



# IIGCC

The Institutional Investors  
Group on Climate Change

**Addressing physical  
climate risks: key steps  
for asset owners and  
asset managers**





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## About IIGCC

The Institutional Investors Group on Climate Change (IIGCC) is the European membership body for investor collaboration on climate change and the voice of investors taking action for a prosperous, low-carbon future. IIGCC has more than 230 members, mainly pension funds and asset managers, across 16 countries, with over €30 trillion in assets under management.

Our mission is to mobilise capital for the low carbon transition and to ensure resilience to the impacts of a changing climate by collaborating with business, policy makers and fellow investors. IIGCC works to support and help define the public policies, investment practices and corporate behaviours that address the long-term risks and opportunities associated with climate change. Members consider it a fiduciary duty to ensure stranded asset risk or other losses from climate change are minimised and that opportunities presented by the transition to a low carbon economy – such as renewable energy, new technologies and energy efficiency – are maximised.

For more information visit [www.iigcc.org](http://www.iigcc.org) and [@iigccnews](https://twitter.com/iigccnews).



## About Chronos Sustainability

Chronos Sustainability was established in 2017 with the objective of delivering transformative, systemic change in the social and environmental performance of key industry sectors through expert analysis of complex systems and effective multi-stakeholder partnerships.

It is currently leading or supporting a series of major sustainability projects and initiatives around the world.

Chronos works extensively with global investors and global investor networks to build their understanding of the investment implications of sustainability-related issues, developing tools and strategies to enable them to build sustainability into their investment research and engagement.

For more information visit [www.chronossustainability.com](http://www.chronossustainability.com) & [@ChronosSustain](https://twitter.com/ChronosSustain).



## About Acclimatise

Acclimatise is a specialist advisory and analytics company providing world-class expertise in climate change adaptation and risk management. Founded in 2004, our mission is to make the world more resilient to climate change. We do this by making climate change information useful for our clients, helping them to take the very best decisions in the face of uncertainty.

With offices in the UK, US, India and mainland Europe, Acclimatise has worked in over 80 countries. Our experience spans a wide range of sectors including government, finance, insurance, water, energy, transport, mining, agriculture, defence, food and beverages, and development. Working with corporates, financial institutions and governments around the world, Acclimatise is committed to achieving the greatest impact in driving action on climate change adaptation.

For more information, please visit:  
[www.acclimatise.uk.com](http://www.acclimatise.uk.com).

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## ABOUT THIS REPORT

This report provides asset owners and asset managers with practical steps to start identifying, assessing, monitoring and managing physical climate risk.

It has been produced in response to growing awareness of the significant financial risks posed by physical climate change, and the challenge that understanding, assessing and managing those risks poses for financial institutions and investors.

It is supplemented by a more detailed guidance document, **Understanding physical climate risks and opportunities**<sup>1</sup>. This guidance sets out how a physical climate risk assessment process can be designed and implemented, and covers how related opportunities might be assessed, it also offers investor case studies, suggestions on data sources and risk assessment tools, and a discussion of the role that scenario analysis can play in assessing physical climate risks.

References to the detailed guidance are provided at relevant points in this document for readers who want to access this more in-depth supporting information.

We recognise that the specific actions that investors will take will depend on whether investment management is outsourced or conducted in-house. We also recognise that organisations will have different levels of internal capacity, and that some may have already analysed how the physical impacts of climate change create risks and opportunities for themselves. We have, therefore, tailored the information in these reports to these different situations.

<sup>1</sup> Hamaker-Taylor, R et. al (2020), IIGCC Guidance – Understanding Physical Climate Risks and Opportunities (IIGCC, <https://www.iigcc.org/resource/understanding-physical-climate-risks-and-opportunities-a-guide-for-investors/>)





## INTRODUCTION

Investors increasingly recognise that climate change presents a systemic risk to their investment portfolios. To date, however, most analysis has been applied to the risks and opportunities presented by the need to reduce greenhouse gas emissions. Relatively little attention has been paid to what the physical impacts of climate change might mean for investment portfolios. This is changing.

The warming of the Earth's climate has brought the issues of climate adaptation and resilience to the forefront of investor attention, and a changing climate is increasingly understood as having significant financial risks.

Human activities such as burning fossil fuels have already caused approximately 1.0°C of global warming above pre-industrial levels, leading to more frequent and more extreme weather and climate events as well as gradual shifts in rainfall patterns, sea levels, sea ice, and glacial retreat, among other changes<sup>i</sup>.

Warming is set to continue, leading to unavoidable, far-reaching consequences on natural systems and resulting impacts on social and economic ones<sup>ii</sup>. The costs associated with these impacts are predicted to be substantial, as is the level of investment required for society to adapt effectively to these changes. Indeed, these costs are already materialising, whether in the bankruptcy of US utility PG&E following the 2018 California wildfires, the economy-wide impacts of Australia's bushfires in 2019, or the supply-chain disruption wrought by flooding in Thailand in 2011.

The financial significance of physical climate risks can no longer be ignored. This is reflected by disclosure requirements such as those from the Task Force on Climate-related Financial Disclosures (TCFD), which recommends that companies and investors report on the physical impacts of climate change as well as on the impacts of efforts to reduce greenhouse gas emissions.

This report offers an entrance point for investors who want to begin assessing, managing and reporting on physical climate risks in their portfolios. It provides practical guidance on how investors can begin to analyse, assess and manage the risks and opportunities presented by physical climate hazards.



The detailed guidance meanwhile, supplements this report with greater detail on the physical climate science and how physical climate risks are manifesting and causing financial consequences. It also offers more detailed advice on how to establish a full process for assessing and managing these risks.

The icons used in the chart below are also found against corresponding chapters of the more detailed guidance. This is intended to help readers refer more easily to the additional information provided.

#### Five steps to get started in managing physical climate risk:



- Understand physical climate risks and how they are measured.



- Assess the significance of these risks at the asset or fund level.



- Review the aggregate effects of these risks at the portfolio level.



- Decide on the actions you will take to manage or mitigate these risks.



- Monitor, review and report on actions taken.

<sup>ii</sup> Intergovernmental Panel on Climate Change (IPCC) (2018), Global Warming of 1.5°C: Summary for Policymakers (IPCC, Geneva), [https://report.ipcc.ch/sr15/pdf/sr15\\_spm\\_final.pdf](https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf)

<sup>iii</sup> IPCC (2013), Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, Geneva), [https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5\\_all\\_final.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf)

## APPROACH

Investors should view the physical risks associated with climate change and the need to adapt to these risks in the same way as they would any other investment risk. The risks and opportunities presented by the physical impacts of climate change should be integrated into existing risk assessment and management processes.

By following the five steps set out below, investors will be able to understand the significance of the risks associated with the physical impacts of climate change to their assets/portfolios and what is needed to manage the risks involved.

Investors can additionally use the more granular information set out in the detailed guidance to further develop their knowledge, include opportunities in their assessment and establish a more comprehensive process.



### Step 1: Understand physical climate risks and how they are measured

Understanding physical climate risks and associated financial impacts should be grounded in an understanding of the most up-to-date climate science. Chapter 2 of the detailed guidance offers a primer for investors on physical risks, covering recent developments in climate science, the application of climate change scenarios to physical climate risk, and how physical exposures can manifest themselves as financial impacts. It also includes a review of how to bring together the layers of data and information needed for physical risk assessment.

Assessments of the economic and financial impacts of climate change require a wide range of information to be gathered. Climate data (observational data and climate projections) needs to be overlaid and combined with other data sets and information, e.g. with financial, business and market data, on investees and wider socio-economic data. Investors will need to ensure that assessments resulting from the following steps are grounded in this information.



### Step 2: Assess the significance of these risks at the asset or fund level

Due to the highly location specific nature of physical climate risks, it is difficult to offer a definitive assessment of the extent to which a particular sector, geography, company or asset will be affected.

Analysing the financial implications of physical climate risks requires that attention is paid to a company's exposure and to the manner in which the company is positioned to respond (i.e. the company's own adaptation strategies and risk management processes).

Investors can start by asking their investment managers (for outsourced investment management) and the companies or assets in which they invest (for internally managed assets) to provide them with an assessment of:

- The financial significance of the physical impacts of climate change for the fund or asset in question, i.e. the scale of the financial impact, the likelihood of the impact and the timeframe over which the impact is expected to occur.
- The assumptions underpinning these assessments (e.g. what climate scenario(s) have been used).
- How the risks are being managed.

Large institutions will have investments with many different investment managers and in a wide variety of assets and companies. They may wish to start by focusing on the asset classes, sectors, or geographies where they have the largest investments. They may decide to prioritise funds, sectors or activities that appear to be most immediately exposed to the physical impacts of climate change. These may include sectors and activities that depend on the natural environment (e.g. agriculture, forestry, fishing), that are located in regions that are particularly exposed to acute hazards such as storms, acute rainfall or heatwaves or that are in a fixed location (e.g. real estate, critical infrastructure such as water storage or power generation, mining). For more discussion, see Section 5.2 of the detailed guidance.

Table 1 presents a more detailed set of questions that can be asked of investment managers and of investee companies, with fuller explanation in Section 8.1 of the detailed guidance. If investment managers and companies are unable to answer these questions, investors should press them to conduct the necessary analysis as a priority.

Table 1

### Examples of questions for investees and asset managers (Adapted from Sullivan et al. 2009<sup>iv</sup> with input from EAPF)

Element	Primary question	Detailed questions
<b>Governance/ Management</b>	Can you describe how you manage the physical impacts of climate change?	<ul style="list-style-type: none"> <li>Who is responsible for assessing and managing the physical risks associated with a changing climate?</li> <li>How does your Board oversee the management of physical climate risks?</li> <li>Have you engaged with key stakeholders to understand their views on climate change-related risks? What have the outcomes of these discussions been?</li> </ul>
<b>Risk analysis process</b>	Can you describe your process for assessing the risks and opportunities associated with the physical impacts of climate change?	<ul style="list-style-type: none"> <li>How do you identify climate change-related risks and opportunities?</li> <li>What datasets do you use to understand these risks?</li> <li>Do you use climate change-related scenarios to inform your business scenarios (strategy or risk assessment processes)? If yes, what climate scenarios do you use?</li> <li>What is the scope of your risk assessment? For example, does it consider: <ul style="list-style-type: none"> <li>Direct impacts on assets?</li> <li>Wider value chain and knock-on effects?</li> <li>Impacts on tangible and intangible assets/value?</li> <li>Impacts on competitors, market sectors and economies?</li> <li>Impacts on future market conditions?</li> <li>Opportunities for new products, services or markets?</li> </ul> </li> <li>What are the key climate change-related risks and opportunities you have identified?</li> <li>How do you define or assess the significance of these risks and opportunities?</li> <li>Are there areas where further information is required?</li> <li>Do the results of your risk assessment indicate that physical climate risk will have significant financial or other (e.g. brand, market access, regulatory) implications for you?</li> </ul>
<b>Risk management and engagement</b>	Can you describe the major actions you are taking to respond to the physical impacts of climate change and improve asset resilience?  Are you engaged in any discussions with your suppliers and customers on the impacts of climate change on their businesses?	<ul style="list-style-type: none"> <li>What is the cost of these actions?</li> <li>What is the residual risk?</li> <li>What steps have you taken with your suppliers to ensure they are aware of and responsive to the need to adapt to climate change?</li> </ul>
<b>Monitoring and review</b>	Can you describe how you are monitoring the implications of climate physical risks for your investments?	<ul style="list-style-type: none"> <li>What indicators or measures are you using to monitor the investment implications of the physical impacts of climate change?</li> <li>Have you established a structured process to monitor and review climate physical risks over time?</li> <li>Will you be taking any steps in the next 12 months to review your business strategies and your major projects in the light of the risks and opportunities posed by the physical impacts of climate change?</li> </ul>
<b>Reporting</b>	Can you describe the information you provide to your investors, to your clients/ beneficiaries and to other stakeholders?	<ul style="list-style-type: none"> <li>What information do you report on the implications of the physical impacts of climate change? Do you report on (a) the investment implications of these impacts, (b) the actions you have taken to mitigate these impacts, (c) the effectiveness of the actions you have taken?</li> <li>How often do you report this information?</li> <li>If you do not currently report, do you have plans to start reporting?</li> </ul>

<sup>iv</sup> Sullivan, R., Russell, D., Beloe, S., Curtiss, F. & Firth, J. (2009), Managing the Unavoidable: Investment Implications of a Changing Climate (Insight Investment, USS, Henderson Global Investors, Railpen and Acclimatise, London, UK).





### Step 3: Assess the significance of physical climate risks at the portfolio level

When assessing the significance of physical climate risks at the portfolio level, investors can begin by reviewing the information provided from Step 2 to:

- Assess the aggregate financial consequences for the assets or funds under relevant scenarios, as discussed in Chapter 6.2 of the detailed guidance.
- Identify whether there are assets or funds that are at particular risk.
- Decide whether further data is required or whether the scope of the assessment needs to be extended.

Discussions about the significance of physical climate risks should use the same decision-making criteria (e.g. on risk acceptability) as other investment risks.

There may be a need to clarify the climate scenarios used by the respondents to Step 2, to ensure that results can be compared on a like-for-like basis. Section 6.2 of the IIGCC Guidance provides further information on the appropriate use of scenarios. Additional guidance on scenario analysis is provided in the 2019 IIGCC report **Navigating Climate Scenario Analysis – A Guide for Institutional Investors**<sup>v</sup>.



### Step 4: Decide on the actions you will take to manage or mitigate these risks

Based on the information collected from Steps 2 and 3, investors need to decide what actions they want to take to ensure that the identified risks are effectively managed in their portfolios. Table 2 presents a list of practical actions that investors might consider, while Chapter 8.1 and Chapter 3.2 of the detailed guidance provides more detail and investor case studies.

Table 2

## Risk Management Actions for Investors

Action	Examples of actions that might be considered
<b>Strengthen risk assessment and management processes</b>	<ul style="list-style-type: none"> <li>• Explicitly consider physical climate risks across a number of different scenarios in due diligence and decision-making processes.</li> <li>• Introduce explicit sector-based screening criteria relating to physical climate risks in due diligence.</li> <li>• Update policies, management information and board risk reports to include consideration of physical climate risk.</li> </ul>
<b>Reduce or avoid the exposure to risk</b>	<ul style="list-style-type: none"> <li>• Sell or reduce investments in companies or assets that have high exposure to the physical impacts of climate change but poor climate risk management systems.</li> <li>• Increase holdings in companies or assets that have high quality climate governance and risk management systems and processes.</li> <li>• Switch to investment managers that are known to better manage physical climate risks.</li> </ul>
<b>Strengthen expectations of investment managers</b>	<ul style="list-style-type: none"> <li>• Require investment managers to conduct climate scenario analysis on their investment portfolios to assess physical risks, and to report on the findings and the actions taken as a result.</li> </ul>
<b>Engage with investment managers</b>	<ul style="list-style-type: none"> <li>• Encourage investment managers to strengthen their governance and management of climate change-related risks and to take action to manage the identified risks. Table 1 provides examples of the questions that could be asked.</li> </ul>

<sup>v</sup>IIGCC (2019), *Navigating Climate Scenario Analysis – A Guide for Institutional Investors* (IIGCC, London), <https://www.iigcc.org/download/navigating-climate-scenario-analysis-a-guide-for-institutional-investors/?wpdmdl=1837&refresh=5e689e6be1c951583914603>.



Table  
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Continued

Action	Examples of actions that might be considered
<b>Strengthen expectations of assets and companies</b>	<ul style="list-style-type: none"> <li>For highly exposed assets or companies, require the asset or company to formally review and update their risk assessments every three years to reflect changes in climate science, in public policy, in market conditions and in the asset or company's management of physical climate risks.</li> <li>Require companies and assets to provide data and information on their exposures to physical climate risk and opportunity, their estimates of the costs and benefits of these exposures, and the actions being taken to manage these risks.</li> </ul>
<b>Engage with companies and assets</b>	<ul style="list-style-type: none"> <li>Encourage companies and assets to strengthen their governance and management of physical climate risks, and to take action to manage the identified risks. Table 1 provides examples of the questions that could be asked.</li> <li>In broad terms, six main risk mitigation options are available to companies: <ul style="list-style-type: none"> <li>Avoid the risk by, for example, closing or moving operations.</li> <li>Reduce the risk by, for example, climate-proofing buildings and infrastructure.</li> <li>Transfer the risk through, for example, purchasing insurance or outsourcing certain activities to third parties.</li> <li>Accommodate the risk through, for example, better heatwave and emergency planning.</li> <li>Accept the risk, where the costs of addressing the risk may be too great relative to the benefits received.</li> <li>Identify opportunities associated with a changing climate.</li> </ul> </li> </ul>
<b>Support effective public policy</b>	<ul style="list-style-type: none"> <li>Engage with regulators and policy makers, to encourage policy and regulatory changes that might be required to encourage reductions in greenhouse gas emissions, adaptation and resilience (e.g. measures that foster a climate-resilient transition).</li> <li>Encourage policy makers to: <ul style="list-style-type: none"> <li>Develop clear, long-term policies that enable companies to plan and invest appropriately.</li> <li>Ensure that unsuitable/risky developments (for example, on flood plains) are either prohibited or are designed with appropriate adaptations measures.</li> <li>Ensure that different regulators for the same sector work together more coherently.</li> <li>Require companies to explicitly discuss the financial and other implications of the physical impacts of climate change for their businesses.</li> </ul> </li> </ul>
<b>Report</b>	<ul style="list-style-type: none"> <li>Integrate physical climate risks and opportunities into financial and other reporting (e.g. to clients, to stakeholders), in line with TCFD recommendations. In the short-term, this reporting may simply detail the risks and opportunities that have been identified but over time should extend to cover the financial significance of these investment risks and opportunities, and of the actions being taken to manage them.</li> </ul>
<b>Insure</b>	<ul style="list-style-type: none"> <li>Obtain or enhance insurance for specific physical climate risks (e.g. for flood risk, for extreme weather events, for supply chain disruption).</li> <li>Review existing insurance of highly exposed assets and assess (a) the adequacy of the insurance cover provided, (b) the potential for the insurance cover to be withdrawn in the future.</li> </ul>



## Step 5: Monitor, Review and Report

Investors need to establish processes to monitor and review physical climate risks and opportunities. They should ensure that they regularly update their assessments of risk at the investee and asset manager level, and at the portfolio level.

Assessments of the significance of physical climate risks for an investment portfolio can change for a variety of reasons. They may reflect changes in the following:

- Assets held in the portfolio or in the fund.
- Scientific understanding of climate change.
- Policy and regulatory context (e.g. policy action may reduce or increase particular risks).
- Value chains and market conditions.
- Macro-economic conditions.
- Actions taken to manage these risks and impacts and adapt and build resilience.

Overall, however, it is likely that financial consequences of physical climate change will increase significantly over time.

Reviewing assessments can be done through asking investees and asset managers to provide regular (e.g. annual) updates on their assessments of the financial significance of physical climate risks for the fund or asset in question, highlighting changes in these assessments and the reasons for these changes. More detail can be found in Section 8.2 of the more detailed guidance.

The results of these reviews should be shared with relevant internal and external stakeholders. Internal stakeholders could include trustees, the board risk committee (or equivalent), and fund managers and analysts. External stakeholders could include clients and regulators. The information provided to these different stakeholder groups will differ depending on their needs and interests, and on the commercial sensitivities of your organisation. See Section 8.3 of the more detailed guidance document for discussion around reporting.

The TCFD suggests that investors should report on their:

- **Governance:** The organisation's governance around climate-related risks and opportunities.
- **Strategy:** The actual and potential impacts of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning.
- **Risk Management:** The processes used by the organisation to identify, assess and manage climate-related risks.
- **Metrics and Targets:** The metrics and targets used to assess and manage relevant climate-related risks and opportunities.

### Additional resources

The supporting more detailed guidance - **Understanding physical climate risks and opportunities** - builds on the steps outline above and provides much broader additional information for readers.

A few examples of content of direct relevance to the process shared in this report include:

- More information on risk management (Section 8.1).
- A case study of how the Environment Agency Pension Fund engages with investees on their approaches to adaptation and resilience (Case Study 10).
- A list of publications that provide guidance on how investors can engage with companies on climate change, and how asset owners can engage with asset managers (Table 14).

IIGCC has also produced a **practical guide for trustees and boards** of asset owner organisations on addressing climate risks and opportunities in their investment processes.<sup>vi</sup>

<sup>vi</sup> IIGCC (2018), *Addressing Climate Risks and Opportunities in the Investment Process* (IIGCC, London), <https://www.iigcc.org/resource/addressing-climate-risks-and-opportunities-in-the-investment-process/>.





### Key Terms Used in this Report

**Adaptation:** The process of adjustment to actual or expected climate change and its effects.

**Exposure:** The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected by the physical impacts of climate change.

**Hazard:** The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources. In this document, the term hazard refers to climate-related physical events or trends or their physical impacts.

**Impacts:** The effects on natural and human systems of extreme weather, climate events and of climate change.

**Physical risks:** The potential for consequences from the physical impacts of climate change on geophysical systems; these impacts include floods, droughts and sea level rise.

**Resilience:** The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning and transformation.

**Risk:** The potential for consequences where something of value is at stake and where the outcome is uncertain. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur.

**Scenario analysis:** A process of assessing how an investment portfolio might perform in different future states, in order to understand key drivers and possible outcomes. In the case of climate change, scenario analysis focuses on two distinct but interlinked sets of risks and opportunities, (a) transition risk scenarios which consider different pathways for the evolution of greenhouse gas intensive economic activities, such as energy generation, industrial production and transportation, (b) physical risk scenarios which focus on changes to the climate, including variables such as temperature rise, sea level rise, and changes to the frequency and severity of extreme weather events, including droughts and storms. The two sets of risks are interdependent, as the greater the degree of transition that takes place, the lower the physical risks and vice versa.

References for key terms and further detail are provided in Annex A of the more detailed guidance.



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