



An Investor Guide to Physical Climate Risk & Resilience

An Introduction

An Investor Guide of the

Global Adaptation & Resilience Investment Working Group

December 2017

Authors

Lead Authors: Jay Koh, Emilie Mazzacurati, Chiara Trabacchi

Contributors: Lori Collins, Joyce Coffee, Linda-Eling Lee, James McMahon, Peter Schultz, Stacy Swann, Sanjay Wagle

Acknowledgements

The authors would like to thank the members of the Global Adaptation & Resilience Investment Working Group (GARI) for their valuable input and feedback. GARI is a private sector, private investor-led initiative announced at Paris COP21 in 2015. It is a partner of the UN Secretary General's A2R Climate Resilience Initiative. The working group has brought together over 150 private and public investors, bankers, leaders and other stakeholders to discuss critical issues at the intersection of climate adaptation and resilience and investment with the objective of helping to assess, mobilize and catalyze action and investment. For more information, please see www.garigroup.com.

Disclaimer

Members of the Global Adaptation & Resilience Investment Working Group (GARI) provided the data and information outlined in this report. The authors would like to acknowledge that these findings might not necessarily reflect the views of all GARI members and participants. The publications of GARI are for information purposes only. Other than disclosures relating to GARI, the information contained in this publication has been obtained from sources that GARI believes to be reliable, but no representation or warranty, express or implied, is made as to the accuracy, completeness, reliability or timeliness of any of the content or information contained herein. As such, the information is provided 'as-is,' 'with all faults' and 'as available.' The opinions and views expressed in this publication are those of GARI, and are subject to change without notice, and GARI has no obligation to update either the information contained in this publication. Further, neither GARI nor its participants or agents shall be held liable for any improper or incorrect use of the information described and/or contained herein and assumes no responsibility for anyone's use of the information. Under no circumstances shall GARI, or any of its participants or agents, be liable for any direct, indirect, incidental special, exemplary or consequential damages (including, but not limited to: procurement of substitute good or services; loss of use, data or profits; or business interruption) related to the content and/or to the user's subsequent use of the information contained herein, however caused and on any theory of liability. User agrees to defend, indemnify, and hold harmless, GARI and its participants and agents from and against all claims and expenses, including attorneys' fees, arising out of the use of information herein provided.

Foreword

The Global Adaptation & Resilience Investment Working Group (GARI) was conceived in the run up to the Paris COP21 conference. Launched at COP21 in conjunction with the UN Secretary General's A2R Climate Resilience Initiative (and now a partner of A2R), GARI was designed to bring together private investors and a range of other stakeholders to focus on investment and 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 the face of adaptation and climate resilience needs, and the associated benefits.

GARI held five meetings over 2016, engaged over 150 private investors and other stakeholders, and released its first [Discussion Paper](#) at COP22 in Marrakech. Following the successful series of discussions, GARI members meet again five times during 2017 to continue advancing the engagement of private investors and other stakeholders in the question of investment and adaptation and climate resilience.

GARI participants in 2017 agreed to develop a “plain language” introduction to the issue of physical climate risk and resilience for investors and other stakeholders.

The GARI meetings and this Investor Guide are indications of the interest of the private sector – private investors and financiers more specifically – in climate adaptation and resilience. The Investor Guide aims to introduce the physical climate risk and resilience issue for investors, providing a practical starting point for discussion – it does not aim to offer a comprehensive analysis.

GARI and this Investor Guide would not be possible without the support of The Lightsmith Group, Nixon Peabody, the Inter-American Development Bank Group, Aon, Sun Valley Institute and other institutions that provided in-kind support. It would also not be possible without a number of tireless, dedicated individuals including, more specifically: John Chow, Aimee Christensen, Ernest Chung, Olivia Darby, Craig Davies, John Firth, Linda-Eling Lee, Greg Lowe, Emilie Mazzacurati, Nancy Saich, Vladimir Stenek, Stacy Swann, Chiara Trabacchi and Sanjay Wagle. I wish to acknowledge Erica Downing, David Espinoza, John Firth, Samantha Medlock, Josh Sawislak, and for their specific comments and editorial contributions in addition to the lead authors and contributors named above. Thanks also to all GARI participants.

We hope you find this Investor Guide useful. Comments or questions can be sent to chair@garigroup.com.

Sincerely,



Jay L. Koh
Chair
GARI



Table of Contents

Executive Summary.....	5
Step 1: Know what physical climate risk is	6
Step 2: Understand why physical climate risk and resilience matter to investors.....	7
Step 3: Assess, disclose and act.....	9
Next steps.....	10
Annex A: Suggestions for further reading.....	11

Executive Summary

This Investor Guide aims to provide private investors, financiers and other stakeholders with a simple, plain language introduction to the topic of physical climate risk and resilience. It does so by providing:

- A description of physical climate risk and resilience
- An explanation of why it matters to investors
- Suggestions about what an investor can do about it; and
- Suggestions for further reading.

This Investor Guide outlines three main avenues through which investors can identify and manage the physical effects of climate change on investment portfolios, and seize climate-resilience investment opportunities, namely:

- a) Investigate whether, how and when the physical impacts of climate change might affect your assets' performances or valuation
- b) Require asset managers and investment advisors to consider climate risk in their investment and corporate engagement strategies
- c) Allocate capital to climate-resilient investment and towards building resilience to de-risk portfolios.

As evidence of climate change's impact on all asset classes mounts, investors should consider starting to understand, assess, and mitigate their climate risk exposure.

In addition, investors can look forward to additional guidance on methodologies, metrics and emerging best practices to manage physical climate risk that are forthcoming in 2018.¹

GARI itself will focus on deeper analysis of physical climate risk and resilience in 2018, including a likely focus on specific sectors, companies, and cities, as well as risk metrics, and investment opportunities.

Investors and other stakeholders who are interested in participating in or contributing to GARI should contact chair@gairgroup.com or visit www.garigroup.com.

Step 1: Know what physical climate risk is

“Physical climate risk” refers to the risks arising from the physical effects of climate change on financial institutions’ and/or businesses’ operations, workforce, markets, infrastructure, raw materials and assets. Physical climate risks may have direct or indirect operational, strategic, financial and social implications and, as illustrated in Table 1, can spread across the investment value chain.

Physical climate risk includes both the impacts from specific events (acute risks) like hurricanes or floods, and those emerging from longer-term changes slower in their onset (chronic risks) like changes in temperature and precipitation leading to drought, land degradation, and sea level rise.

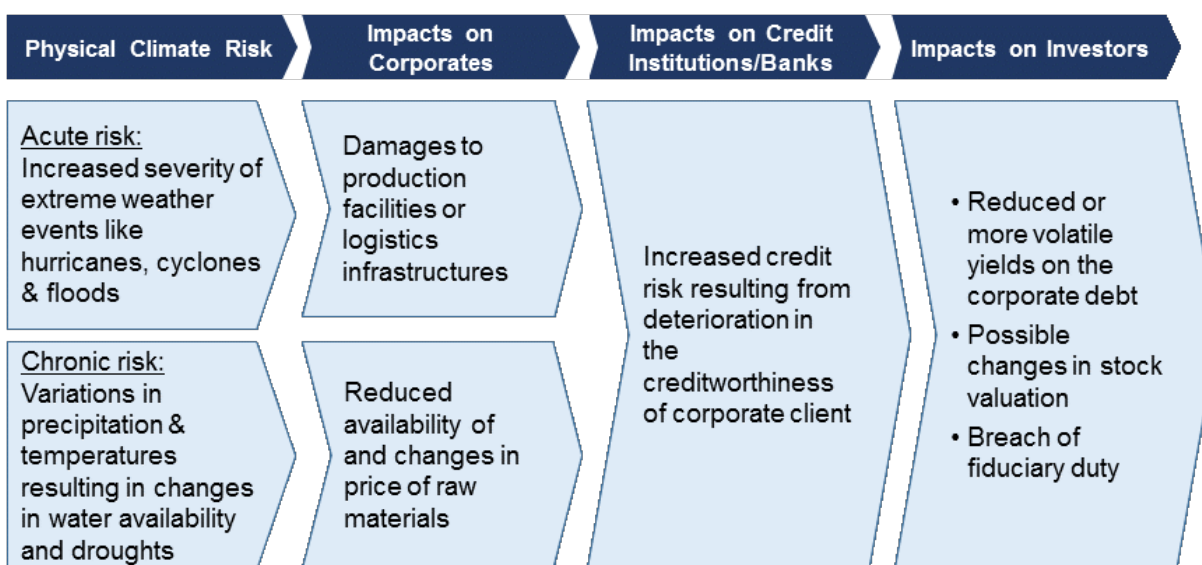
Exposure to physical climate risks is not homogenous, and can change over time. Corporations, credit institutions, banks and other investors’ exposure varies depending on business-specific circumstances such as the context of their operations (sector, industry, and geography), the nature of their operations, and portfolio composition. Therefore, the financial materiality of physical risks as well as the threshold for materiality can vary from one institution to another.

Physical climate risk is distinct from “Transition risk”, which is defined by the Financial Stability Board’s [Task Force on Climate-Related Risk Disclosures](#) (TCFD) as the risks resulting from the policy, legal, technology and market changes occurring in the shift to a low carbon economy. Transition risks – in some circumstances described as “stranded asset risk” – may include the repricing or write-downs of carbon-intensive assets that could quickly become “stranded”, meaning unusable or reduced to lower/zero value.ⁱⁱ

Physical climate risks can create opportunities for investments in climate resilience i.e., investments that can help anticipate, absorb, accommodate or recover from the increased risk and impact of acute or chronic risks.ⁱⁱⁱ Climate resilient investment opportunities represent a strategy to manage physical risk. These opportunities include:

- Products and services helping to identify, assess and manage climate risks, e.g., technologies to forecast the availability and improve efficiency in the use of natural resources such as water
- Projects or practices that reduce physical climate risk e.g. infrastructure and “hubs” for improved business continuity during and after extreme weather events
- Companies producing such products and services
- “Climate resilient” securities such as bonds issued to raise capital for use in projects or activities with the specific purpose of building resilience to climate events^{iv}, or
- Investment vehicles focused on climate resilience companies or assets.^v

Table 1. Examples of physical climate risks and related implications along the finance value chain



Step 2: Understand why physical climate risk and resilience matter to investors

Financial impacts, regulatory-related and industry pressures, fiduciary duties and investment opportunities are key reasons why investors should become more aware of physical climate risk and resilience.

Financial impacts

If physical climate risk is mispriced or underestimated, it can have a material financial impact on an organization's income statement or balance sheet, whether it is a company, a credit institution or an institutional investor.^{vi} Table 2 provides examples of possible impacts to these three different classes of market players.

Table 2. Examples of potential financial impacts

Corporate	Credit institution / Bank	Institutional Investor
<ul style="list-style-type: none"> • Income risk: revenue losses; additional CAPEX / OPEX • Financing risk: impact on cost of capital / ability to access funds; increased insurance costs 	<ul style="list-style-type: none"> • Credit risk: impairment of lending portfolios stemming from potential reduction in value of on- and off-balance sheet assets due to a deterioration in the credit profile of a client / the context in which an institution invests; reduced value of assets used as collateral • Additional capital reserves requirements 	<ul style="list-style-type: none"> • Financial performance risks (of an issuer/issue) including credit risk <ul style="list-style-type: none"> ○ Debt holder: impacts on yields, pricing and spreads ○ Equity holder: impacts on investment's valuation and related implications on returns on equity and exit strategy

Regulatory-related pressure

In 2015, the Paris Agreement signaled the political will of almost all the world's nations to manage climate change-related risks. Since then, there have been a number of international, regional and national regulatory-related developments relevant to investors and financiers.

Table 3 provides an overview of key recent initiatives, including the noteworthy Task Force on Climate-Related Financial Disclosure (TCFD) led by Michael Bloomberg under the patronage of the Governor of the Bank of England – Mark Carney – and the G20 Financial Stability Board. The industry Task Force acknowledged that mispricing of climate-related risks can lead to mispricing of assets, misallocation of capital, and can potentially give rise to concerns about financial stability.^{vii} Following the release of the Task Force's recommendations in June 2017, leading insurance supervisors and regulators announced their support to the adoption of the suggested climate risk disclosure framework.^{viii} Further, several supervisory authorities are currently investigating climate-related risks for the financial sectors, including the Chinese, UK, French, Italian, Australian and Californian authorities.^{ix} France already required the disclosure of climate risk under Art. 173 of the Energy Transition Law from 2015, and the Dutch Central Bank announced the introduction of climate-related risks in its supervisory assessment frameworks^x. Other Central Banks noted their intention to do the same, where appropriate.^{xi}

In reaction to these regulatory-related pressure, sixteen of the world's biggest banks with more than US\$7 trillion combined assets under management, are now working to evaluate their exposure to climate change-related risks.^{xii}

Investors are also moving. Deutsche Asset Management is using a global database of corporate sites' exposure to climate risk to identify where natural disasters spawned by climate change may pose the greatest risks to its investment portfolio.^{xiii} BlackRock has included climate risk as one of the key engagement themes of its Investment Stewardship work for 2017, with the aim of encouraging companies most exposed to climate risks to consider reporting against the TCFD recommendations.^{xiv}

Table 3. Recent regulatory-related initiatives prompting to physical climate risks management

Regulatory-related pressures	Target audience	Requirements	Year of application
<ul style="list-style-type: none"> GLOBAL: Task Force on Climate-related Financial Disclosures (TCFD) 	<ul style="list-style-type: none"> Financial and non financial organizations with public debt and/or equity 	<ul style="list-style-type: none"> Recommends voluntary consistent disclosure of climate-related financial risk Provides a framework for disclosure in financial filings, including suggestions on how to practically assess forward-looking climate-related risk through scenario analysis 	<ul style="list-style-type: none"> Recommendations released in 2017
<ul style="list-style-type: none"> EUROPE: Institutions for Occupational Retirement Provision Directive (IORP II) - 2016/2341 	<ul style="list-style-type: none"> Institutions for occupational retirement provision (i.e. all registered EU pension funds) 	Requires to <ul style="list-style-type: none"> Consider climate and environmental matters in governance, risk and investment decisions Evaluate environmental, social & governance risks, including climate change-related risks, resource scarcity and stranded assets Disclose 	<ul style="list-style-type: none"> In effect since January 2017, Member States have until January 2019 to transpose the Directive into national law
<ul style="list-style-type: none"> FRANCE: Energy Transition Law Art 173 on climate risk reporting 	<ul style="list-style-type: none"> Publicly traded financial and non financial French organizations 	<ul style="list-style-type: none"> Sets out mandatory disclosure requirements of climate risk – including physical risk Requires all French institutional investors to assess and disclose the climate risk to their investment portfolios (including physical risks) 	<ul style="list-style-type: none"> In effect since January 2016 First reporting due in 2017

Industry pressures

A number of industry groups, shareholders, asset managers and other stakeholders are also supporting the drive toward climate risk disclosure and management.^{xv}

Leading asset managers including BlackRock, State Street and Vanguard have made climate risk a primary investment stewardship, engagement and governance issue.^{xvi} Investment advisors Cambridge Associates and Mercer have also recommended investors to assess and address climate risk.^{xvii} Credit rating agencies^{xviii} and re/insurance companies^{xix} have signaled the relevance of integrating climate risks – including physical climate risk – in credit risk analysis, underwriting and investment decisions, and called for the adoption of the TCFD recommendations.

Fiduciary duties

Institutional investors, who have a fiduciary duty to implement capital preservation strategies in the interest of their beneficiaries, may also need to integrate climate risk management in investment practice and portfolio management. Failing to do so could result in a failure of fiduciary duties.^{xx}

The introduction of “bail in” regulations that require certain creditors to bear a portion of the burden of a potential borrower’s default, may enhance the call for climate risk management strategies to preserve capital.

Investment opportunities

Physical climate risk and resilience can also create opportunities:

- Resilience as a risk management strategy: investors and financiers can seek to allocate their capital towards long-term assets with lower physical climate risk, such as infrastructure designed to withstand more frequent hurricanes, or invest in / lend to corporations with superior resilience strategy. Climate-related financial risk disclosure information, emerging standards and climate scoring methodologies and indexes can help investors and financiers to distinguish between assets / projects with different levels of exposures to physical climate risk. This enables investors to rebalance investment portfolios away from assets with less attractive climate risk-adjusted return characteristics.
- Resilience as a business opportunity: investors and financiers can seek to allocate their capital in favor of companies providing products and services that improve climate resilience and support adaptation planning. Examples of such companies include providers of data and analytics services such as weather analytics, catastrophe modeling, and investment screening, or providers of solutions to physical climate risk like more efficient water processes, drought-resistant agriculture, and risk hedging and insurance.

Step 3: Assess, disclose and act

Institutional investors, corporates, lenders and other players of the financial system have a range of choices when it comes to physical climate risk management. This guide suggests the following:

- a) Learn more about whether, how, and when climate risk may have a material impact on your assets and portfolios.
- b) Require asset managers or investment advisors to consider climate risk in their investment and corporate engagement strategies
- c) Allocate capital to climate-resilient investment and towards building resilience

a) Learn more about whether, how and when climate risk may have a material impact. Simply start to ask your risk analysis team or portfolio management team about how physical climate change might affect performance or valuation, and to what extent, over time. Then, identify the most adequate “entry points” to raise systematically this question in decision-making processes. For instance:

- Incorporate physical climate risk analysis into an existing process for identifying and evaluating environmental, social, and governance (ESG) risks and/or opportunities, and in management oversight.
- Pilot new approaches for screening investments and portfolios for risks, and evaluating their relevance over the long-run under various scenarios; by leveraging emerging methods, metrics and processes for screening investments in equities, fixed income, and other asset classes that are

emerging in response to the TCFD recommendations and the French Energy Transition Law (Article 173)^{xxi}

- Engage with investees or borrowers to understand their risk exposure, through e.g. dialogue and proxy voting, promote climate-related financial risk disclosure in financial filings to improve transparency of the underlying risks facing companies.
- Partner with industry peers to undertake cutting edge research and/or share knowledge and experiences.

b) Recommend asset managers and investment advisors consider climate risk in their investment and corporate engagement strategies. Investors can work with their investment advisors to understand whether and how they assess physical climate risk, or influence them to do so. For example, investors could determine whether their investment advisors incorporate physical climate risk into their risk/return analysis by asking a few simple questions during due diligence or manager review:

- Do you consider the risk created by the physical impact of climate change in your investment and corporate engagement strategy?
- How do you assess physical climate risk in the due diligence and investment decision-making process?
- How do you monitor and report on possible changes to the physical risks of climate change in your portfolio?

c) Allocate capital to climate-resilient investment and towards building resilience to de-risk portfolios. Investors can choose to invest in assets and instruments that help anticipate, absorb, accommodate or recover from the risks and impacts of physical climate risks e.g., infrastructure bonds screened for climate impact. They could also work with the developer or manager of new or existing assets to make them more resilient through e.g. upgraded engineering requirements during design. Investors can also choose to invest in assets, companies and investment vehicles that can help build resilience. Lenders could favor lending to climate-resilient investments or borrowers by increasing their credit score vis-à-vis relatively more vulnerable alternatives, and/or engage with borrowers to promote, where relevant, changes to project submitted for funding.

Next steps

Identifying and evaluating exposure to physical climate risk and considering investing in resilience is becoming increasingly important as climate change increases risks and impacts, and regulatory and industry-related actions unfold in response.

The time is now for investors, lenders, and other stakeholders to assess, address, and optimize climate risk in existing investment portfolios and future investment strategy.

This Guide has outlined a few simple steps for investors to begin understanding and addressing physical climate risk and resilience, both as a risk and an opportunity.

To this end, GARI aims to continue engaging with investors, lenders and practitioners to build knowledge about physical climate risk, evaluation methodologies, and climate-resilience investment opportunities. In 2018, GARI will focus on deeper analysis of sectors, risk metrics, and investment opportunities.

GARI invites all interested parties to participate in working group meetings and to reach out with any questions or comments at www.garigroup.com.

Annex A: Suggestions for further reading

- Acclimatise (2017). [Using Scenarios in Corporate Disclosure of Physical Climate Risk](#), November 2017.
- AECOM and World Wildlife Fund Inc. (2017). [Review of Screening Tools to Assess Sustainability and Climate Resilience of Infrastructure Development](#), September 2017.
- Aon (2017). [Financial Regulators Awaken: Prepare to Disclose Climate Risk - How Risk Management and Analytics can Support the Financial Stability Board's Recommendations](#), June 2017.
- Backer McKenzie and PRI (2017). [Recommendations of the Task Force on Climate-related Financial Disclosures - Country Reviews](#), October 2017.
- BlackRock Investment Institute (2016). [Adapting Portfolios to Climate Change](#), September, 2016.
- Cambridge Associates (2015), [Risks and Opportunities from the Changing Climate: Playbook for the Truly Long-Term Investor](#), December 2015.
- Climate Finance Advisors, Acclimatise, and Four Twenty Seven (2017), [Lenders' Guide for Considering Climate Risk in Infrastructure Investments](#), December 2017 (forthcoming).
- Deutsche Asset Management and Four Twenty Seven (2017). [Measuring Physical Climate Risk in Equity Portfolios – White Paper](#), November 2017.
- Deutsche Bundesbank (2017). [Behind the Curve? The Role of Climate Risks in Banks' Risk Management](#), October 2017.
- De Nederlandsche Bank (2017). [Waterproof? An Exploration of Climate-related Risks for the Dutch Financial Sector](#), October 2017.
- EY (2017). [How Have Investors Met Their ESG and Climate Reporting Requirements Under Article 173-VI?](#), December 2017.
- European Parliament and the Council of the European Union (2016), [Directive \(EU\) 2016/2341 of The European Parliament and of the Council of 14 December 2016 on the Activities and Supervision of Institutions for Occupational Retirement Provision \(IORPs\)](#), December 2016.
- Financial Stability Board (2017). [Recommendations of the Taskforce on Climate-related Financial Disclosures](#), June 2017.
- French Government (2016), [LOI n° 2015-992 du 17 Août 2015 Relative à la Transition Énergétique pour la Croissance Verte - Article 173](#), [Energy Transition Law - Article 173], August 2015.
- Global Adaptation & Resilience Investment Working Group (GARI), [Bridging the Adaptation Gap: Approaches to Measurement of Physical Climate Risk and Examples of Investment in Climate Adaptation and Resilience](#), November 2016.
- Mercer (2011), [Climate Change Scenarios – Implications for Strategic Asset Allocations](#), February 2011.
- Mercer (2015). [Investing in a Time of Climate Change](#), September 2015.
- Moody's (2017). [Environmental Risks -- Evaluating the Impact of Climate Change on US State and Local Issuers](#), November 2017.
- RE:FOCUS Partners (2017). [A Guide to Public-Sector Resilience Bond Sponsorship](#), September 2017.
- Standard and Poor's (2017). [Climate Risk Increasingly Important for Ratings](#), Environmental Finance, November 2017.
- Standard and Poor's Ratings Direct (2015). [Climate Change Will Likely Test the Resilience of Corporates' Creditworthiness to Natural Catastrophes](#), April 2017.
- UNEP PRI (2016). [French Energy Transition Law: Global Investor Briefing](#), May 2016.
- WWF (2017). [Climate Guide to Asset Owners: Aligning Investment Portfolios with the Paris Agreement](#), December 2017.

End notes

ⁱ The interest within the corporate and financial services sectors in better understanding physical climate risk has led to a number of initiatives announced in late 2017. These initiatives will likely lead to rapid changes in the market as new guidance emerges on methodologies, metrics, and best practices to manage physical climate risk. Three projects in particular will publish results in the first half of 2018:

- [Towards a Resilient Finance Sector: Disclosing Physical Climate Risk and Opportunities](#), an initiative from the European Bank for Reconstruction and Development (EBRD) in partnership with the Global Center for Excellence in Climate Adaptation (GCECA). Under this initiative EBRD and the GCECA are running a series of Working Groups focused on metrics for physical risk and resilience, and the integration of climate risk in strategic planning in the financial sector.
- [The Climate Action in Financial Institutions Initiative](#), which sees the involvement of 31 public and private financial institutions, and aims to make climate change considerations a core component of how financial institutions conduct business. One of its four 2017-2018 Work Streams – *Climate Risks: Approaches, Tools and Methodologies* – will look at develop common understanding of climate risk-related issues; shared definitions; and experience on developing metrics to assess this issue quantitatively and qualitatively. [The UNEP FI Pilot project on Implementing the TCFD Recommendations](#), an initiative from UNEP FI that together with 16 of the world's leading banks, is working on implementing the recommendations set forth by the Financial Stability Board's Task Force on Climate-related Financial Disclosure (TCFD). This initiative will pilot the development of scenarios, models and metrics to enable scenario-based, forward-looking assessment and disclosure of climate-related risks and opportunities.

ⁱⁱ For example, technology developments reducing the demand for fossil fuel related products and policy changes could make the extraction of fossil fuel reserves commercially unviable, thereby reducing the valuation of oil, gas and coal mining companies and their ability to repay their debt (see e.g. [Weyzig, 2014](#); [UBS, 2016](#); [LSE, 2016](#)). To get an idea of the scale of potential losses, Weyzig (2014) estimated in over EUR 1 trillion the exposure of the European financial sector (banks, insurance companies, and pension funds) to high-carbon assets.

ⁱⁱⁱ Re-elaboration from IPCC (2012) and IPCC (2017).

^{iv} For instance, the city of Cape Town in July 2017 issued its first green bond for US\$76 million, with the specific purpose of using proceeds to support transportation, energy efficiency, wastewater, and coastal resilience projects ([CBI and HSBC, 2017](#)). Natural infrastructures also represent an opportunity into which investing to abate physical climate risks such as increased flooding.

^v CRAFT - Climate Resilience and Adaptation Finance & Technology Transfer Facility – is an example of a climate-resilience investment vehicle. CRAFT is a fund providing growth capital and strategic support to companies generating data, products and services that manage climate risks and impacts. For further information, see [climatefinancelab.org](#).

^{vi} For instance, the impact of the hailstorm that hit the Netherlands in 2016 resulted in over EUR 600 million in insured losses, which was considerably higher than predicted in the insurers' models ([DNB, 2017](#)). The unexpected 2017 hurricane seasons resulted in significant unforeseen losses for the reinsurance sector – estimated in approximately US\$20 billion-US\$25 billion for the reinsurance sector alone ([Insurance Journal, 2017](#)). Germany's Hannover Re and Munich Re stated they could miss 2017 profit target because of claims from the natural disasters ([Insurance Journal, 2017](#)).

^{vii} Carney (2015), [Breaking the Tragedy of the Horizon - Climate Change and Financial Stability - speech by Mark Carney](#); September 2015; TCFD (2017), [Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures](#), June 2017.

^{viii} See e.g. UNEP (2017) – *Press Release – Leading Insurance Supervisors Support Adoption of Climate Disclosure Recommendations*, July 2015; De Nederlandsche Bank (2017), [Increasing Climate-Related Risks Demand More Action from the Financial Sector](#), October 2017; Lowson et al. (2017), [FSB TCFD Guidance on Climate-Related Financial Disclosures: Regulatory and Market Responses](#), Harvard Law School, October 2017.

^{ix} De Nederlandsche Bank (2017), [Increasing Climate-Related Risks Demand More Action from the Financial Sector](#), October 2017.

^x Idem ix

^{xi} Deutsche Bundesbank (2017), [Behind the Curve? The Role of Climate Risks in Banks' Risk Management](#) – speech by Dr. Andreas Dombret, Member of the Executive Board of the Deutsche Bundesbank, October 2017.

^{xii} Source: Reuters - [Banks Worth US\\$7 Trillion Pledge to Calculate Costs of Climate Risks](#), 11 July 2017. A number of other public and private banks are also working to identify best practices in incorporating climate risk into investment decisions through the so-called [Climate Action in Financial Institutions Mainstreaming Initiative](#). The European Bank for Reconstruction and Development (EBRD), in partnership with the Global Center for Excellence in Climate Adaptation, also recently announced a series of technical working group focused on physical climate risk and resilience metrics, and the integration of physical risk in scenario planning and investment decisions with the participation of a diverse set of financial institutions: asset owners, asset managers, banks, insurance, and credit rating agencies (see EBRD (2017)).

^{xiii} Deutsche Asset Management and Four Twenty Seven (2017), [Measuring Physical Climate Risk in Equity Portfolios – White Paper](#), November 2017.

^{xiv} BlackRock web site – [Investment Stewardship, Our Engagement Priorities for 2017-2018](#) – see particularly the climate risk disclosure Investment Stewardship priority.

^{xv} For example a recent [HSBC survey](#) (2017), reported that 61% of surveyed corporate issuers and investment houses intend to increase climate risk disclosure. Further, an [article](#) from Environmental Finance highlighted that a group of investors managing nearly US\$ 2 trillion in assets wrote letters to 62 of the world's largest banks calling for improved disclosure of climate-related information (see [Why Pressure is Mounting for Banks to Address Climate Change](#), Environmental Finance, 26 September 2017 and [Boston Common Asset Management web site](#)). The legal challenge against the Commonwealth Bank of Australia (CBA) from its shareholders for inadequate disclosure of climate change risks in its 2016 annual report represents another example (Source: [CBA Climate Change Case Could Have 'Global Ramifications'](#), Environmental Finance, 9 August 2017).

^{xvi} See BlackRock web site – [Investment Stewardship, Our Engagement Priorities for 2017-2018](#); Vanguard web site, [Investment Stewardship 2017: How Vanguard Advocates for Investors](#), August 2017; SSGA, (2017a), [SSGA's Perspectives on Effective](#)

[Climate Change Disclosure](#), August 2017; SGGA (2017b), [Letter to the Board of Directors and ESG Guidelines](#), January 2017.

^{xvii} Cambridge Associates (2015), [Risks and Opportunities from the Changing Climate: Playbook for the Truly Long-Term Investor](#), December 2015; Mercer (2015), [Investing in a Time of Climate Change](#), September 2015

^{xviii} For instance S&P, who recently emphasized that climate risk is increasingly important for ratings ([Environmental Finance, 2017](#)), developed a [green bond evaluation methodology](#) and a [green evaluation](#) approach. The former provides a non-credit rating framework for analysis the environmental impact of the projects financed by the bond's proceeds over their lifetime. The approach considers also adaptation to climate change, thereby physical climate resilience. The latter, the green evaluation, is an asset-level environmental credential aimed at providing investors with a more comprehensive picture of the green impact and climate risk attributes of their portfolios. Such evaluation – that can be applied to any type of financing, in part or in full – features an adaptation score reflecting the estimated reductions in the costs of expected damages that projects achieve.

^{xix} For instance, see UNEP (2017) – [Press Release – Leading Insurance Supervisors Support Adoption of Climate Disclosure Recommendations](#), July 2017; Allianz Group (2017), [Climate Change Strategy of Allianz Group](#), August 2017; and, the list of companies who have expressed their support for the TCFD recommendations available at [FSB's TCFD web site](#).

^{xx} A number of companies and investors have already endorsed a statement on fiduciary duty and climate change disclosure (see [Climate Disclosure Standard Board web site](#)).

^{xxi} See e.g. Deutsche Asset Management and Four Twenty Seven (2017), [Measuring Physical Climate Risk in Equity Portfolios – White Paper](#), November 2017; Allianz Global Investors web site, [Climate Change Turns Up the Heat on Investors](#), August 2015.