing the natural resources most impacted by climate – food systems, water, and energy, and the infrastructure which delivers these resources to more populous urban areas. The ASAP survey identified solutions being developed including:

Agriculture and food systems:

- Software platforms connect smallholder farmers with actionable weather, crop health, and localized climate specific information via mobile devices
- Climate resilient inputs including organic soils and drought resistant seeds
- Innovative financial products, such as parametric insurance and services improving access to commodity markets for smallholder farmers.
- Analytics solutions with inputs from AI, satellite, and drone analytics
- Cold chain storage and refrigeration solutions

Water:

- Wastewater treatment
- Utility scale water efficiency hardware and software solutions
- Energy efficient desalination solutions
- Flood insurance products
- More efficient water irrigation solutions
- Nature based water collection infrastructure

Information and Analytics:

- Environmental risk assessment software and risk insurance products
- Weather analytics and information dissemination
- Satellite and drone analytics for agriculture, utilities, and forestry
- Supply chain risk analytics and optimization software
- Health care and pharmaceutical solutions

With appropriate investment, many of these solutions for emerging markets can be scaled both regionally and globally to areas facing similar challenges.

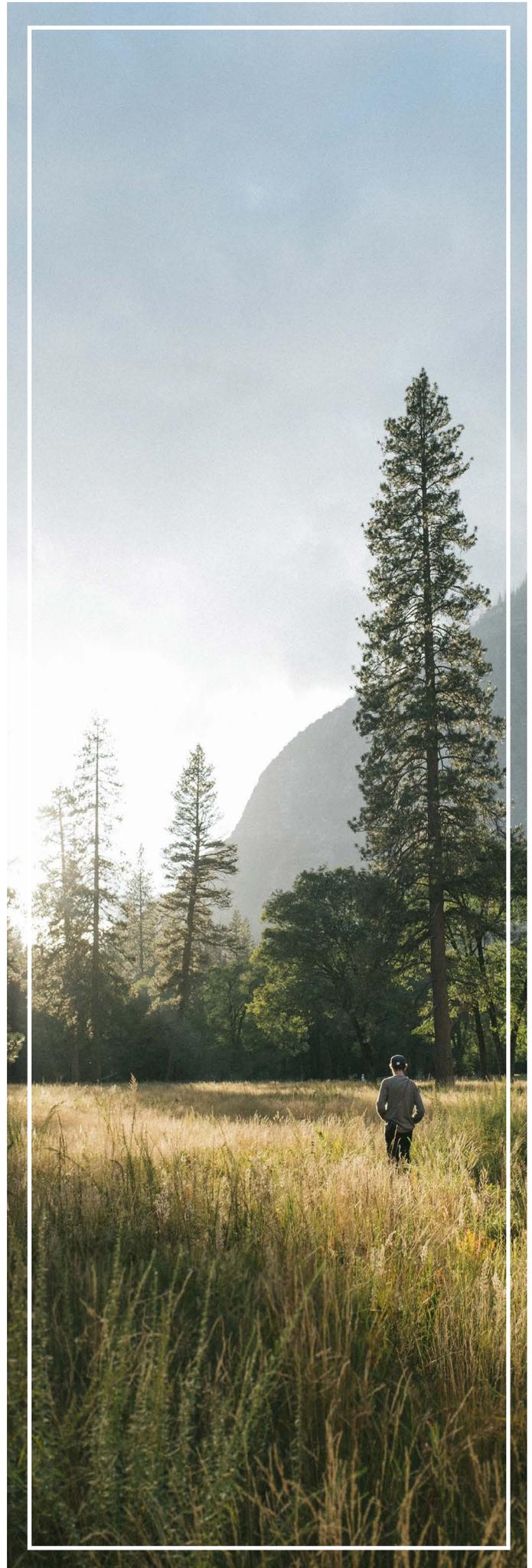
focused on climate, food and agriculture includes many technologies and ventures that will help cope with climate impacts and are bound to grow as impacts become more widespread.

With a little more time, the market may be able to show traction on initial climate resilience investments. Institutional Investors Group on Climate Change (IIGCC) is encouraging investors to incorporate adaptation and resilience into equity funds, and some early work has been done by rating agencies to integrate resilience into pricing and credit ratings. As resilience becomes a mainstream feature of investing, rather than a dedicated from of impact investment, investments may be measured more by their lack of resilience as an outlier and competitive disadvantage in the face of operational hazards.

Metrics Are Still Evolving

To realize the economic potential and attract investors, the market needs metrics to identify opportunities and to demonstrate strong financial returns and resiliency impacts, even on tough issues such as climate equity and justice. Metrics will help communities understand what it means to be ‘adapted’ in terms of what is acceptable and what is possible. The market has yet to define what adaptation and resilience requires in a changing world, which in turn delays progress in developing consensus investment standards and metrics. Despite the uncertainty, work has progressed through TCFD on defining climate risk metrics, including measuring financial impacts and guidance on disclosure of transition plans.¹⁹ In North America, a group of 19 major North American banks, including Bank of America, Wells Fargo and Royal Bank of Canada collaborated to develop climate risk management standards and announced the launch of the RMA Climate Risk Consortium, aimed at developing climate risk management standards for banks to integrate throughout their operations.²⁰

Understanding climate risk has become more approachable, but still requires a combination of modeling and data sources to capture both acute and chronic impacts, and the layering of multiple models to arrive at a set of metrics that can be embedded into financial decisions. Consumers of this data now understand that climate risk can and should be expressed through a variety of financial metrics, including Climate Value at Risk (CVaR), climate-adjusted probability of default, climate-adjusted returns, climate risk macroeconomic forecasting and more to allow for sophisticated modeling and seamless integration into workflows. These emerging tools drive progress, but also point to the amount of work still ahead to develop robust models. Frontier research issues include the ability to expand scenario analysis to capture worst case scenarios, tipping points and secondary impacts on society and the economy.



IV. GARI 2022 Survey – Demand for Resilience Investing

The 2022 GARI survey was designed to revisit the original 2016 GARI survey and discussion paper to assess how sentiment in the industry has evolved. The pool of participants in each case came from GARI working group members and in both years was a mix of self-selected participants, not directly comparable across the two surveys.

The 2022 GARI survey included several questions from the original 2016 survey in order to assess how demand for resilience investment has changed over time. The 2022 survey explored how organizations viewed the level of importance of climate risk management, perceived needs for managing risks, and areas of most interest for investing in climate opportunities. The survey was expanded from 2016 to acknowledge the evolution of impact investing and the growing importance of Environmental, Social and Governance (ESG) factors as well as Diversity, Equity and Inclusion (DEI) in shaping investment decisions.

2022 GARI survey respondents had a range of assets under management from under \$100M to over \$1 trillion and included 21 financial services providers and 10 other stakeholders. While this overall input is limited in the context of the vast number of financial services providers that influence resilience investing, the survey responses

along with insights from GARI convenings provide a meaningful window into the needs of the market to drive progress and impact in resilience investing.

Overall GARI observed that demand for resilience investing is of growing importance in terms of both managing risk and pursuing new opportunities. Opportunity exists for organizations to integrate resilience planning into their existing and new investments to hedge risks, or make equity/bond investments in resilience assets/companies to pursue profits.

Risk Management

Compared with 2016, 2022 GARI survey results showed a higher sense of importance for physical and transition risk, and a big jump in concern around regulatory risk with an increase to 80% (from just 53% in 2016) rating it

Figure 2: GARI 2022 Survey - Climate Risk Importance

“How important is climate risk to your organization?”

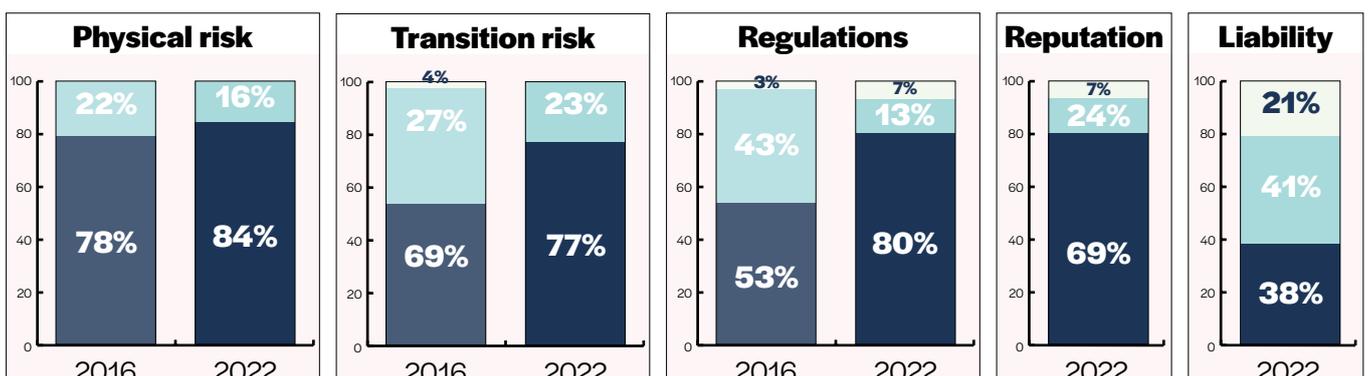
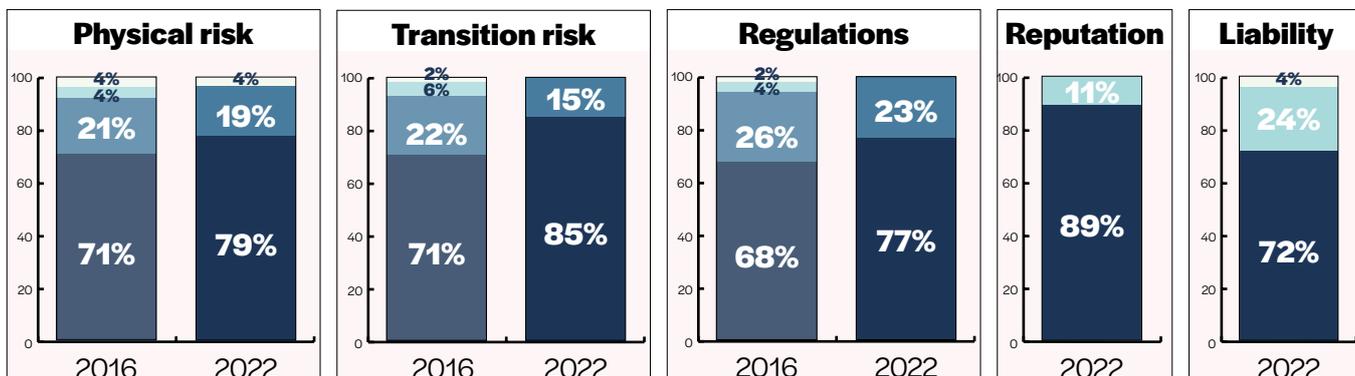


Figure 3: GARI 2022 Survey - Climate Risk Screening

“When will your organization start screening for climate risk in its portfolio?”



very important (Figure 2). New to the 2022 survey were questions on reputation and liability risk, which both reflected interest in new areas of concern. Reputation risk was considered very important by 69% of respondents. Liability risk from stakeholders claiming to have suffered climate-related losses was deemed very/somewhat important by 79% of respondents (although just 38% said very important).

We also asked when organizations will start screening for climate risk (Figure 3). The majority of respondents in both 2022 and 2016 were already screening for physical, transition and regulatory risk. The 2022 survey added questions on screening for reputation and liability risk, and found that the majority of respondents were also already screening for these risks (89% and 72% respectively).

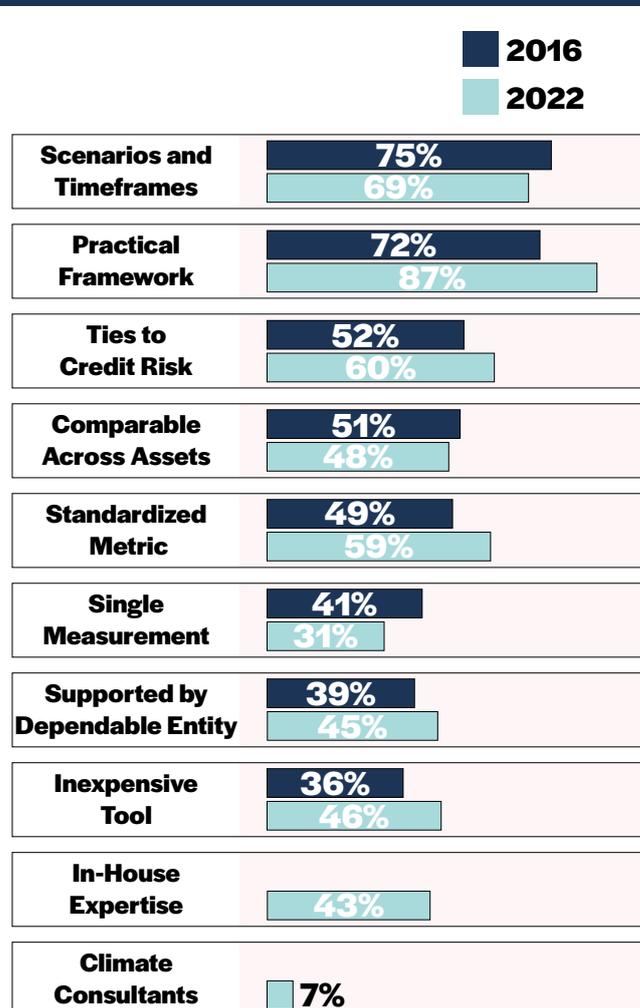
Participants were asked what features of climate risk screening tools would be most beneficial. Of the ten potential features offered, the largest interest was in having a practical framework for outputs that could be integrated to investment decisions.

Opportunities For Investment In Adaptation And Climate Resilience

Approaches to screening are currently considered primarily a risk management tool, although some metrics and measurements may provide insight into climate-related investment opportunities. The market for resilience and adaptation investing is just coming into focus, and the general sense of opportunity in 2022 is very similar to 2016. Where in 2016 we only referenced companies that “provide tools and technology to map and assess risk,” in 2022 we included “climate tech” companies to the survey to

Figure 4: GARI 2022 Survey - Screening Features

“What are the most important features you would look for in a climate risk screening approach?” (% rating “Very Important”)



explore interest in companies where technology is a solution-driver in a broader sense (Figure 5). The 2022 results demonstrated emerging interest in these climate tech companies that are creating a range of products in areas from agriculture to buildings and more. In fact, respondents in 2022 showed the most interest in climate tech (57%), just behind a similar bucket for companies that offer climate solutions more generally (60%) as shown in Figure 5.

Other opportunities for investing were noted by 30% of survey participants, with suggestions including:

- insurance-linked securities
- nature-based solutions
- carbon removal projects
- buildings
- agriculture
- investing in Integrated Water Resources Management (environmental flows, Rights of Rivers)
- launching a new fund focused on small/ local/community level clean energy projects
- simply investing in companies that demonstrate they are more resilient than others.

Some of these emerging areas for investment such as nature-based solutions and climate resilient agriculture have support in the 2022 U.S. climate legislation, which will provide benefits of scale and adoption.

Motivations To Invest In Resilience

For any of the opportunities discussed above, motivations are a mix of risk management and opportunity. Managing physical climate risks was the primary driver (57%) from the GARI survey respondents, with superior returns and managing transition risk following at 40% each (Figure 6).

In addition to returns and risk management, impact investing and social equity have emerged as important factors. Given the rising interest in ESG and DEI goals for companies and investors, we wanted a sense from the market on the level of impact these goals are currently having, if any, on investing in resilience. Survey results showed that ESG/DEI goals were a motivator for 37% of respondents (ESG ratings less so at 13%) and 30% cited attracting capital from ESG/impact investors as a motivation.

Figure 5: GARI 2022 Survey - Opportunities to Invest

“Which opportunities to invest in climate adaptation and resilience are of greatest interest to your organization? (Check all that apply)”

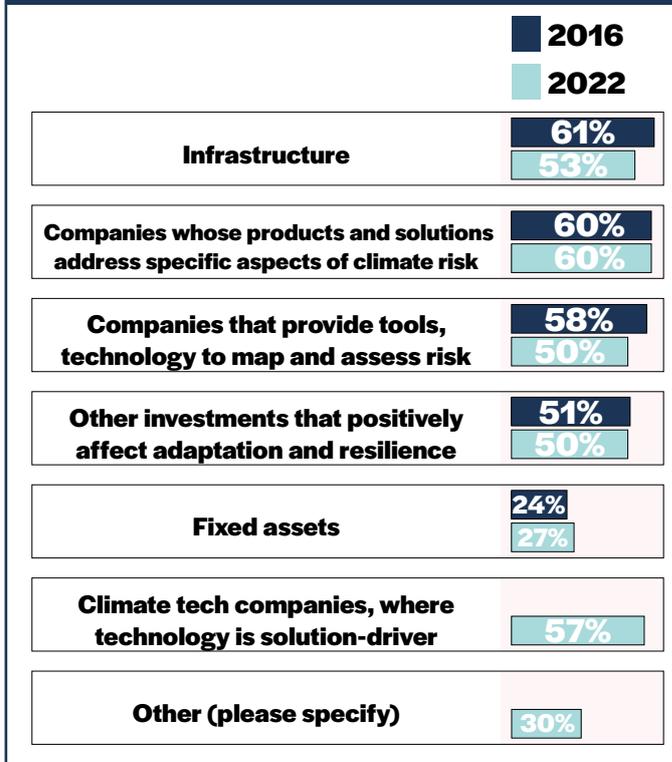


Figure 6: GARI 2022 Survey - Motivations to Invest

“What are your motivations for investing in adaptation and resilience? (Check all that apply)”



30% of respondents offered “Other” motivations which reflected the interest in social impact, including:

- to make change and have impact;
- demonstrating ‘for-profit’ business models to address environmental sustainability;
- government organization with mandate;
- avoiding “mutually-assured destruction” - an existential issue;
- companies will be more sought after in the future and therefore a good investment;
- because the planet is in serious trouble, and it’s the ethical thing to do.

Within ESG, we asked how these metrics were prioritized. We learned that ESG and climate risk frameworks, such as TCFD, had equal priority for the majority of responders (**Figure 7**), although climate risk metrics took priority over ESG factors for 30% of responders.

We also asked a slightly different question around what would enable or attract the institution to invest in climate adaptation and resilience, offering ten (10) choices as well as room for suggestions (**Figure 8**). Most important to investors is “investable products/companies” along with clear metrics for impact, indicating further need to define and measure what makes an adaptation and resilience investment successful and profitable. Some of the other features suggested that would attract investment included:

- showing resilience and adaptation are necessary/sufficient conditions for the future of successful businesses;
- sound science backing authentic water security/viability;
- clearer insights/instruments on blended finance for smaller projects; and
- mandates from asset owners to integrate climate resilience in stewardship and policy advocacy.

Figure 7: GARI 2022 Survey - Climate Risk v. ESG

“How do you prioritize ESG metrics vs. other climate risk measures?”

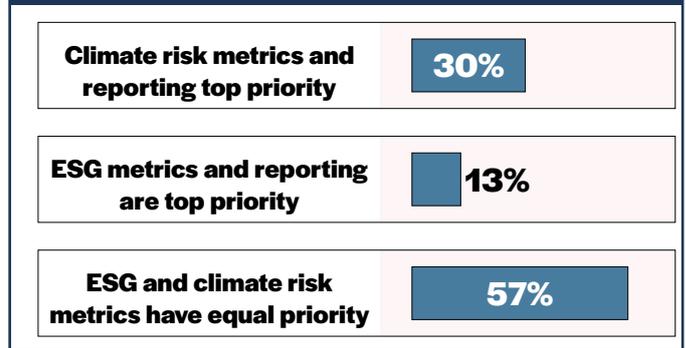
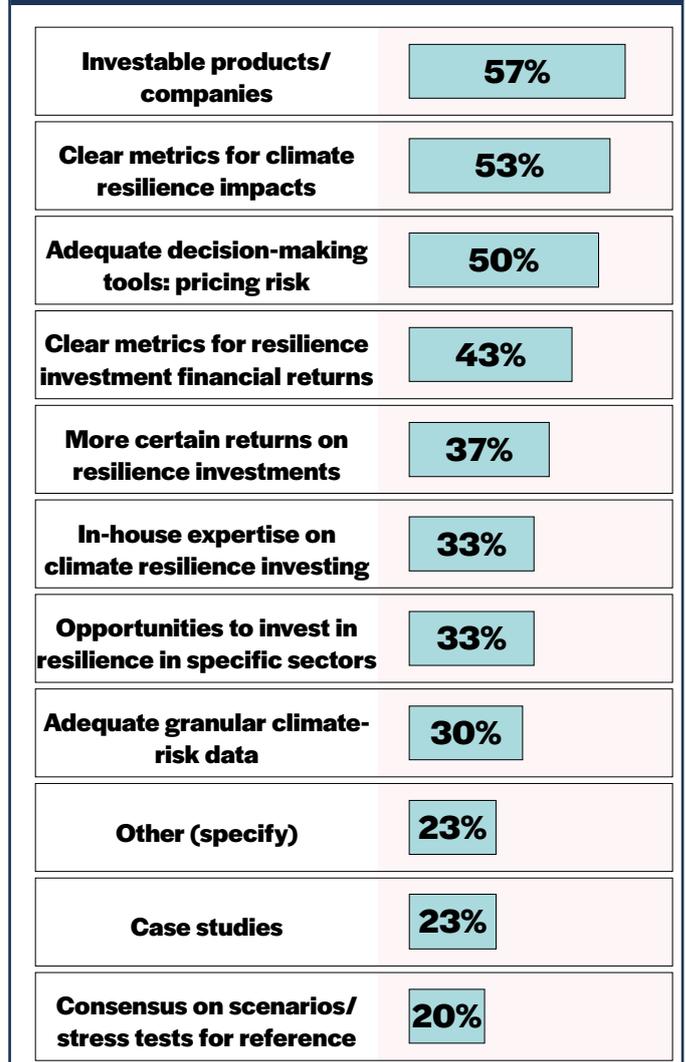


Figure 8: GARI 2022 Survey - Enablers to Investing

“What would enable/attract you to investing in climate resilience and/or adaptation? (Check all that apply)”



V. GARI 2022 Convenings and Webinars

Throughout the year, GARI convenings offer an ongoing opportunity to capture insights from the market. These convenings provide a window into what investors and key stakeholders are currently thinking and create a forum for sharing ideas and updates, allowing GARI to expand and deepen thought leadership in resilience investing and further catalyze action.

In 2022 GARI held four convenings, including three virtual meetings and a hybrid event in New York during New York Climate Week. In addition, GARI partnered with Tata Consultancy Services to launch a virtual Speaker Series open to the public that kicked off in May 2022. GARI also participated in an outside working group on climate metrics, as discussed below.

January 2022 Kickoff – GARI Strategy

GARI kicked off 2022 with a virtual meeting attended by investors, governments, corporates, non-profits, NGOs and climate finance consultants from across the world. GARI benefitted from the participation of many long-standing working group members as well as several new participants. To start off a new year, the agenda centered on a review of GARI's guiding mission, vision and values along with an overview of 2022 objectives and plans for GARI including the announcement of a newly formed GARI Advisory Board.

Working group members also shared updates on their organizations, providing a benefit to participants of being informed on relevant happenings across the world that impact the climate adaptation agenda. A high level summary of the updates includes:

- **Coalition for Climate Resilient Investment (CCRI)** gave an update on traction in scaling up of capital mobilization for resilience through efforts to develop an innovative financial instrument that recognizes and rewards integration of physical climate risks in the investment decision-making process.
- **The Climate Service (TCS)** reported on the acquisition of climate data company TCS by S&P Global as part of its ESG solutions portfolio for customers.
- **TomorrowNow** gave an overview of the role weather data plays when integrated with community vulnerability intelligence to create innovative resilience solutions, and announced a \$2 million grant from the Gates Foundation to further this work.
- **The Higher Ground Foundation** described a pilot adaptation project in Côte d'Ivoire that aims to reduce vulnerability and feed into the national adaptation plan and funding framework.
- **Adaptation and Resilience Investors Collaborative** was announced by the Foreign, Commonwealth and Development Office (FCDO) in the UK as an initiative to overcome key hurdles to private investment in climate adaptation and resilience in developing and emerging countries.

- **The Global Innovation Lab for Climate Finance** was described by the Climate Policy Initiative as an effort to identify innovative financial instruments to drive adaptation.
- **Investor Leadership Network** gave updates on the Blended Finance Blueprint and the Sustainable Infrastructure Fellowship Program.
- **Adaptation SME Accelerator Project (ASAP)** update provided by the Lightsmith Group regarding partnership with Village Capital on work in Asia and Africa.
- **Lightsmith Group** announced the close of their \$186 million growth equity climate fund, the first to focus on climate resilience and adaptation.

Spring Meeting - Resilient Net Zero

GARI working group members at the Spring 2022 meeting discussed the importance of resilience investing in the context of corporate decarbonization goals. The discussion centered on the concept of “resilient net zero” - a vision to achieve resiliency in tandem with net zero. Given the reality that carbon reduction and resiliency solutions impact one another at strategic and operational levels, one insight was that mitigation versus adaptation is a false dichotomy in the financial sector. One participant referenced the EU Taxonomy pillar to “do no significant harm”²¹ as a first consideration for both mitigation and resiliency initiatives, ensuring that a well-intentioned strategy does not set back the path to resilience or net zero. Several participants emphasized resiliency as central to business strategy, risk management, enhancing value

“One thing I still find striking in my work with public sector in the U.S. is how much public money.. is spent on new and modernizing infrastructure that does not build in resilience because the design decisions do not ...anticipate future hazards....”

Joyce Coffee,
Climate Resilience Consulting

and protecting the bottom line. From an operating asset view, resiliency materializes in financial statements in terms of expected performance and creditworthiness.

June Meeting - Public/Private Resilience Financing

GARI’s June meeting focused on how public/private financing opportunities for resilience investing can create a path to achieving the global ambitions highlighted at London Climate Week including 1) green, fair and resilient transitions, 2) the road to COP27 for ambition and adaptation and 3) whole of society climate mobilization. The panel included investors, NGOs and public sector representatives and was shaped around three key questions: what investments in resilience are needed, how to leverage public balance sheets, and challenges and opportunities for unlocking financing in this area.

De-Risking

The over-arching premise of the discussion on needs was the desire to de-risk private sector financing, especially for infrastructure, through a mix of metrics, climate data, clear investment objectives for repayment and forward-thinking design criteria. One participant noted, “One thing I still find striking in my work with public sector in the U.S. is how much public money (taxes and rate-payer dollars) is spent on new and modernizing infrastructure that does not build in resilience because the design decisions do not require an anticipation of future hazards different from the past.” Combining financial and engineering expertise could optimize return on infrastructure investments and build community resilience by anticipating future hazards and designing up front for resilience. One panelist offered the concept of “robustness” in infrastructure design as the discipline to stress test infrastructure plans for various climate scenarios during the design process.

Public balance sheets are an important tool for leveraging scarce public resources through public/private partnerships or other ways to finance resilience investments. IFAD presented a program proposed to the Green Climate Fund to distribute \$135 million to host banks, primarily in Africa, which would then match those funds for investments in adaptation initiatives. GEF/World Bank announced strategic plans to triple adaptation funding over the next four years, largely focused on innovation, technology transfer and private sector engagement. GEF promotes blended finance, using grants and flexibility for loans to support investment funds, insurance, as well as incubation and acceleration programs for micro, small and medium enterprises.

Municipal Bond Market

Mobilizing debt markets was another area of focus for this panel. One participant noted the importance of the vast municipal bond market with over \$400 billion in bonds issues each year, which are a primary means for financing municipal infrastructure. The bond market has opportunity to create incentives for resilient infrastructure and pass the benefits to issuers by translating resilience to credit strength and ultimately better pricing. Community Reinvestment Act (CRA) investments might also be an avenue for encouraging communities to incorporate climate considerations in financing to help justify more resilient developments.

Unlocking financing for public resilience investments starts with defining “resilience investing” and establishing clear criteria that can drive a pipeline of opportunities, with related metrics for impact (both financial and resilience). GARI’s panel discussed a window of opportunity for potential pricing benefits, particularly in the bond market, from demonstrating credit strength from resilient infrastructure. One example was in the San Francisco Public Utilities Commission where Moody’s cited the city’s work on sea level rise as a credit strength, the first step towards favorable pricing.

considerations in financing to help justify more resilient developments.

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Long-term insurance for cities

Abhishek Dhawan from United Nations Capital Development Fund highlighted the limitations of existing insurance policies and challenges faced in attracting capital for resilience financing in developing countries. Mr. Dhawan presented an overview of the new Climate Insurance-Linked Resilient Infrastructure Financing (CILRIF) tool, a long-term insurance solution under development for cities to reduce risk perception and attract resilient infrastructure financing. CILRIF is positioned to make a significant contribution toward climate resilience in the developing world.

Three roles of insurance in resilience

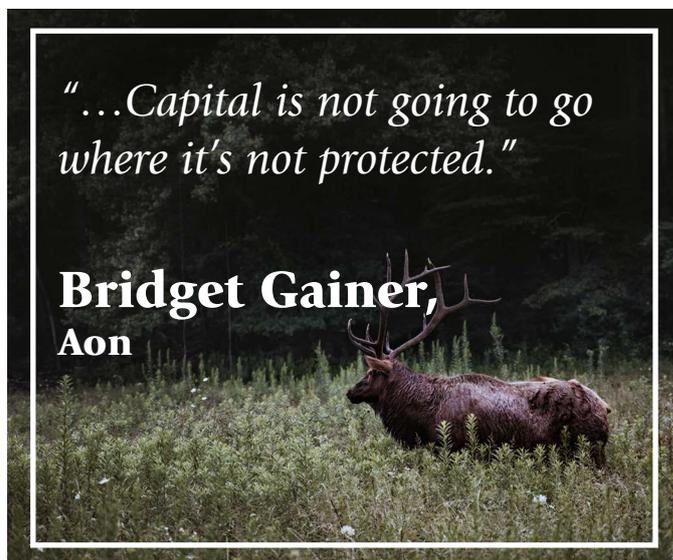
Lauren Carter, United Nations Development Program, highlighted three roles that insurance can play in delivering resilience: (1) removing risk through underwriting; (2) providing capital for infrastructure investments; and (3) changing risk management incentives with price signals from premiums and cash flows. Price signals in the insurance and financial industries is a rich topic that may be the focus of future GARI working group discussion.

Virtual Speaker Series - Role Of Insurance in Delivering Resilience

GARI hosted a webinar in May 2022 on the role of insurance in delivering resilience that focused on financing adaptation and underwriting climate risk. Three panelists explored the role of the insurance industry in underwriting climate risk to protect the global poor and investing in climate-resilient infrastructure. The panel, featuring climate finance experts from Aon, UNCDF and UNDP, presented ongoing efforts to engage the insurance industry as a catalyst for risk management and capital deployment in order to counteract physical climate risk.

Insurance as transition strategy, not exit

Mobilizing debt markets was another area of focus for this panel. One participant noted the importance of the vast municipal bond market with over \$400 billion in municipal bonds issues each year, which are a primary means for financing municipal infrastructure. The bond market has opportunity to create incentives for resilient infrastructure and pass the benefits to issuers by translating resilience to credit strength and ultimately better pricing. Community Reinvestment Act (CRA) investments might also be an avenue for encouraging communities to incorporate climate



September Meeting – Investor Panel

The September meeting was held during New York Climate Week and featured an exciting investor panel as well as a robust discussion of potential paths forward for resilience investing. Gathered in one room we had the world's largest infrastructure investor (Macquarie), the first private equity fund dedicated to climate resilience (Lightsmith), the world's largest bank by market capitalization funding technology to drive resilience (JP Morgan Chase), the international instigator driving over \$1 trillion market for climate bonds (Climate Bonds Initiative), a major pension fund creating a climate-focused private equity fund (Nuveen), and the European Institutional Investors Group on Climate Change (IIGCC).

Creative approaches to resilience financing included:

- Macquarie gave an example integrating nature-based solutions with infrastructure financing (green-grey solutions). Nature-based solutions may take longer to grow into being effective resilience measures, but this green infrastructure may be cheaper over the long term without as many cascading impacts as grey infrastructure creates (e.g., hard levees diverting water elsewhere).
- Block parties were funded in California as part of resilience planning to build adaptive capacity in communities. Studies demonstrate that communities with stronger social cohesion are more resilient and adapt better to shocks and stresses as community members are aware of and look after the most vulnerable (e.g., elderly, those with underlying illness) in their communities.
- Tilting mechanisms such as procurement requirements, regulation, green guarantees and green asset purchasing by central banks are opportunities to tilt funding towards resilience.
- A pre-approved suite of resilience technology solutions for grants, ratemaking, insurance, credit agencies, etc. instead of one-off products that have to be understood and vetted individually would speed implementation of resilience solutions in communities.

To drive the resilience investment market forward, panelists coalesced around the need for consistent metrics and systemic management of climate risk and opportunity identification. A solid taxonomy for resilience investment would help enable investors and other stakeholders to take action. One panelist noted how the “net-zero” concept has helped advance the conversation on mitigation. A clear and standard metric for resilience similar to CO₂e for mitigation would ease communication across investors and stakeholders, and help stimulate investment in solutions. Metrics are also needed to give

a sense of progress towards success. We need the equivalent of “Project Drawdown” for adaptation that provides quantitative steps to measurable improvements in resilience. IIGCC announced the development of a Climate Resilience Investment framework that will advance this conversation and emphasized the need for resilience to protect financial value while also protecting the human ecosystem more broadly.

Imagination and storytelling were encouraged as keys to attracting investors and support. We must create big rethinks about what we construct and how we manage cities, economies, and landscapes in a 21st century of huge volatility. Imagination is needed to envision our targets for resilience. In 2032, what will that world look like? We don't know where Russia/Ukraine or inflation will be, or what will be the next TikTok, but we know for sure that climate change and mass casualty events will continue to happen. We need to consider the choices we make now to support entrepreneurs, and to integrate resilience with net zero goals, and a genuine focus on social equity and gender components. In addition to the momentum of funds flowing into resilience, we were reminded that the next generation is very cognizant of climate change and innovative solutions. As Galen Treuer from Miami-Dade County government suggested, a lot of the vision might be sitting out there already – we just need to embrace it.

Metrics And Measurement For Climate Resilience (MMCR) Working Group

In addition to convenings that GARI hosted during 2022, GARI participated in a climate resilience metrics working group led by UNIDO and BFA Consulting. This interdisciplinary group looked at successful models for climate resilience metrics and related case studies. Resiliency metrics are not as clear cut as “zero” for carbon emissions. To attract investment, resiliency measures are evolving for buildings, industries and transportation and may be reflected in quantitative insurance risk ratings, ESG ratings, capital expenditure decisions and many other factors. One framework for these metrics may come from Race to Resilience, which sets a framework based on the number of people impacted and a theory of change rooted in transformation of capacity to thrive. The metrics working group is seeking case studies to be developed in 2022 and shared in early 2023.

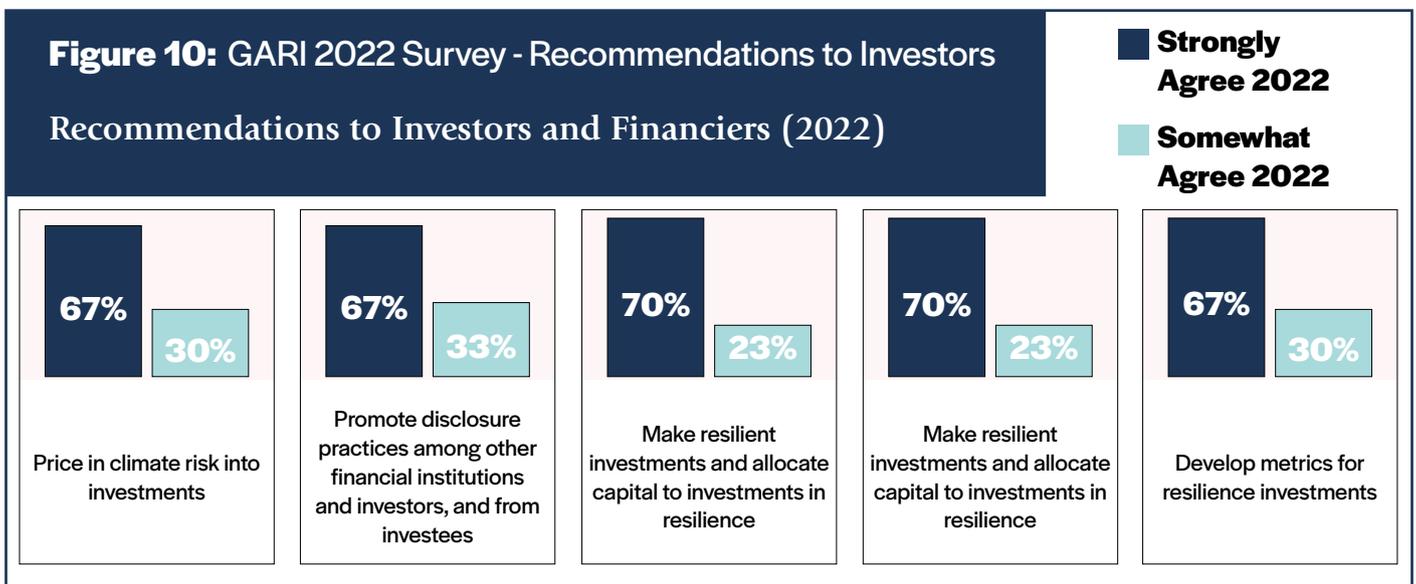
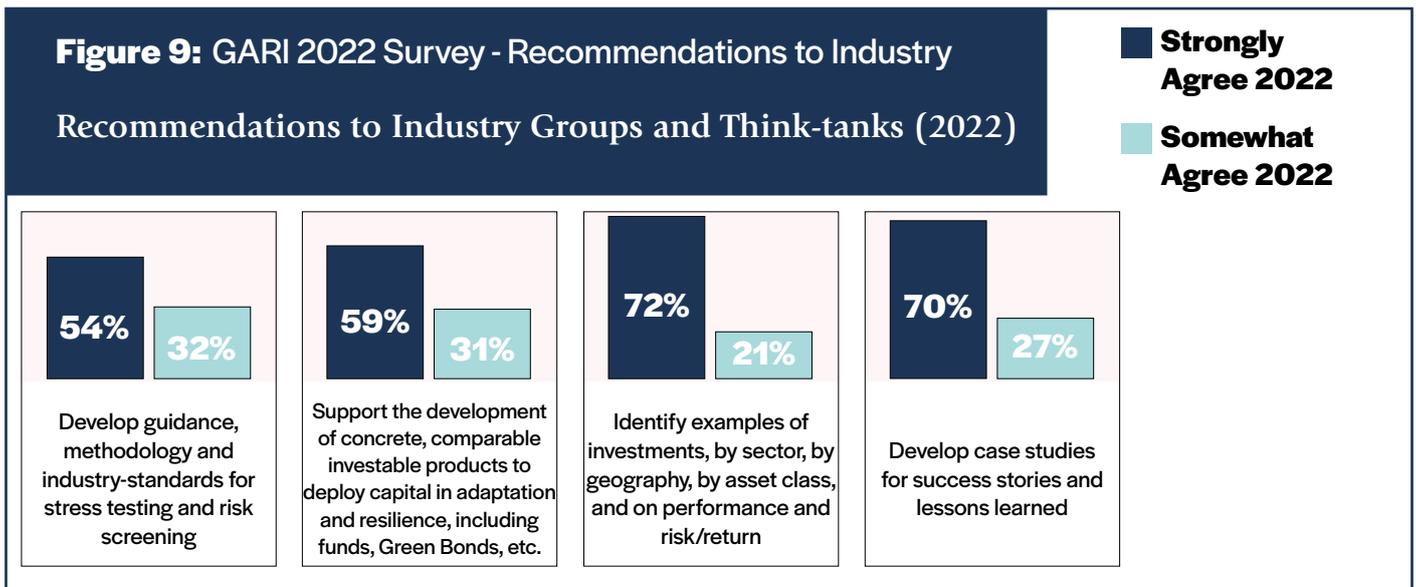
VI. Potential Paths Forward

Recommendations To Industry Groups And Think Tanks

Most important to GARI participants is the need for industry groups and think-tanks to develop case studies, success stories and lessons learned with 97% of survey responders rating this as very or somewhat important (Figure 9). Similar response was shown for identifying examples of investments in every sector, geography and asset class that can show strong investment and impact performance on risk/return. Supporting the development of investable products was also a recommendation to industry groups.

Recommendations To Investors And Financial Services Providers

Recommendations to investors and financial services providers (Figure 10) led with allocating capital to resilience investing and integrating resilience into general investments (70%). Similar levels of recommendation focused on pricing climate risk into investments (67%), promoting disclosure practices (67%) and developing metrics for resilience (67%). When considering strongly/somewhat agree, there was close to 100% support for these recommendations. Following closely behind was developing comparable investment products (52% strongly agree, 80% total agreement).

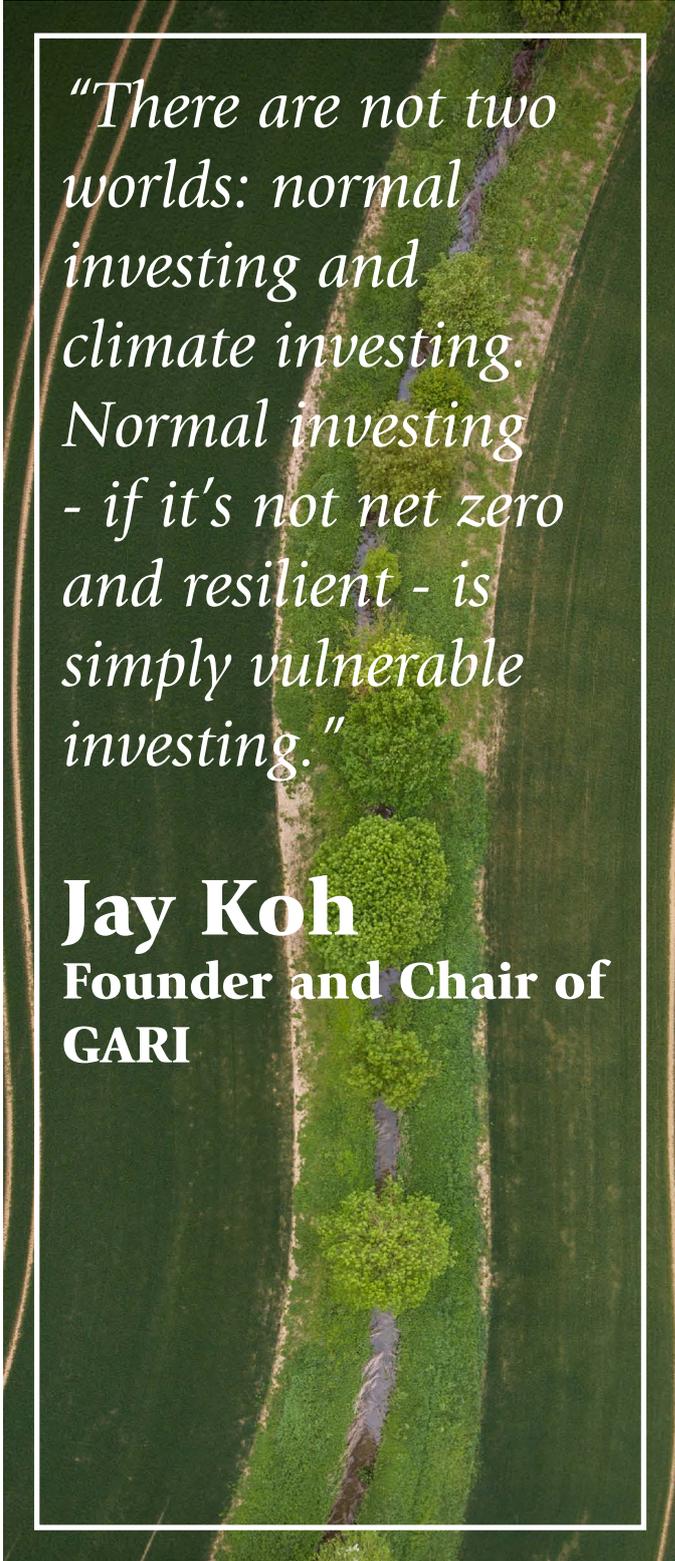


Paths Forward

These survey responses together with qualitative feedback from GARI discussions throughout the year offer a view of potential paths forward for resilience investing. Resilience investing has made great progress in terms of interest and understanding, but there is much work remaining to bring the market to full potential. Feedback from GARI members showed that driving more investment in resilience will require clear metrics and adequate decision-making tools. For example, the desire for products that help assess and address specific climate risks (**Figure 5**) call for improved impact and financial measurements. Separately, creating a practical framework for risk screening (**Figure 4**) could offer a visionary path by sector. Also clear is the emerging importance of social impact as a driver for attracting capital (**Figure 6**). Given these insights, paths forward may include:

- Developing metrics and standards for risk management and opportunity assessment;
- Pricing climate risk into investments as a key decision tool;
- Creating a practical framework, potentially through a macro view looking at an end-game vision for key sectors such as food, transport, buildings, energy (eg: Project Drawdown for resilience);
- Incorporating resilience into net-zero initiatives and goals; and
- Focusing on social impact, environmental justice and inclusive equity in investment.

GARI will focus on these areas in 2023 and beyond to help shape progress through convenings of experts and continuing to develop a peer-to-peer learning community. GARI activities will provide a forum for discussion, engagement and networking among practitioners, experts and other stakeholders to help forge partnerships and spark new solutions for private sector investment in adaptation and resilience. GARI encourages investors, lenders, asset-owners, insurers and other stakeholders to join this conversation.



"There are not two worlds: normal investing and climate investing. Normal investing - if it's not net zero and resilient - is simply vulnerable investing."

Jay Koh
Founder and Chair of
GARI

VII. Appendix

Table 1: Overview of Global Climate Risk-Related Regulatory Actions			
Regulatory Pressures	Target Audience	Requirements	Year of Application
Bank of International Settlement²²	<ul style="list-style-type: none"> Financial organizations Financial supervisors 	<ul style="list-style-type: none"> Climate related risk assessments Liability risk assessments Inventory of losses and vulnerability assessments Guidance and good practices 	<ul style="list-style-type: none"> 2021
Canada²³	<ul style="list-style-type: none"> Any organization that manages assets 	<p>Mandatory TCFD disclosures:</p> <ul style="list-style-type: none"> Disclosures of scopes 1-3 used in climate related management Reports that include benchmarks, risks, planning, and climate related strategies <p>Recommendations:</p> <ul style="list-style-type: none"> Scenario analyses List of climate-financial risks 	<ul style="list-style-type: none"> 2024
Central Bank of Brazil²⁴	<ul style="list-style-type: none"> Brazilian National Financial System (SFN) National Economy 	<ul style="list-style-type: none"> Risk and Return tests on BCB assets Financial standing and climate disclosure reports Risk Management Policy Sustainability regulations Banks stress tests 	<ul style="list-style-type: none"> 2021 Monitoring to begin in 2023
Central Bank of Malaysia²⁵	<ul style="list-style-type: none"> Malaysian Financial System Asset managers experiencing effects of climate change 	<ul style="list-style-type: none"> Climate change risk regulations “Green financial solutions” Reference macroeconomic and financial stability assessments 	<ul style="list-style-type: none"> Established in 2019
Central Bank of Mexico (Sustainable Finance Taxonomy)²⁶	<ul style="list-style-type: none"> Financial institutions 	<ul style="list-style-type: none"> ESG risk factors Continued monitoring of economic changes 	<ul style="list-style-type: none"> 2020 (implemented), updated in 2021
China²⁷	<ul style="list-style-type: none"> Major commercial banks and related institutions All listed companies 	<ul style="list-style-type: none"> Mandatory disclosure a stated goal 	<ul style="list-style-type: none"> TBD
EU Sustainable Finance Disclosure Regulation (SFDR)²⁸	<ul style="list-style-type: none"> Members of financial based markets: advisors and financial product manufacturers 	<ul style="list-style-type: none"> Disclose how funds factor sustainability risks into investment decisions, under the guidance of regulatory technical standards (RTS) 	<ul style="list-style-type: none"> 2023
EUROPE: IORP II Pensions Directive (Institutions for Occupational Retirement Provision)²⁹	<ul style="list-style-type: none"> Pension funds with more than 100 members 	<p>Requires to</p> <ul style="list-style-type: none"> Evaluate ESG risks, including climate change related risks, resource scarcity and stranded assets Disclose information to current and prospective scheme members 	<ul style="list-style-type: none"> In effect since 2017 Members must implement by 2019

Regulatory Pressures	Target Audience	Requirements	Year of Application
EUROPE: The Sustainable Finance Disclosure Regulation³⁰	<ul style="list-style-type: none"> Financial advisors that are related to insurance-based investment products Financial market members that create and sell financial and portfolio management services 	Requirements of firms: <ul style="list-style-type: none"> Disclose risks and sustainability information on the firm and product-levels, Identification of sustainability risks, Support of societal and environmental considerations, and Plans for sustainable investment 	<ul style="list-style-type: none"> March 2021
European Central Bank³¹	<ul style="list-style-type: none"> European Banks 	<ul style="list-style-type: none"> Climate risk disclosure and assessment Corporate Sustainability Reporting Directive (CSRD) 	<ul style="list-style-type: none"> 2022
Financial Stability Board³²	<ul style="list-style-type: none"> Companies affected by risks created by climate change Financial organizations International entities Policy makers 	<ul style="list-style-type: none"> Plan to manage risks created by change in climate Climate risk data and assessments: stress test and climate scenario analyses Data on “financial resilience” Integration of data tools 	<ul style="list-style-type: none"> 2022
FRANCE: Article 29 of Energy Climate Law³³	<ul style="list-style-type: none"> Publicly traded financial and non-financial French organizations 	<ul style="list-style-type: none"> Climate disclosures Reporting on biodiversity ESG integration requirements 	<ul style="list-style-type: none"> 2023 – percent of assets in fossil fuels 2022 - Biodiversity 2019 – Climate risks
France³⁴	<ul style="list-style-type: none"> Companies Investment Managers 	<ul style="list-style-type: none"> Disclose risks to environment under Law on the duty of vigilance Disclose and follow rules of Energy Transition for Green Growth Act Report data and ESG factors related to sustainability and the climate risks of the company (Article L533-22-1 & D533-16-1, Monetary and Financial Code) Scenario Analyses Scope projections 	<ul style="list-style-type: none"> First proposed in 2016
GLOBAL: Task Force for Climate-related Financial Disclosures (TCFD)³⁵	<ul style="list-style-type: none"> Financial and non-financial related groups experiencing public debt and/or equity 	<ul style="list-style-type: none"> Recommends voluntary consistent climate-related financial risk disclosure Provides a framework for disclosure in financial filings and suggestions for how to practically assess climate risks Disclosure related to risks of climate change on applicant and how they are measured Follow the guidelines for principles for effective disclosure Prepare a scenario analysis for climate related patterns 	<ul style="list-style-type: none"> Recommendations published in 2017 2021 status report

Regulatory Pressures	Target Audience	Requirements	Year of Application
International Monetary Fund ³⁶	<ul style="list-style-type: none"> IMF members 	<ul style="list-style-type: none"> Summary of climate related risks Gaps in resources to support the Nationally Determined Contributions Summary of brown assets and related vulnerabilities 	<ul style="list-style-type: none"> 2022 (updated)
Japan's Financial Services Agency (FSA) ³⁷	<ul style="list-style-type: none"> Companies listed on the TSE's 'Prime' market 	<ul style="list-style-type: none"> Information based on environmental activities in business Disclosure of environmental impacts Disclosure of climate based "countermeasures" and their support 	<ul style="list-style-type: none"> 2022
New Zealand ³⁸	<ul style="list-style-type: none"> Large companies, insurance managers, banks, "non-bank deposit takers" and investment leaders 	<ul style="list-style-type: none"> Requires ~ 200 large financial institutions under the Financial Markets Conduct Act to issue climate-based disclosures Asset \$1 billion or more 	<ul style="list-style-type: none"> 2023
Switzerland Federal Council ³⁹	<ul style="list-style-type: none"> Public companies, banks, insurance companies 	<ul style="list-style-type: none"> Mandatory climate risk disclosures Double materiality reporting - risk their businesses face from climate-driven events, but also the risks their operations pose to the environment 	<ul style="list-style-type: none"> 2024
The Net Zero Asset Managers Initiative: Proposed rule of the Securities and Exchange Commission ⁴⁰	<ul style="list-style-type: none"> Worldwide asset managers 	<ul style="list-style-type: none"> Management of assets related to climate risk Climate data Company related information and associated climate risks 	<ul style="list-style-type: none"> 2021
The UN Principles for Responsible Investment (PRI) ⁴¹	<ul style="list-style-type: none"> Investors Companies registering for climate related risks 	<ul style="list-style-type: none"> Climate disclosure from registrant Reasonable Assurance: Scope 1&2 Attestation Reports Management Assessments Financial Statements 	<ul style="list-style-type: none"> 2022
U.S. Federal Reserve Bank ⁴²	<ul style="list-style-type: none"> Financial investors and organizations Communities and developers 	<ul style="list-style-type: none"> Consumer trend monitoring Economic disclosure Continued guidance through updated requirements 	<ul style="list-style-type: none"> 2022-supervisory and regulatory activities
UK Government ⁴³	<ul style="list-style-type: none"> UK's largest registered companies and financial institutions 	<ul style="list-style-type: none"> Mandatory TCFD-based reporting A description of current management strategies and potential risks Use of the scope outline and threshold requirements Reference to the Energy and Carbon Report or the Non-Financial and Sustainability Information Statement 	<ul style="list-style-type: none"> 2022
US: Commodities Futures Trading Commission (CFTC) ⁴⁴	<ul style="list-style-type: none"> U.S. derivatives markets, including futures, options, and swaps 	<ul style="list-style-type: none"> Market Risk Advisory Committee (MRAC) issued recommendations to address the growing impact of climate-related financial risk 	<ul style="list-style-type: none"> 2020

Regulatory Pressures	Target Audience	Requirements	Year of Application
<p>US: Executive Order 14030: Climate-related Financial Risk⁴⁵</p>	<ul style="list-style-type: none"> U.S. Treasury 	<ul style="list-style-type: none"> Consider how to combat climate change, especially as it affects the U.S. financial sector 	<ul style="list-style-type: none"> May 2021
<p>US: Office of the Comptroller of the Currency (OCC)⁴⁶</p>	<ul style="list-style-type: none"> U.S. banks with over \$100 billion in assets 	<p>Draft principles:</p> <ul style="list-style-type: none"> Incorporate climate-related risks into determining bank strategies and operations, as well as how those risks could affect stakeholder expectations. Develop plans for monitoring material risks related to climate, and find ways to collect data that help determine that risk The invitation for public discussion (2022) 	<ul style="list-style-type: none"> 2021
<p>US: Securities Exchange Commission (SEC)⁴⁷</p>	<ul style="list-style-type: none"> Publicly traded securities in the U.S. 	<ul style="list-style-type: none"> Rulemaking on climate disclosures Creation of a Climate and ESG Task Force to highlight any mistakes or issues with climate risk disclosures⁴⁸ Examination focusses on climate and ESG-related risks to ensure that investors' best interests and business continuity plans are met⁴⁹ Guidance on climate-related risk disclosures⁵⁰ 	<ul style="list-style-type: none"> March 2021 March 2021 February 2010
<p>US: Treasury Financial Stability Oversight Council⁵¹</p>	<ul style="list-style-type: none"> Member agencies 	<ul style="list-style-type: none"> Recommendations to evaluate climate risks, release climate information and data, and support/redesign risk management 	<ul style="list-style-type: none"> October 2021

VIII. References

1. <https://sgp.fas.org/crs/misc/IF11827.pdf>
2. https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en
3. <https://lightsmithgp.com/news-posts/first-taxonomy-created-to-identify-private-sector-solutions-for-investing-in-climate-adaptation-and-resilience/>
4. https://www.whitehouse.gov/wp-content/uploads/2022/04/OMB_Climate_Risk_Exposure_2022.pdf
5. <https://www.cdp.net/en/articles/media/worlds-biggest-companies-face-1-trillion-in-climate-change-risks>
6. <https://www.federalreserve.gov/econres/notes/feds-notes/climate-change-and-financial-stability-20210319.htm>
7. <https://www.ngfs.net/en>
8. <https://www.soa.org/globalassets/assets/files/resources/research-report/2019/12th-emerging-risk-survey.pdf>
9. https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Status_Report.pdf
10. <https://www.esgtoday.com/state-street-to-require-companies-to-provide-tcdf-aligned-climate-disclosures/>
11. <https://fortune.com/2021/02/17/blackrock-climate-companies-expectations/>
12. https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Implementing_Guidance.pdf
13. <https://www.blackrock.com/aladdin>
14. <https://www.unep.org/resources/adaptation-gap-report-2021>
15. <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/>
16. <https://www.svb.com/trends-insights/reports/future-of-climate-tech#>
17. FASTR webinar, 9/20/22
18. <https://www.climatebonds.net/2021/10/1trillion-annual-green-bond-milestone-tipped-end-2022-latest-survey-se-an-kidney-calls>
19. https://assets.bbhub.io/company/sites/60/2021/07/2021-Metrics_Targets_Guidance-1.pdf
20. <https://www.rmahq.org/climate-risk-consortia/?gmssopc=1>
21. <https://www.spglobal.com/esg/insights/a-short-guide-to-the-eu-s-taxonomy-regulation>
22. https://www.bis.org/fsi/fsisummaries/climate_env_risks.htm
23. <https://www.daato.net/articles/canada-adopts-tcdf-recommendations-in-first-climate-disclosure-mandate>
24. <https://www.bcb.gov.br/en/publications/report-risk-opportunity>
25. <https://www.bnm.gov.my/climatechange>
26. <https://www.banxico.org.mx/publications-and-press/other-announcements/%7B38E-DA543-97F9-21CF-F38F-A15903DBA9E7%7D.pdf>
27. <https://chinadialogue.net/en/business/how-should-china-improve-climate-disclosure-in-the-finance-sector/>
28. https://finance.ec.europa.eu/sustainable-finance/disclosures/sustainability-related-disclosure-financial-services-sector_en
29. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L2341>
30. <https://www.intuition.com/what-is-the-sfdr-sustainable-finance-disclosure-regulation/>
31. https://www.ecb.europa.eu/ecb/climate/our_approach/html/index.en.html
32. <https://www.fsb.org/2022/04/supervisory-and-regulatory-approaches-to-climate-related-risks-interim-report/>
33. <https://www.novethic.com/sustainable-finance/isr-rse/the-new-decree-under-article-29-of-the-french-law-on-energy-and-climate-keeps-its-promise-to-strengthen-requirements-149884.html>
34. https://cdn.cdp.net/cdp-production/cms/policy_briefings/documents/000/003/249/original/CIFF_Policy_Briefing_France_v3.pdf
35. <https://www.fsb-tcdf.org/recommendations/>
36. <https://www.imf.org/en/Topics/climate-change>
37. <https://www.fsa.go.jp/en/refer/legislation/legislation.pdf>

38. <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/mandatory-climate-related-financial-disclosures/>
39. <https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-84741.html>
40. <https://www.federalregister.gov/documents/2022/04/11/2022-06342/the-enhancement-and-standardization-of-climate-related-disclosures-for-investors>
41. <https://www.federalregister.gov/documents/2022/04/11/2022-06342/the-enhancement-and-standardization-of-climate-related-disclosures-for-investors>
42. <https://www.federalreserve.gov/aboutthefed.htm>
43. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1056085/mandatory-climate-related-financial-disclosures-publicly-quoted-private-cos-llps.pdf
44. <https://www.cftc.gov/sites/default/files/2020-09/9-9-20%20Report%20of%20the%20Sub-committee%20on%20Climate-Related%20Market%20Risk%20-%20Managing%20Climate%20Risk%20in%20the%20U.S.%20Financial%20System%20for%20posting.pdf>
45. <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/05/20/executive-order-on-climate-related-financial-risk/>
46. <https://www.occ.gov/news-issuances/bulletins/2021/bulletin-2021-62a.pdf>
47. <https://www.sec.gov/news/press-release/2021-42>
48. <https://www.sec.gov/news/press-release/2021-42>
49. <https://www.sec.gov/news/press-release/2021-39>
50. <https://www.sec.gov/rules/interp/2010/33-9106.pdf>
51. <https://home.treasury.gov/news/press-releases/jy0426>



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