

# TCFD

# Implementation

## Considerations for Private Equity

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KPMG LLP

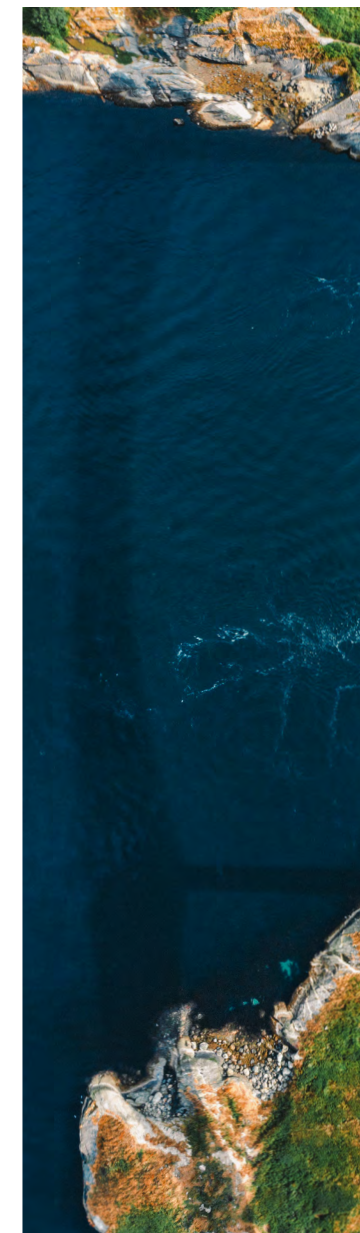
October 2022





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# Acknowledgements

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## iCI and BVCA

We would like to thank the Initiative Climat International (iCI) (the global, practitioner-led community of private equity firms and investors that seek to better understand and manage the risks associated with climate change) and the British Private Equity & Venture Capital Association (BVCA<sup>1</sup>) (a UK based industry body and public policy advocate for the private equity and venture capital industry) for their extensive efforts in the development of this document.

## iCI/BVCA Working Group members:

- Aga Siemiginowska, Oakley Capital
- Alison Westwood, Pantheon Ventures
- Ben Robson, Molten Ventures
- Diba Ahour, Principles for Responsible Investment

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- Felix Bayne, Travers Smith
- Graeme Ardu, Triton Partners
- Gurpreet Manku, BVCA
- Jennifer Flood, Investindustrial
- Jovana Stopic, IK Partners
- Laura Minchie, Harbourvest
- Maria Carradice, Mayfair Equity Partners
- Mirja Weidner, Charterhouse
- Myles Tatlock, Anthesis Group
- Natasha Morris, Adamantem Capital
- Nicholas Chipperfield, BVCA
- Salma Moolji, Ares Management
- Serge Younes, Investindustrial
- Sandrine Lalmant, Triton Partners
- Sophia Walwyn-James, 3i
- Tim Lewis, Travers Smith
- Tom Taylor, BVCA
- Yohan Hill, Adams Street Partners

During the writing of the guide, the iCI Working Group and KPMG held discussions with representatives of the following industry bodies:

- Taskforce for Climate-related Financial Disclosures
- Private Equity Sustainable Markets Initiative Taskforce (PESMIT)
- IIGCC
- Cambridge University Institute for Sustainable Leadership
- New York University Institute for Sustainable Business
- Ceres
- World Resources Institute

We would also like to extend our thanks to all other parties that provided advice and guidance throughout this process, of which there are too many to list individually.

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# Glossary

**AIFMD:** Alternative Investment Fund Managers Directive

**AUM:** Asset under management

**BAU:** Business as usual

**BVCA:** The British Private Equity & Venture Capital Association

**CDOs:** Collateralised Debt Obligations

**CFRF:** Climate Financial Risk Forum

**CGE:** Computable General Equilibrium

**CLOs:** Collateralised Loan Obligations

**CO<sub>2</sub>:** Carbon dioxide

**CSRD:** Corporate Sustainability Reporting Directive

**CVAR:** Climate Value at Risk

**DCF:** Discounted cash flow

**ESG:** Environmental, Social and Governance

**ESRS:** European Sustainability Reporting Standards

**EU:** European Union

**FCA:** Financial Conduct Authority

**FSB:** Financial Stability Board

**GFANZ:** Glasgow Financial Alliance for Net-Zero

**GHG:** Greenhouse gas

**GPs:** General Partners

**GVA:** Gross Value Added

**ICI:** Initiative Climat International

**IEA:** International Energy Agency

**IFRS:** International Financial Reporting Standards

**IIASA:** International Institute for Applied Systems Analysis

**IIGCC:** Institutional Investors Group on Climate Change

**IMM:** Impact Multiple of Money

**IPCC:** Intergovernmental Panel on Climate Change

**IPEV:** International Private Equity and Venture Capital Valuation Guidelines

**ISSB:** International Sustainability Standards Board

**ITR:** Implied Temperature Rise

**LPs:** Limited Partners

**M&A:** Mergers and acquisitions

**MiFID:** Markets in Financial Instruments Directive

**NDCs:** Nationally Determined Contributions

**NFRD:** Non-Financial Reporting Directive

**NGFS:** Network for Greening the Financial System

**NiGEM:** National Institute Global Econometric Model

**NZAM:** Net-Zero Asset Managers Initiative

**OECD:** Organisation for Economic Co-operation and Development

**PCAF:** Partnership for Carbon Accounting Financials

**PE:** Private Equity

**PRA:** Prudential Regulatory Authority

**PwP:** Portfolio warming potential

**RCP:** Representation Concentration Pathways

**SASB:** Sustainability Accounting Standards Board

**SBTi:** Science-Based Targets Initiative

**SDGs:** Sustainable Development Goals

**SDR:** Sustainability Disclosure Requirements

**SEC:** Securities and Exchange Commission

**SFDR:** Sustainable Finance Disclosure Regulation

**SMI:** Sustainable Markets Initiative

**SSP:** Shared Socioeconomic Pathways

**TCFD:** Taskforce on Climate-Related Financial Disclosures

**TFND:** Taskforce for Nature-Related Financial Disclosures

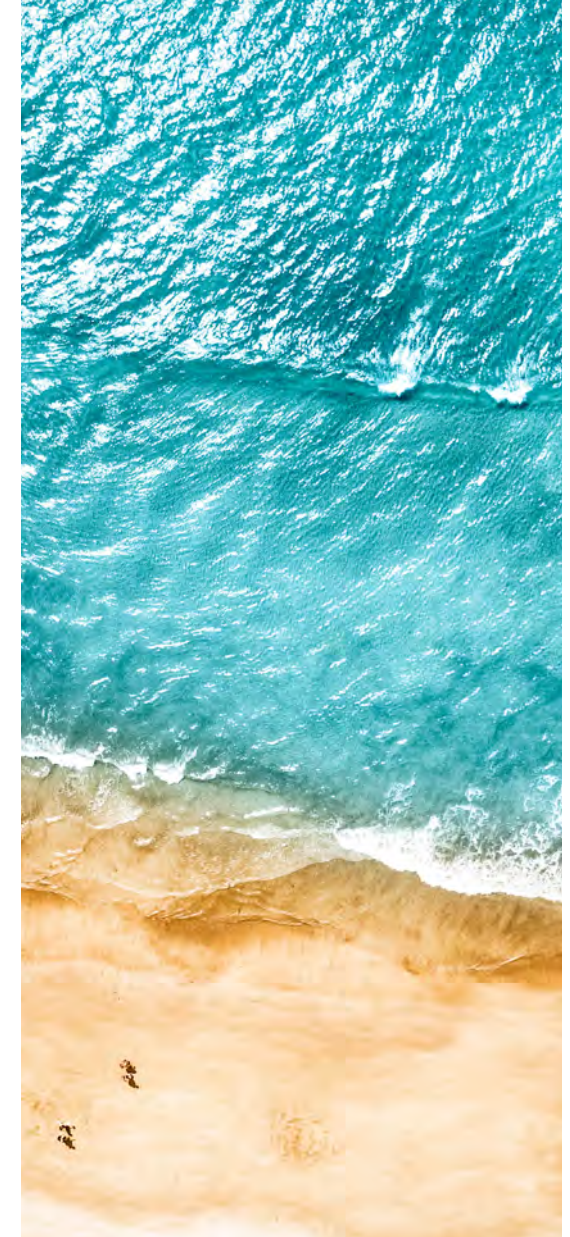
**PRI:** United Nations Principles for Responsible Investing

**VAR:** Value-at-Risk

**VC:** Venture Capital

**WACI:** Weighted Average Carbon Intensity

**WEF:** World Economic Forum





# Important notice – please read

**This report on TCFD Implementation Considerations for PE has been prepared by KPMG LLP ('KPMG') for the Initiative Climat International and the British Private Equity and Venture Capital Association (the 'Clients') in accordance with terms agreed by the Clients with KPMG and the scope of work set out in Appendix 1 to the report.**

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KPMG's work for the Clients, on which this report is based, was conducted between 6 May 2022 and 6 October 2022, and the work comprised summarising good practice guidance around TCFD-style reporting based on analysis of publicly available information, information supplied to KPMG by the Clients and discussions with wider stakeholders. We have not undertaken to update the report for events or circumstances arising after 6 October 2022.

KPMG does not provide any assurance as to the appropriateness or accuracy of sources of information relied upon, and does not accept any responsibility for the underlying data used in this report. For this report the Clients have not engaged KPMG to perform an assurance engagement conducted in accordance with any generally accepted assurance standards and consequently no assurance opinion is expressed.

The opinions and conclusions expressed in this report are (subject to the foregoing) those of KPMG and do not necessarily align with those of the Clients.

This report makes reference to current regulations and legislations as at the date of this report. We have not updated this report based on new regulations and legislations arising after this date, nor any changes made to existing regulations and legislations since this date.



# Foreword

## We are at a defining moment in the fight against climate change.

As we continue to see climate-related disasters and risks increase in frequency around the world, likewise the scale of climate opportunities and technology to support the low carbon transition is growing. There is an urgent and unequivocal need for action. The 2022 IPCC report on climate change mitigation highlights that “unless there are immediate and deep emission reductions across all sectors, 1.5 °C is beyond reach” – meaning catastrophic and irreversible damage to the planet, livelihoods, and economies we depend on.

Finance is vital for the green energy transition. Meeting these climate mitigation and adaptation pledges will require significant investment. As signatories to the Paris agreement review their ambitions, they are putting in place the regulatory drivers to mobilise capital and rapidly transform systems. Private equity firms have a role to play in the transition to the low carbon economy needed to achieve the goals established by the Paris Agreement. They can provide the much-needed capital to scale climate solutions but also adaptation and resilience. They can use their influence with portfolio companies to drive the change we need to achieve a net-zero economy. By positively influencing businesses in their climate transition and even supporting companies in the real economy develop credible transition plans, private equity firms can both multiply their impact and accelerate progress towards global goals.

Rigorous climate analysis can help direct investments towards sustainable projects and activities. The TCFD was formed by the Financial Stability Board (FSB) to create a framework that makes financial risks and opportunities related to climate change a natural part of companies’ risk management and strategic planning processes. As the uptake of TCFD increases across the global market, companies’ and investors’ understanding of the potential financial implications associated with climate change has grown. We hope this guide supports increased climate ambitions in the PE industry as its players are given recommendations on how to evaluate business impacts and identify potential responses. You can read more about this in the Strategy section.

Effective climate governance is paramount. Climate analysis is more impactful when it reaches the top of the organisation and similarly, a tone from the top is essential to drive climate action across the portfolio. The Governance section explains who is responsible for overseeing and managing climate change risks and opportunities.

PE firms’ climate risks are mainly indirect and need to be integrated in the overall risk management processes. These will vary depending on the size of the firm, the geographies it operates in and the sectors in which it invests, but the Risk Management section highlights key approaches for assessment, mitigation and how to make sure climate risks are not siloed.

Getting to net-zero starts with measuring where we stand today and providing transparency to stakeholders on where we are going. You can read more about this in the Metrics and Targets section.

In this guide, you will get an overview of the TCFD recommendations and considerations specific to the PE business model. You will read about good practices in the PE industry, illustrated by case studies of PE firms of various sizes, who are charting their own course towards decarbonisation. You will also receive practical tools to drive implementation.

With global carbon emissions rising sharply to pre-pandemic levels, more needs to be done. How we manage assets today will have impacts tomorrow and will have compounding impacts on our ability to reach net-zero by 2050. Hope will get us so far, but it is no substitute for action. By publishing this guide, we hope to encourage further engagement and meaningful climate action.



**Simon Weaver**

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# Executive summary

Private equity (PE) firms and their portfolio companies (PCs) have a critical role to play in the transition to a low-carbon and climate-resilient economy. The purpose of this document is to support PE firms along their climate journey. It was developed by KPMG at the request of Initiative Climat International (ICI) and the British Private Equity & Venture Capital Association (BVCA) in response to calls from PE firms for practical guidance on climate disclosures that considers the specific context of investors in private markets as well as the diversity in approaches to climate across firms. It also seeks to satisfy the needs of private markets investors for comparable disclosures across firms.

The Taskforce on Climate-Related Financial Disclosures (TCFD) is a market leading standard for climate-related disclosure. The TCFD has published guidance for asset managers but does not consider some of the specificities of PE firms managing closed-ended funds holding portfolios of unlisted SMEs, including their holding period, the significant changes in portfolio composition over the life of a fund, operational complexities (e.g., fund structures and data flows), and the requirement to disclose at various levels (e.g., firm, fund and portfolio company level). This document provides recommendations related to these considerations: it highlights good practices for PE firms and illustrates the potential approaches that private markets firms may take to disclose information in a way that reflects their specific structure.

## It provides PE-specific guidance by:

- ➔ **Referencing practical tools and data sources that are relevant for investors in private companies.**
- ➔ **Explicitly recognising where aligning with the TCFD recommendations can be useful for PE firms in furthering their understanding of and managing climate-related risks and opportunities.**
- ➔ **Summarising findings from interviews with a broad range of stakeholders across private markets firms, industry collaborations and academia.**



This implementation guide has been designed and structured to address the challenges PE firms have around TCFD. The interviews and surveys KPMG conducted with ICI and BVCA member firms identified the need for tailored guidance in three key areas in particular: scenario analysis, metrics and targets, and valuations. The guide therefore goes into more details in these areas and illustrates how these can be useful to assess PE firms' resilience to climate risks and to influence investment strategies and capital allocation to specific sectors.

Disclosure of climate-related information has improved in recent years but still require improvements in their comparability. Through engagement with the PE community, we aim to enhance the degree of comparability of PE firms' approaches to climate disclosures and drive increased usability for investors and other end users.

We have included additional considerations for private credit, venture capital, funds of funds and secondaries. Those participating in other private market asset classes should consult wider guidance as they develop their approach to TCFD reporting.

**For ease of use, the document's structure mirrors the four pillars of TCFD: Governance, Strategy, Risk Management, and Metrics and Targets.**

For each pillar, we include:

- A background to the pillar, guidance from the TCFD and a description of good practice. Where relevant, this includes references to complementary publicly available guidance provided by regulatory bodies in leading countries, signposting existing guidance throughout the report, with URLs for convenience;
- Enablers of good practice, including practical tools and data sources where relevant;
- An outline of key considerations for PE firms; and
- Anonymised case studies per TCFD pillar based on publicly available information. These case studies illustrate current practices to date for PE firms. Appendix 9 and Appendix 10 include further examples from conventional asset managers and Venture Capital (VC) firms.

The guide is based on current guidance and practices, and we expect it to evolve as PE firms' experience and capabilities develop, and new requirements are brought into force.

Approaches to climate change vary across private markets firms and this guide is directed to all PE firms, regardless of where they are on their climate journey. As such, we have split our guidance for each TCFD pillar across three bands of ranging complexity and sophistication. To drive climate action, firms need appropriate oversight and allocation of responsibilities. Where this oversight sits will vary from one firm to the other given the different structures of PE firms and this guide

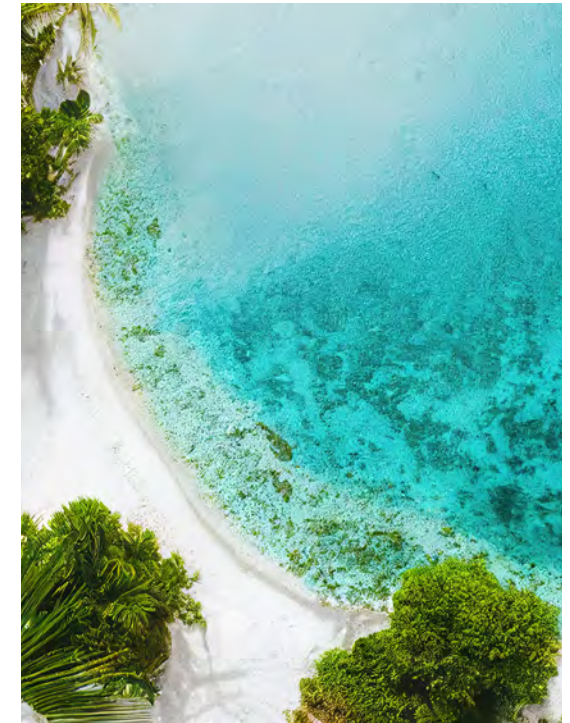
provides examples of how this could be structured. Management's role is to assess and manage climate risks and opportunities. This responsibility is either allocated to the Head of ESG when he/she is part of senior management or is delegated to that person. However, the assessment and management of climate risks is usually a joint effort between the ESG and investment teams.

The identification of climate risks and opportunities and how PE firms respond to them is the key component of the strategy pillar. Scenario analysis can be useful in the identification of climate risks and opportunities at different stages of the investment cycle: during the holding period, after the holding period and the long-term outlook for PCs, funds and the PE firm. This guide provides an overview of the available tools and resources.

The oversight and allocation of responsibilities need to be embedded in the structures of the PE firm and controls need to be embedded in the governance processes, such as the terms of reference of the board/committees. Climate risk also needs to be incorporated into the overall risk management.

PE firms may want to complement their carbon emissions and footprint with forward-looking metrics such as Climate Value at Risk (CVAR) for certain funds to quantitatively estimate, over the life of the fund, the potential financial loss because of climate change, but present Implied Temperature Rise (ITR) over a longer term to explain the estimated change in temperature a portfolio would align to.

Climate-related financial disclosures throughout the PE industry tend to be at a relatively early stage, but the level of disclosures is significantly improving year on year. Investors, regulators, and the wider financial market will increasingly expect PE firms to be aligned to other financial institutions' market practices, with those lagging behind potentially facing reputational risks and growing pressure, and those leading the market being viewed favourably by stakeholders.





# Introduction and practical guide

We have structured this guide with the intention for it to be as useful as possible for PE firms, including sufficient detail to help firms developing their approach to climate. To help PE firms navigate this guide, we have split our considerations for each TCFD pillar across three bands of ranging complexity and sophistication of approach.

These bands are not a classification system, hence not all PE firms will, or should, aspire to the higher band levels. Simpler approaches (e.g., an alignment to Band 1), may represent the most appropriate approach for a firm. PE firms may also wish to consider components of each band across each of the four pillars and across the various recommendations within each pillar.

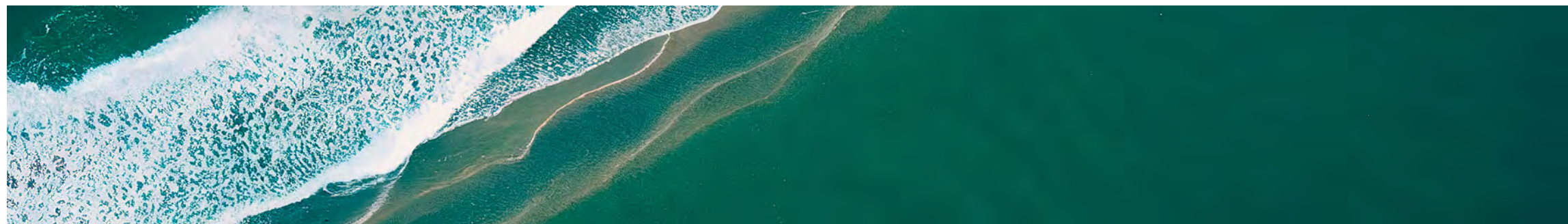
The adjacent table suggests five criteria to consider when determining the most appropriate band: exposure to high-risk climate sectors, geographic coverage, internal resource capabilities, LP/stakeholder engagement and level of implementation. Bands could be used as a roadmap to set internal milestones, where progress is required to reach an optimal band.

Bands			
Band	Band 1	Band 2	Band 3
<b>Exposure to high-risk climate sectors</b>	Limited	More exposure to sectors	Exposure to high-risk climate sectors across the portfolio
<b>Geographic coverage (including underlying assets)</b>	Limited exposure to climate risks and opportunities across different geographies	More exposed to different climate risks and opportunities across different geographies	Wide ranging exposures to climate risks and opportunities across geographies
<b>Internal resource capabilities</b>	Low/medium	Medium/high	High
<b>LP/Stakeholder engagement</b>	Low/medium	Medium/high	High
<b>Level of implementation</b>	Entry	Intermediate	Advanced

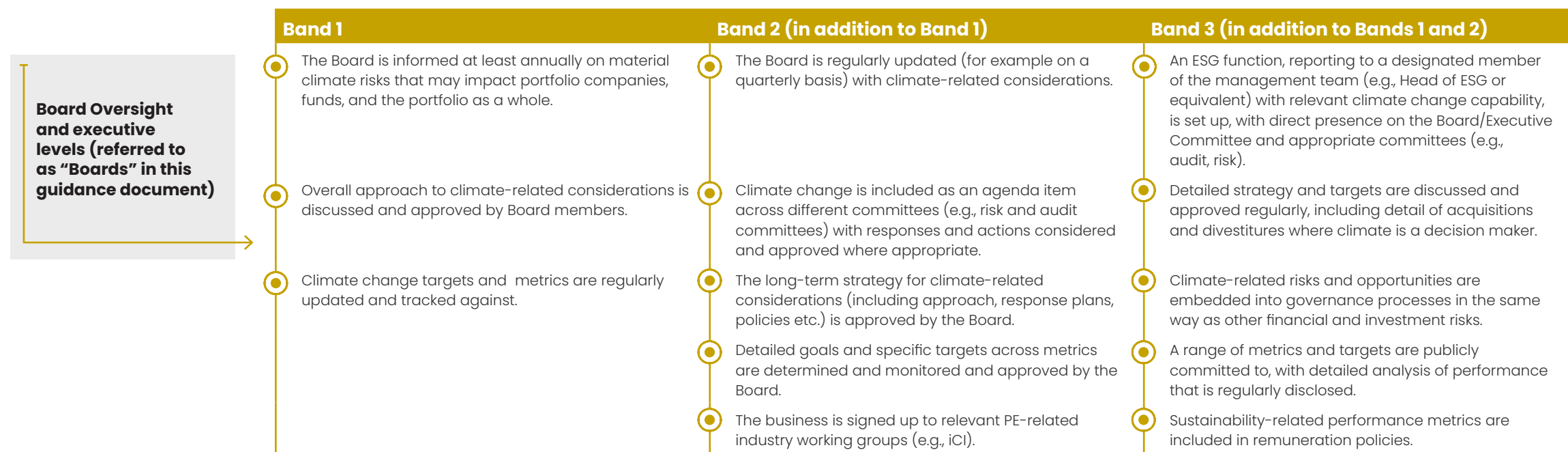


These bands are not intended to capture PE firms' regulatory requirements, which will vary depending on size and geographic exposure. These regulatory requirements should be carefully considered in determining the best approach for a given PE firm.

The "Practical application guidance" for each pillar is replicated below. These tables summarise the key actions per pillar that firms may wish to consider. They are not exhaustive, and firms should consider the best approach for their business. Further information is then available in the per-pillar sections and the appendices where users of this document can find detailed commentary, support, examples, and case studies.



## Governance – Practical application guidance







**Management's role (Senior ESG and Investment professionals) in assessing and managing climate-related risks and opportunities**

**Band 1**

- Climate-related responsibilities are allocated to management personnel who have an appropriate level of access to the Board.
- High-level processes are in place so that management is appropriately informed of climate-related issues and that they are escalated where applicable (e.g., through regular portfolio/fund monitoring).
- Processes are documented for how and when climate-related risks and opportunities are analysed.
- The ESG/investment team engages with PC Boards on climate risks and opportunities.

**Band 2 (in addition to Band 1)**

- A dedicated individual is responsible for climate-related issues across functions. They have regular access to the Board to raise climate-related issues.
- Well documented processes/climate policies are in place to regularly inform wider management of climate-related issues (e.g., new regulations which may impact portfolio companies).
- Regular training on climate-related topics is presented to staff and management.
- Appropriate resource is allocated for climate-related initiatives.
- PC Boards requested to include climate considerations as an agenda item.

**Band 3 (in addition to Bands 1 and 2)**

- Several management personnel have a climate component to their role, headed by a senior individual with access to committees and the Board.
- Detailed processes are in place with management and the Board regularly updated with climate-related issues.
- A transition plan is disclosed publicly alongside other disclosures (noting the requirements for transition plan disclosure as per the ISSB).
- PC Boards requested to include climate considerations as part of strategic discussions, with updates of progress against goals.

## Strategy – Practical application guidance

### Description of the climate-related risks and opportunities identified over the short, medium, and long term

### Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Disclosure of climate-related risks and opportunities	<ul style="list-style-type: none"> <li>At an entity level, PE firms disclose the types of risks/opportunities and potential impacts of climate change on the firm’s overall strategy and financial planning over time. For example, the extent to which a PE firm may change its investment strategy over different time horizons to account for the crystallisation of transition and physical risks.</li> </ul>	<ul style="list-style-type: none"> <li>Firms provide detailed descriptions of the types of climate-related risks and opportunities considered over varying timeframes and which aspects are expected to be most material for a fund or wider portfolio. For example, the types of physical (both acute and chronic) risks and transition risks most likely to impact portfolio companies in the short-, medium- and longer-term horizons, on a per sector/geography basis.</li> </ul>	<ul style="list-style-type: none"> <li>Firms provide an overview of the processes and approaches used to identify the above climate-related risks and opportunities.</li> </ul>
Disclosure of climate-related impacts	<ul style="list-style-type: none"> <li>For the identified risks and opportunities, firms disclose the potential impacts of mitigation and adaptation strategies for material portfolio companies and fund investment strategies more broadly.</li> </ul>	<ul style="list-style-type: none"> <li>Firms provide detail of their climate-related goals and targets (e.g., GHG emission reduction commitments), and present how the firm intends to achieve the described goals.</li> </ul>	<ul style="list-style-type: none"> <li>Firms provide an overview of what impact these climate-related issues may have on the financial performance and position of the firm.</li> <li>Climate change, where considered to be material for a portfolio company, is considered at a high level for business valuations both at due diligence stage, and during the hold period.</li> </ul>





**Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning (cont.)**

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Rationale for scenario modelling	<ul style="list-style-type: none"> <li>Disclosure requirements and to help influence the high-level strategy of a PE firm to climate change.</li> </ul>	<ul style="list-style-type: none"> <li>Use cases are strategic, with outputs used to monitor risks and opportunities for portfolio companies, and to influence exit strategies where appropriate.</li> <li>Portfolio alignment analysis is conducted to help influence long-term climate goals.</li> </ul>	<ul style="list-style-type: none"> <li>Scenario analysis for climate change is used as a BAU tool for identifying opportunities.</li> <li>Short- and medium-term scenario analysis is regularly performed to assess risks and opportunities.</li> <li>Long-term analysis is used to influence acquisition strategies and set goals for public disclosure.</li> </ul>
Responses to climate analysis	<ul style="list-style-type: none"> <li>Sector analysis is used to identify particular industries which are projected to be materially impacted by climate change, and this helps to influence long-term targeting/avoidance of certain sectors (e.g., new green industries benefiting from government subsidies versus coal extraction industries).</li> <li>Material portfolio company holdings which are more significantly exposed to climate change are engaged with regularly to understand business strategy and responses to identified risks.</li> <li>Outputs from scenario analysis influence investment strategy and a gradual alignment of the portfolio towards industries projected to benefit from climate change, and away from those adversely impacted.</li> <li>Climate-related diligence is included pre-transaction and in more detail during processes.</li> <li>Based on the results of scenario analysis, an active role is taken in encouraging and influencing portfolio companies to act in a more sustainable manner, with supporting evidence for potential financial risks or benefits.</li> <li>Planned entrances/exits from sectors and industries are determined in order to align the portfolio to long-term climate goals, with strategies for long-term alignment (e.g., timing of reductions in sector/industry exposures) communicated to LPs.</li> <li>Where company engagement is not a suitable course of action, for example because the inherent nature of the business is not aligned to the climate goals of a firm and cannot be appropriately developed/alterd (e.g., thermal coal energy), climate modelling is used to help influence exits.</li> </ul>		



**Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning (cont.)**

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Valuations process	<ul style="list-style-type: none"><li>Climate change, where considered to be material for a portfolio company, is considered at a high level for business valuations both at the acquisition stage, and during the hold period.</li></ul>	<ul style="list-style-type: none"><li>Climate change is factored into acquisition decisions and regular fund valuations.</li><li>Potential changes in cashflows arising from climate-related risks and opportunities are incorporated into valuation considerations.</li><li>Some consideration of future developments and carbon pricing is included in valuations.</li></ul>	<ul style="list-style-type: none"><li>Climate considerations are fully integrated to acquisition valuations and regular fund valuations.</li><li>Valuations consider future cashflows at different time horizons arising because of direct climate-related costs, internally set or shadow costs, expected changes in the price of carbon emissions, and the expected changes in future cashflows arising from climate-related opportunities and risks.</li><li>Firms consider adjustments to valuation multiples to incorporate climate-related uplifts where the projected impacts of climate in future periods are not already priced into comparable market multiples.</li></ul>





**Description of the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario**

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Disclosure of resilience	<ul style="list-style-type: none"> <li>Firms provide an overview of how resilient the firm, and overall strategy of the firm, is to climate-related risks and opportunities under different climate scenarios over time with additional detail on where investment strategies may be exposed and how investment strategies may change in response to climate change.</li> </ul>		
Climate modelling approach	<ul style="list-style-type: none"> <li>High-level climate analysis is performed. This includes performing sensitivity analysis or qualitative analysis.</li> <li>Firms may consider mapping pre-modelled projected GVA changes (e.g., via the NGFS scenario explorer data) to portfolio sector exposures.</li> <li>Scenario analysis is performed every 2-3 years and reviewed annually.</li> </ul>	<ul style="list-style-type: none"> <li>Climate modelling is more sophisticated, using external consultants where skills/capability gaps exist.</li> <li>Models are either hosted on internal systems or output is analysed and produced by external specialists.</li> <li>Models are run regularly (e.g., annually) with the outputs (e.g., the impact of climate on portfolio companies, funds or investment strategies) disclosed where appropriate in a firm's TCFD report.</li> </ul>	<ul style="list-style-type: none"> <li>A bespoke tool exists as part of BAU software and strategic modelling techniques.</li> <li>The modelling solution is well aligned to the use cases, and this influences the model development/selection (e.g., micro-/macro-econometric models).</li> <li>Model inputs are parameterised to internal judgements and assumptions for consistent financial modelling.</li> <li>Scenario modelling can be performed regularly and can be performed on demand where appropriate (e.g., after a material change in portfolio.)</li> </ul>
Scenario selection	<ul style="list-style-type: none"> <li>A baseline set of pre-modelled scenarios is used to influence strategy, such as the orderly and disorderly 2°C scenarios (where data is available from several free public models such as NGFS).</li> </ul>		<ul style="list-style-type: none"> <li>A wider range of scenarios is considered and modelled where appropriate. Given an internally hosted model, assumptions and judgements can be updated on demand.</li> </ul>



## Risk management – Practical application guidance

	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
<p><b>Processes for identifying and assessing climate-related risks</b></p>	<ul style="list-style-type: none"> <li>Existing risk functions are responsible for analysing climate-related risks.</li> <li>Materiality thresholds are in place with respect to climate risks, with a clear escalation policy to senior management and Board levels.</li> <li>Updates on climate-related regulations are regularly monitored and escalated where necessary.</li> <li>A high-level approach to investee company engagement is established, with trigger points for engagement actions.</li> <li>Processes for assessing risks are established for each fund, and/or investment strategy.</li> </ul>	<ul style="list-style-type: none"> <li>A dedicated individual is responsible for climate-related issues across functions. They have regular access to the Board to raise climate-related issues.</li> <li>A detailed and regularly updated materiality policy is established on a fund and strategy basis.</li> <li>Changes in the regulatory landscape are regularly considered by sector Subject Matter Experts ('SME's), with updates provided to the Board.</li> <li>A detailed engagement plan is in place for various levels of climate-related risks.</li> <li>Processes for assessing risk are documented in detail for each fund, and/or investment strategy.</li> </ul>	<ul style="list-style-type: none"> <li>An ESG function, reporting to a designated member of the management team (e.g., Head of ESG or equivalent) with relevant climate change capability, is established, with direct presence on the Board/ Executive Committee and appropriate committees (e.g., audit, risk).</li> </ul>
<p><b>Processes and approach for mitigating climate-related risks</b></p>	<ul style="list-style-type: none"> <li>Climate risk responses where these are identified as material are clearly documented, including thresholds for risks that can be managed, transferred, accepted, or avoided. This includes response plans for portfolio companies such as where and how to engage, and in determining sector avoidance/exclusions policies.</li> <li>Identified risks and mitigants are disclosed in risk registers, financial statements etc.</li> <li>Pre-determined risk responses are presented at a fund, and/or investment strategy level.</li> </ul>		<ul style="list-style-type: none"> <li>A climate risk response framework is in place, with risks then being considered on a risk-by-risk basis to enable a tailored result to each situation.</li> <li>Identified risks and mitigants are disclosed in detail in risk registers, financial statements etc.</li> <li>Detailed pre-determined risk responses are presented on at a fund, and/or investment strategy level. For example, reducing exposures to certain sectors in response to an increase in the climate-related risks of a fund.</li> </ul>



**Detail of how climate change is incorporated into overall risk management**

**Band 1**

Climate risk is considered by the wider risk function in isolation, with links to other business risks (e.g., market, operations) made in material circumstances.

**Band 2 (in addition to Band 1)**

Existing risks categories of business risks (e.g., credit, market, technology) include a climate component, which is overlaid on existing calculations.

**Band 3 (in addition to Bands 1 and 2)**

Climate change considerations are fully integrated across the business in terms of risk management.

All risk types impacted by climate risk are considered and these form part of regular risk reporting. For example, the impact of climate change on market risks.



## Metrics and Targets – Practical application guidance

	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Static / Historical metrics	<ul style="list-style-type: none"> <li>Metrics monitored are compliant with TCFD recommendations; namely absolute emissions and an intensity metric such as WACI.</li> <li>Metrics are monitored at a portfolio and fund level.</li> </ul>	<ul style="list-style-type: none"> <li>A transition risk and opportunity heatmap by sector and geography is produced.</li> <li>A physical risk and opportunity heatmap by sector and geography is produced.</li> </ul>	N/A
Simple metrics and other KPIs	<ul style="list-style-type: none"> <li>Other simple metrics are disclosed, such as:                             <ul style="list-style-type: none"> <li>Portfolio % exposed to carbon-related assets by sector.</li> <li>Portfolio % which is vulnerable to physical risks.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Metrics monitored are compliant with TCFD recommendations; namely absolute emissions and an intensity metric such as WACI.</li> <li>Metrics are monitored at a portfolio and fund level.</li> </ul>	N/A
Engagement metrics	<ul style="list-style-type: none"> <li>Number of engagements with portfolio companies to assist/intervene on climate-related considerations.</li> </ul>	<ul style="list-style-type: none"> <li>Outcomes of engagement is disclosed, e.g., % of portfolio covered by emission reduction targets.</li> </ul>	



	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Forward-looking metrics	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>High-level forward-looking metrics (such as CVAR and ITR) are considered with assistance in modelling from consultants.</li> <li>Qualitative forward-looking analysis is performed.</li> </ul>	<ul style="list-style-type: none"> <li>CVAR metric aligned to the timeframes of the use cases is produced using scenario analysis (i.e., multiple CVARs). CVAR results are used to influence investment strategy and can be disclosed in annual and more regular reporting.</li> <li>ITR (or equivalent) is produced and disclosed with public commitments made with commentary for deviations against plans.</li> </ul>
Targets	<ul style="list-style-type: none"> <li>Medium-long term targets are aligned with stakeholder expectations (e.g., goals for net-zero) and ratcheted up over time.</li> <li>Progress against targets are disclosed to investors.</li> </ul>	<ul style="list-style-type: none"> <li>Interim targets are set, disclosed, and monitored against.</li> <li>Target levels of engagement (number or percentage) are set and monitored against.</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio decarbonisation target set (e.g., SBT PE guide Portfolio Coverage Approach)</li> <li>CVAR targets are monitored and disclosed. CVAR targets consider portfolio alignment strategies.</li> <li>ITR targets/commitments are aligned with 2°C or better scenarios with ambitious reductions at short-term and long-term phases.</li> </ul>





# **Background on the** Taskforce for Climate-Related Financial Disclosures ('TCFD')

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# TCFD Overview

The Financial Stability Board (FSB) created the TCFD in 2015 to develop consistent climate-related financial risk disclosures<sup>2</sup>. The TCFD was set up, in part, because investors did not have the information on how companies, banks and other financial institutions were planning to, or whether they were capable of, adapting to a low-carbon economy and responding to higher temperature pathways. Investors needed more effective, clear, and consistent climate-related disclosures.

Since its inception, the TCFD has served as a market leading standard for climate-related disclosure. Many countries and governing bodies have adopted these recommendations to drive business uptake and action. In 2021, the TCFD published additional recommendations and guidance for financial institutions, i.e., asset managers and owners. This document builds on this additional guidance and compares it with some of the rules and requirements set by other regulatory bodies.

TCFD disclosures may become a requirement in more jurisdictions as endorsement by G20 regulators paves the way for adoption of the ISSB (The International Sustainability Standards Board). The ISSB was set up at COP26 and aims to develop globally comparable sustainability information for the capital markets. The ISSB sustainability reporting standards build on the TCFD framework and will supersede TCFD when the ISSB publishes its final requirements. Given the strong alignment of the ISSB standards drafts with TCFD guidance, we expect the detail included in this document will remain valid after the standards are finalised.

# Purpose of the TCFD

Although companies might look at understanding the climate impact on their business to meet their regulatory requirements, the purpose of these climate disclosures is for businesses to inform investors how climate capabilities have been embedded into business strategy in order to drive climate action. Climate change is a financial risk that can influence businesses' revenues, costs, assets, liabilities, capital, and financing, and, ultimately, value. There is therefore an opportunity to use climate analysis tactically to identify the potential risks and opportunities that climate change presents for their business and how the business should react to them.

The output of this climate analysis can help businesses to meet regulatory and disclosure requirements, and allows investors and other stakeholders to understand how any given business may be exposed to risk, may stand to benefit from opportunities, and how resilient the business may be under a range of different climate scenarios and time horizons.





# The TCFD and PE

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# Why are private equity firms turning to TCFD regardless of regulation?

PE firms are increasingly required to disclose in line with the TCFD-based regulations, but we find that PE firms often also turn to climate risk assessment and disclosures, and the TCFD, for the following non-regulatory reasons:

- Climate risk<sup>3</sup> may have an impact on portfolio companies during a PE firm's holding period or be a relevant consideration for potential buyers;
- Its robust approach can be used to assess the climate risk of investment strategies of different products, capital allocation to specific sectors, further integrate climate risks in due diligence and exit models; and
- To meet investor expectations.

## Climate risk may have an impact on PCs during a PE firm's holding period or be a relevant consideration for potential buyers

The effects of climate change will have a material impact on businesses and sectors across all geographies. Given portfolio companies are typically held for 3-7 years, some physical and transition risks may not have a financial impact on all portfolio companies until a time beyond the holding period. However, climate impacts may still influence the value of the business in the medium or long-term. This is a relevant consideration for any buyer and may affect the exit price or ability to the PE firm to sell.

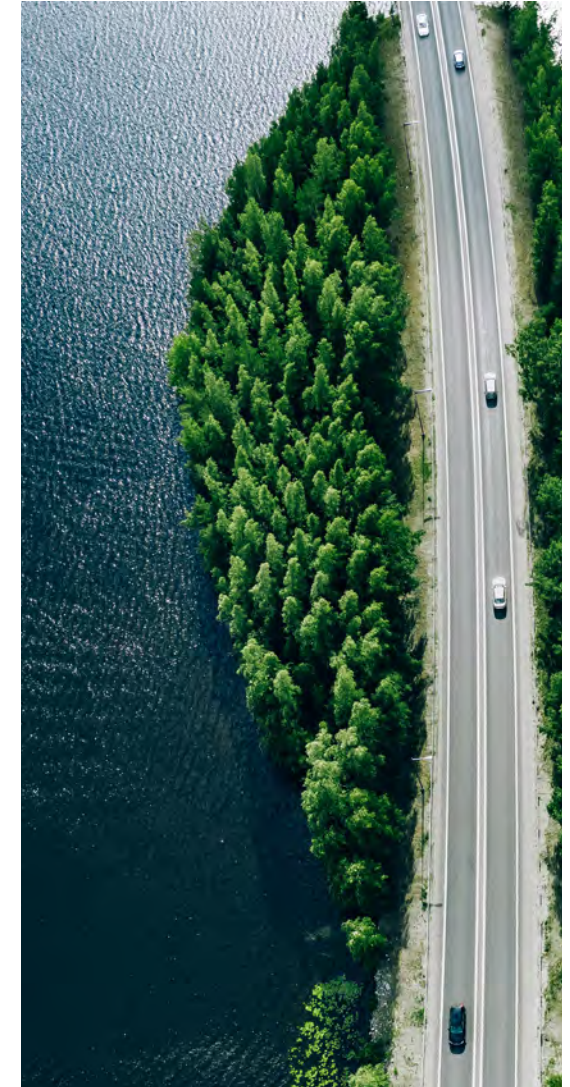
## Its robust approach can be used to assess the climate risk of investment strategies of different products, capital allocation to specific sectors, further integrate climate risks in due diligence and exit models

The realisation of physical versus transition risks is, broadly, negatively correlated. Simply put, a more rapid shift to a lower carbon economy (in which a greater degree of transition risks and opportunities are realised earlier) results in a lesser impact of physical risks in future periods. Conversely, in a scenario in which the shift to a low-carbon economy is slower and businesses, economies and governments continue to operate as they do today, a greater degree of physical risks will be realised in the future as the planet warms. Further detail on the types of physical and transition climate risks and opportunities that may exist for businesses is included in Appendix 2.

Transition risks can crystallise in the short term (e.g., an immediate policy or regulatory change) and PE firms need to be aware of how these risks may impact their portfolio.

**In the UK, the Government announced that the sale of new Internal Combustion Engine cars will be illegal from 2030, with hybrid engines also banned from 2035, meaning that all new vehicles sold will be exclusively electric vehicles. This has presented both risks and opportunities for the automotive industry, reflected in the costs to redeploy operations and expertise into a new market (e.g., battery materials sourcing), offset by the new demand for EVs and required infrastructure (e.g., charging points).**

Scenario analysis allows PE firms to identify and estimate potential climate-related risks and opportunities under different scenarios. It also helps influence responses as different climate scenarios unfold. Examples include assessing the risk of investment strategies of different products, capital allocation to specific sectors, understanding of risks during due diligence, during hold periods, use in exit models, and long-term alignment at the corporate, fund and portfolio company level.





## To meet investor/LP expectation

Many investors are increasingly aware of the potential risks and opportunities posed by climate change and the potential implications for their investment returns. Disclosure of a PE firm's strategy and exposure to climate change may therefore be important to LPs as they increasingly align their investment strategy with their climate commitments and to diversify their exposure to climate risks.

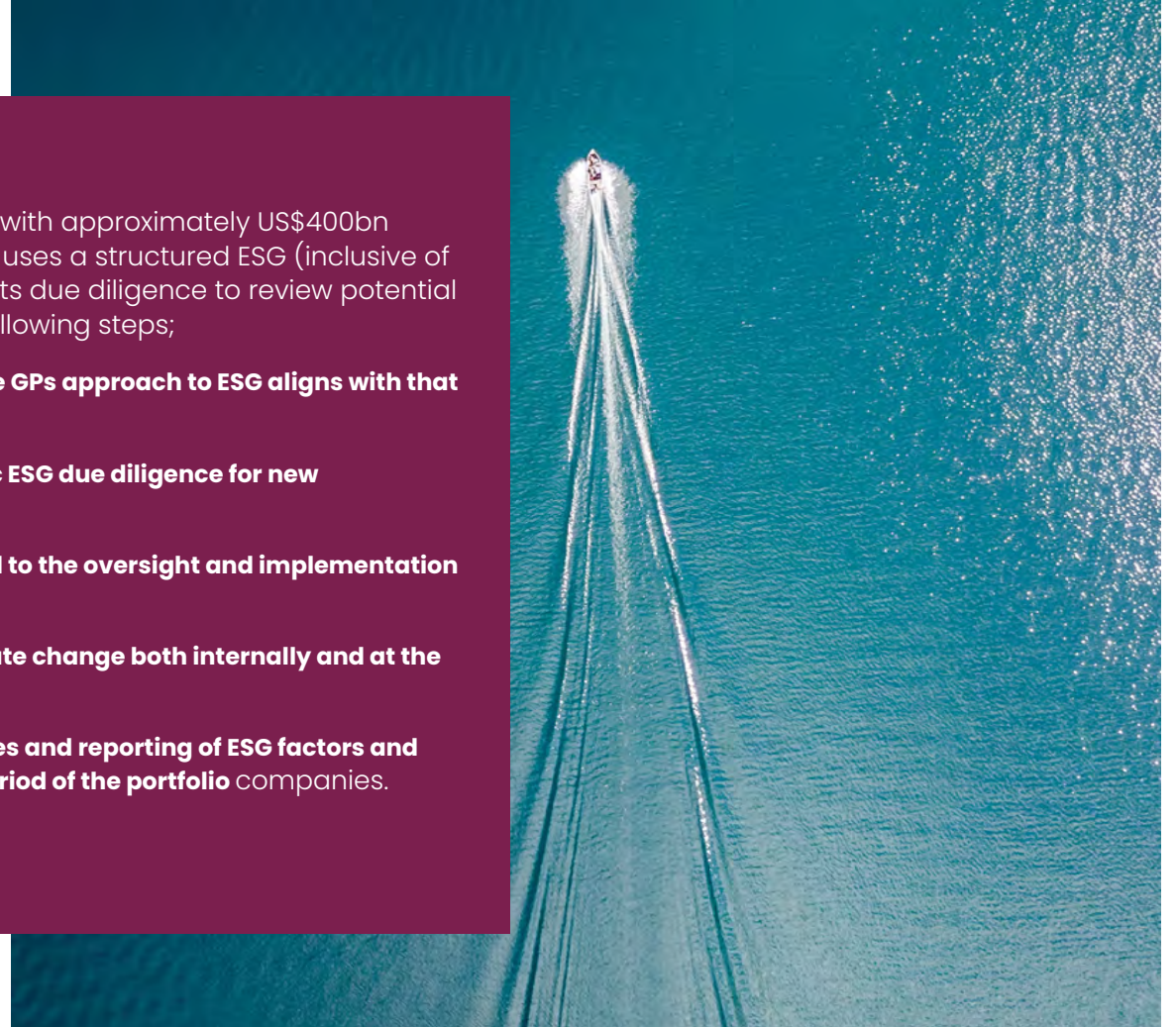
The increasing expectation for investors is likely to be that firms can articulate the main climate-related risks and opportunities within their funds and wider portfolios and evidence that robust processes are in place to identify and manage those potential risks and opportunities as they appear. Many investors already consider the integration of climate change risks and opportunities into investment processes part of their fiduciary duty and feel as though it enables them to make better investment decisions, improve performance and reduce overall risk<sup>4</sup>.

This has resulted in a significant increase in assets placed in ESG (Environmental, Social and Governance) and sustainable-labelled funds by both institutional investors (e.g., pension funds, life insurers) and individual investors. ESG due diligence of GPs has also evolved in recent years.

### Case study<sup>5</sup>

A North American Pension Fund LP with approximately US\$400bn assets under management (AUM) uses a structured ESG (inclusive of climate change) questionnaire in its due diligence to review potential GPs, which is summarised in the following steps;

- 1. Determines the extent to which the GPs approach to ESG aligns with that of the pension fund;**
- 2. Determines if there is a systematic ESG due diligence for new investments being considered;**
- 3. Considers the resources expended to the oversight and implementation of ESG practices;**
- 4. Assesses a GP's approach to climate change both internally and at the portfolio company level; and**
- 5. Monitors GP management activities and reporting of ESG factors and risks throughout the ownership period of the portfolio companies.**



# TCFD reporting as a regulatory requirement

The TCFD and climate-related disclosures are increasingly forming the basis of regulatory requirements around the world. Countries like the United Kingdom, Japan and others have already begun to mandate climate disclosures using the TCFD recommendations as the foundation of their rules, whilst other countries are preparing to do so in the coming years. Thus far, eight countries have or will be enforcing TCFD-aligned climate disclosure in the coming years: United Kingdom (2022<sup>6</sup>), Japan (2022<sup>7</sup>), New Zealand (2023<sup>8</sup>), Singapore (2023<sup>9</sup>), China (2025<sup>10</sup>), Switzerland (2024<sup>11</sup>), Canada (2024<sup>12</sup>), France (2021<sup>13</sup>).

Some regulatory bodies have gone further in terms of prescriptive requirements, such as the Prudential Regulatory Authority and the Financial Conduct Authority in the UK. We provide more detail about these requirements below. Later in this document, we consider some of the requirements as a current benchmark of good practice.

Whilst the requirements in each geography differ to an extent, the adoption of the ISSB standards by more jurisdictions and strengthening of international cooperation on sustainability-related disclosure, for example through the International Platform on Sustainable Finance, could lead to a convergence in regulatory approaches to climate disclosures.

## UK TCFD reporting requirements for Asset Managers – FCA Policy Statement 21/24 (PS21/24); ESG Sourcebook

In the United Kingdom, TCFD reporting is required by the FCA for asset managers, as set out in the table below. The relevant rules are set out in the FCA's ESG Sourcebook.

UK TCFD reporting requirements – asset managers			
	Assets under management /advice	Applies from:	First required Disclosure date:
<b>Largest asset managers</b>	>£50 billion (3 year rolling average)	Accounting year starting on or after January 1, 2022	By 30 June 2023
<b>Smaller asset managers</b>	Between £5 billion and £50 billion	Accounting year starting on or after January 1, 2023	By 30 June 2024
<b>Out of scope</b>	<£5 billion (3 year rolling average)	N/A	

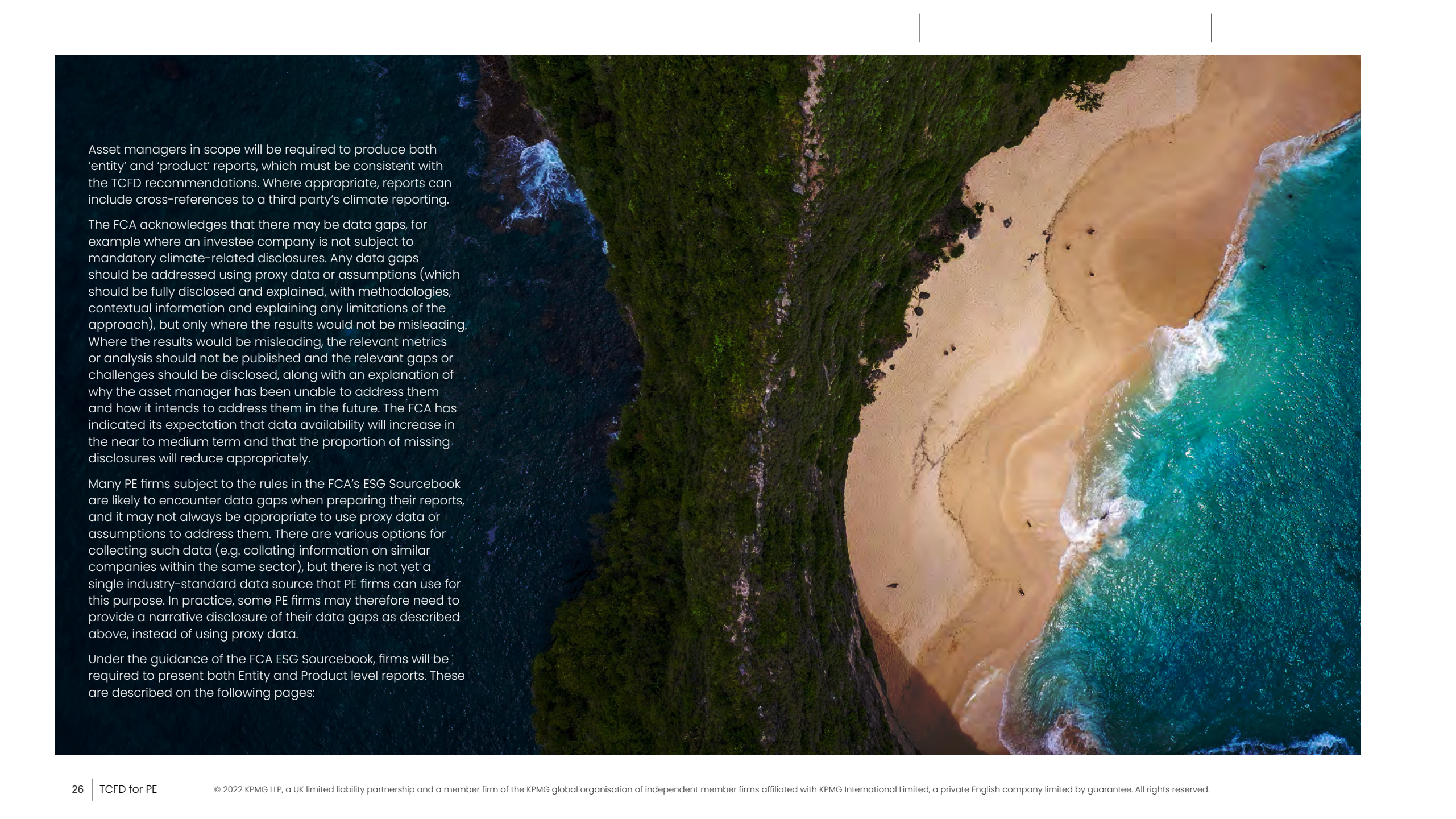
Source: [FCA PS21/24](#)

A high-level summary of the UK TCFD reporting rules applicable to asset managers is set out below. An application flowchart is also included in Appendix 4 – which has been reproduced from an Invest Europe guide on this topic.

### 'Asset managers' for these purposes are the following:

- A UK fund manager or self-managed fund; or
- A UK authorised firm carrying out 'portfolio management' – this term has an extended meaning in this context and includes:
  - traditional portfolio management services (i.e. taking investment decisions on behalf of clients); and
  - private equity activities consisting of providing investment advice on a recurring or ongoing basis in connection with an arrangement of the "predominant purpose of which is investment in unlisted securities".





Asset managers in scope will be required to produce both 'entity' and 'product' reports, which must be consistent with the TCFD recommendations. Where appropriate, reports can include cross-references to a third party's climate reporting.

The FCA acknowledges that there may be data gaps, for example where an investee company is not subject to mandatory climate-related disclosures. Any data gaps should be addressed using proxy data or assumptions (which should be fully disclosed and explained, with methodologies, contextual information and explaining any limitations of the approach), but only where the results would not be misleading. Where the results would be misleading, the relevant metrics or analysis should not be published and the relevant gaps or challenges should be disclosed, along with an explanation of why the asset manager has been unable to address them and how it intends to address them in the future. The FCA has indicated its expectation that data availability will increase in the near to medium term and that the proportion of missing disclosures will reduce appropriately.

Many PE firms subject to the rules in the FCA's ESG Sourcebook are likely to encounter data gaps when preparing their reports, and it may not always be appropriate to use proxy data or assumptions to address them. There are various options for collecting such data (e.g. collating information on similar companies within the same sector), but there is not yet a single industry-standard data source that PE firms can use for this purpose. In practice, some PE firms may therefore need to provide a narrative disclosure of their data gaps as described above, instead of using proxy data.

Under the guidance of the FCA ESG Sourcebook, firms will be required to present both Entity and Product level reports. These are described on the following pages:



## Entity level reporting

An annual TCFD entity report at the level of the UK-authorized entity. At least the most recent report must be published in a prominent place on the firm's main business website in a way that makes it easy for prospective readers to locate and access. A firm's TCFD entity report need not be included in a firm's annual statutory accounts. Disclosures against the four TCFD pillars as summarised below (the following additional requirements imposed under the FCA rules set out in **bold**):

### **Governance – disclosure of the firm's governance around climate-related risks and opportunities:**

- description of the board's oversight of climate-related risks and opportunities; and
- description of the management's role in assessing and managing climate-related risks and opportunities.

### **Strategy – disclosure of the actual and potential impacts of climate-related risks and opportunities on the firm's business, strategy, and financial planning where such information is material:**

- description of the climate-related risks and opportunities the firm has identified over the short, medium, and long-term;
- description of the impact of climate-related risks and opportunities on the firm's businesses, strategy, and financial planning;
- description of the resilience of the firm's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. This should include:
  - **an explanation of the firm's approach to climate-related scenario analysis;**

- **an explanation of how the firm applies climate-related scenario analysis in its investment and risk decision-making process; and**
- **where reasonably practicable, quantitative examples to demonstrate the firm's approach to climate-related scenario analysis; and**
- **explanation of how the firm's strategy under TCFD has influenced its delegation and outsourcing arrangements.**

### **Risk management – disclosure of how the firm identifies, assesses, and manages climate-related risks:**

- description of the firm's processes for identifying and assessing climate-related risks;
- description of the firm's processes for managing climate-related risks; and
- description of how processes for identifying, assessing, and managing climate-related risks are integrated into the firm's overall risk management.

### **Metrics and targets – disclosure of the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material:**

- disclosure of the metrics used by the firm to assess climate-related risks and opportunities in line with its strategy and risk management process;
- disclosure of Scope 1, Scope 2, and Scope 3 greenhouse gas emissions, and the related risks (Note: there is a transitional provision in respect of Scope 3 emissions data – all firms have until 30 June 2024 to report such data for the first time);
- description of the targets used by the firm to manage climate-related risks and opportunities and performance targets; and
- **on a comply or explain basis, description of the targets the firm has set to manage climate-related risks and opportunities, including the KPIs it uses to measure progress against those targets.**

The report must include a signed compliance statement stating that it complies with the FCA rules.

Practically, if a PE firm is a member of a group, it may cross reference climate-related financial disclosures made by its group or a member of its group when producing its TCFD entity report. This is only permitted to the extent that those group disclosures are consistent with TCFD Recommendations and Related Disclosures, are relevant to the firm and cover the assets the firm administers or manages.



## Product level reporting

- An annual TCFD report at the product (i.e. fund) level must be made available to “clients” of the UK firm, on demand. In the case of unauthorised alternative investment funds managed by a UK AIFM, this is extended to apply to fund investors.
- Each client/investor is entitled to receive one TCFD product report once per reporting period.
- Firms will need to determine the extent to which these rules oblige them to make TCFD product reports available to fund investors. Where the rules do not cover fund investors (e.g. where the investor is not a “client” of the UK firm and the fund is not managed by a UK AIFM), firms will need to determine whether to make TCFD product reports available in any case in order to meet investor demand.
- Reports must reflect a 12 month reporting period and firms use the most recent calculation date for which up to date information is available for that period.
- Disclosures of aggregate figures for each fund’s portfolio at the relevant reporting date against:
  - Five core metrics
    - i. Scope 1 and 2 greenhouse gas emissions;
    - ii. Scope 3 greenhouse gas emissions (from 2024);
    - iii. total carbon emissions;
    - iv. total carbon footprint; and
    - v. weighted average carbon intensity.
  - Plus two additional forward-looking metrics (as far as is reasonably practicable);
    - vi. climate value at risk (CVAR); and
    - vii. metrics which show the climate warming scenario with which a product or portfolio is aligned (e.g. an implied temperature rise metric);
  - Plus any additional metrics the firm believes an investor would find useful in selecting a TCFD product – the calculation methodologies must be clearly explained and the metrics must be presented in a way that is not more prominent than that of the five core metrics.
- Include historical annual calculations from any previous TCFD product level reports, plus an explanation of how the metrics should be interpreted (including any limitations and information on any assumptions/proxies used). Also describe any deviations from the overarching approach of the firm disclosed in its TCFD entity level report.
- Include;
  - A discussion of the most significant drivers of impact on the product;
  - A qualitative summary of how climate change is likely to impact underlying assets under the following scenarios;
    - i. ‘Orderly transition’ – assume climate policies are introduced early and become gradually more stringent, reaching global net-zero carbon dioxide (CO<sub>2</sub>) emissions around 2050 and likely limiting global warming to below 2°C on pre-industrial averages;
    - ii. ‘Disorderly transition’ – assume climate policies are delayed or divergent, requiring sharper emissions reductions achieved at a higher cost and with increased physical risks in order to limit temperature rise to below 2°C on pre-industrial averages; and
    - iii. ‘Hothouse world’ – assume only currently implemented policies are preserved, current commitments are not met and emissions continue to rise, with high physical risks and severe social and economic disruption and failure to limit temperature rise.
  - Where the product has ‘concentrated or high exposures to carbon-intensive sectors’ (not defined), quantitative analysis of the above scenarios.
- Firms must also provide clients/investors within scope of the product report rules with additional data on underlying holdings on request. Each client/investor is entitled to receive one set of data annually. Where requested by the client/investor and reasonably practicable for the firm to produce, this includes climate or carbon-related data reasonably required to meet the client/investor’s own climate-related financial disclosure obligations.

## Other UK TCFD reporting requirements

Some portfolio companies may also fall into scope for their own TCFD reports, which therefore should be prepared at the entity level, and aggregated to the fund/portfolio level. TCFD reporting has been required for UK premium listed companies from January 1, 2021, and for standard listed companies from January 1, 2022. It will also be required for other UK companies and LLPs, depending on their size, as set out in the table below.

UK TCFD reporting requirements – companies/LLPs			
	Specifications:	Enforced from:	Required disclosure date:
<b>Premium listed UK company</b>		Accounting year starting on or after January 1, 2021	On or after January 1, 2022
<b>Standard listed UK company</b>		Accounting year starting on or after January 1, 2022	On or after January 1, 2023
<b>Large UK company</b>	>500 employees and £500 million in turnover	Accounting year starting on or after April 6, 2022	On or after April 6, 2023
<b>Large UK LLPs</b>	Traded or Banking LLPs with >500 employees Large LLPs, which are not traded or banking LLPs with >500 employees and >£500 million in turnover	Accounting year starting on or after April 6, 2022	On or after April 6, 2023
<b>UK Public Interest Entities</b>		Accounting year starting on or after April 6, 2022	On or after April 6, 2023
<b>Small UK company</b>	<500 employees and £500 million in turnover	No mandatory disclosure at entity level	
<b>Overseas subsidiary</b>		Disclosure at entity level dependent on enforcement in jurisdiction	

Source: [FCA PS21/24](#), [Department for Business, Energy & Industrial Strategy](#)<sup>15</sup>



# Other global climate-related frameworks, standards and regulations

Several international regulations, guidance frameworks and standards will influence PE firms. Their overlap with the four TCFD pillars is illustrated in the table below and they are further described in Appendix 3. TCFD compliance may form the basis for many of these regulations, but many of them build and expand upon specific sections and have varying expectations. PE firms may want to consider these international standards when working on their climate disclosures. This is not an exhaustive list but provides a sample of current publicly available resources.

Other global frameworks and standards				
Other frameworks /standards	TCFD pillar	Application		
		All	Funds	PCs
ISSB Climate-Related Disclosures	All	Y		
Glasgow Financial Alliance for Net-Zero (GFANZ) (net-zero transition plans and portfolio alignment)	Strategy/Metrics and Targets	Y		
Net-Zero Asset Managers Initiative (NZAM)	Strategy/Metrics and Targets	Y		
Science-Based Targets initiative (SBTi)	Strategy/Metrics and Targets	Y (PE guidance)	Y (PE guidance)	Y (corporate)
Initiative Climat International (ICI)	Strategy, Metrics and targets	ICI SBTi guidance Carbon accounting guide for PE	Carbon accounting guide for PE	Carbon accounting guide for PE
EU Corporate Due Diligence Directive	Governance/Risk Management			Y
EU Corporate Sustainability Reporting Directive (CSRD) / European Financial Reporting Advisory Group (EFRAG)	Governance/Metrics and Targets			Y
Financial Conduct Authority Sustainability Disclosure Requirements	Metrics and Targets	Y	Y	
U.S Securities and Exchange Commission (SEC)	Metrics and Targets	Y	Y	
ESG Data Convergence Initiative (EDCI)	Metrics and Targets		Y	Y
Taskforce for Climate-related Financial Disclosures (TCFD) (GP guidance)	All	Y		
Invest Europe ESG Reporting guide	Metrics and Targets		Y	Y
EU Sustainable Finance Disclosure Regulation (SFDR)	Metrics and Targets	Y (2022)	Y	



# The four pillars of the TCFD

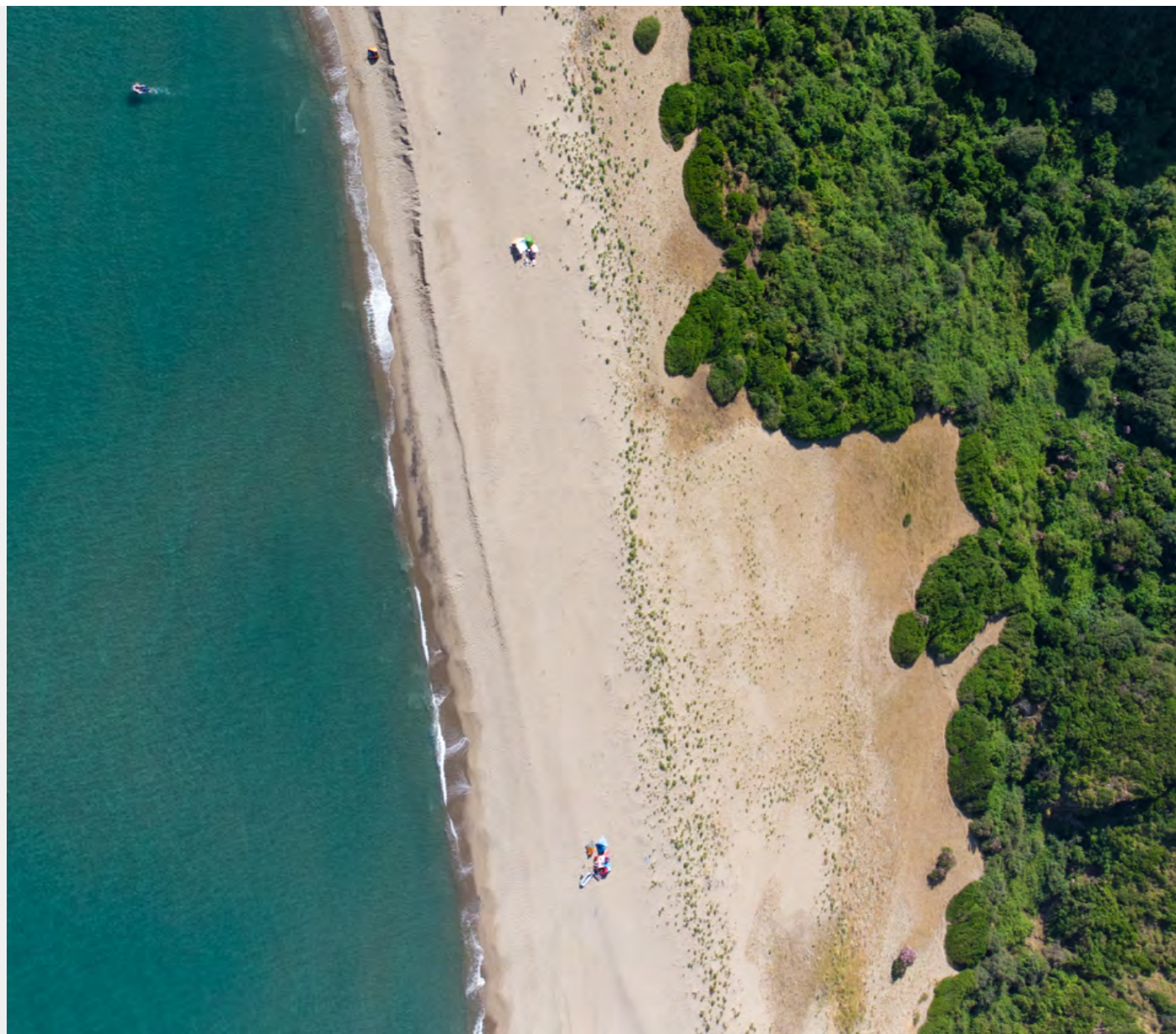
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**The following section provides guidance on each of the four pillars of the TCFD framework; Governance, Strategy, Risk Management, and Metrics and Targets and explains how these may be best used to help create tangible outcomes for PE firms. Each of the four pillars provides:**

- ➔ A background to the pillar, guidance from the TCFD and a description of good practice. Where relevant, this includes references to publicly available complementary guidance provided by regulatory bodies in leading countries;
- ➔ Enablers of good practice, including practical tools and data sources where relevant;
- ➔ An outline of considerations for PE firms. Given some of the nuances of PE operating models, such as their holding period, the significant changes in portfolio composition over the life of a fund, operational complexities (e.g., fund structures and data flows), and the requirement to disclose at various levels (e.g., firm, fund and portfolio company level), this document provides tailored guidance based on our workshops and interviews with the PE community; and
- ➔ Anonymised case studies. These case studies illustrate current practices to date for PE firms. Appendix 9 and Appendix 10 include further examples from conventional asset managers and Venture Capital (VC) firms.



# Governance

## Background and purpose

To drive climate action firms need appropriate oversight and allocation of responsibilities. The objective of the Governance pillar of TCFD is two-fold: to both engage Board members and management in climate risk analysis, and to provide them with the tools to manage said risks, as well as being able to leverage the potential opportunities that climate action may present. In the context of PE firms, this has implications for the governance of both the firm itself, but also for its funds and portfolio companies given the various layers of governance.

Whilst in a traditional listed firm, the Board has oversight of strategy and risk management, in PE firms that is typically more complex. The structures of private market firms, and those charged with governance, will vary from firm to firm and may also include a cross-border component. This has the potential to lead to some ambiguity in determining at what level appropriate structures should be implemented. For example, a PE firm in the UK (where the climate regulatory market is more developed), may report into a parent entity based in the United States (where regulations

are developing but are not yet as stringent). In cases like these, it is important for private market firms to consider the spirit of the guidance in their approach. The guidance indicates that climate change considerations should reach the top layer of decision making, and therefore those that have the influence to enact change are those that should ultimately be responsible.



### We surveyed individuals from 55 PE firms globally and the implementation of the TCFD recommendations with respect to governance was varied:

**40%**

of respondents have already assigned Board level responsibility for climate-related risks; and

**However,**

**31%**

of respondents indicated assigning Board level responsibility was too complex or that they lacked the incentive, resources or understanding of its applicability; and

**53%**

of respondents have assigned management level responsibility for climate-related risks.

**20%**

of respondents indicated assigning management level responsibility was too complex or that they lacked the incentive, resources or understanding of its applicability.

As PE firms assess their resilience to climate risks, gather further information from portfolio companies and seek to align their portfolio, climate-related topics are likely to become more common in Board and senior management discussions, and hence to become more embedded in the governance processes of the PE firm.



## The TCFD Guidance

The governance pillar of TCFD aims to ensure<sup>14</sup>:

- **The Board oversees climate risk and opportunities**
- **Management assesses and manages climate risks and opportunities**

This guide provides some examples of practices in PE firms.

The TCFD guidance on disclosures relating to the governance pillar is as follows:

### TCFD Guidance – Governance Pillar<sup>15</sup>

#### TCFD Recommended disclosure

#### TCFD Guidance

##### **Describe the Board’s oversight of climate-related risks and opportunities**

Organisations should disclose the processes and frequency by which the Board and/or Board committees (e.g., audit, risk, or other committees) are informed about climate-related issues

Whether the Board and/or Board committees consider climate-related issues when reviewing and guiding strategy, major plans of action, risk management policies, annual budgets, and business plans as well as setting the organisation’s performance objectives, monitoring implementation and performance, and overseeing major capital expenditures, acquisitions, and divestitures

How the Board monitors and oversees progress against goals and targets for addressing climate-related issues

##### **Describe management’s role in assessing and managing climate-related risks and opportunities**

Whether the organisation has assigned climate-related responsibilities to management-level positions or committees; and, if so, whether such management positions or committees report to the Board or a committee of the Board and whether those responsibilities include assessing and/or managing climate-related issues

A description of the associated organisational structure(s)

Processes by which management is informed about climate-related issues

How management (through specific positions and/or management committees) monitors climate-related issues

## Current good practices and relevant guidance

In this section (and in the 'Current good practices and relevant guidance' section for the other TCFD pillars), 'good practice' is based on guidance from regulatory bodies which are more advanced in terms of climate-related requirements, other climate bodies who provide guidance on a voluntary basis, and our experience of current implementation of climate considerations by PE firms.

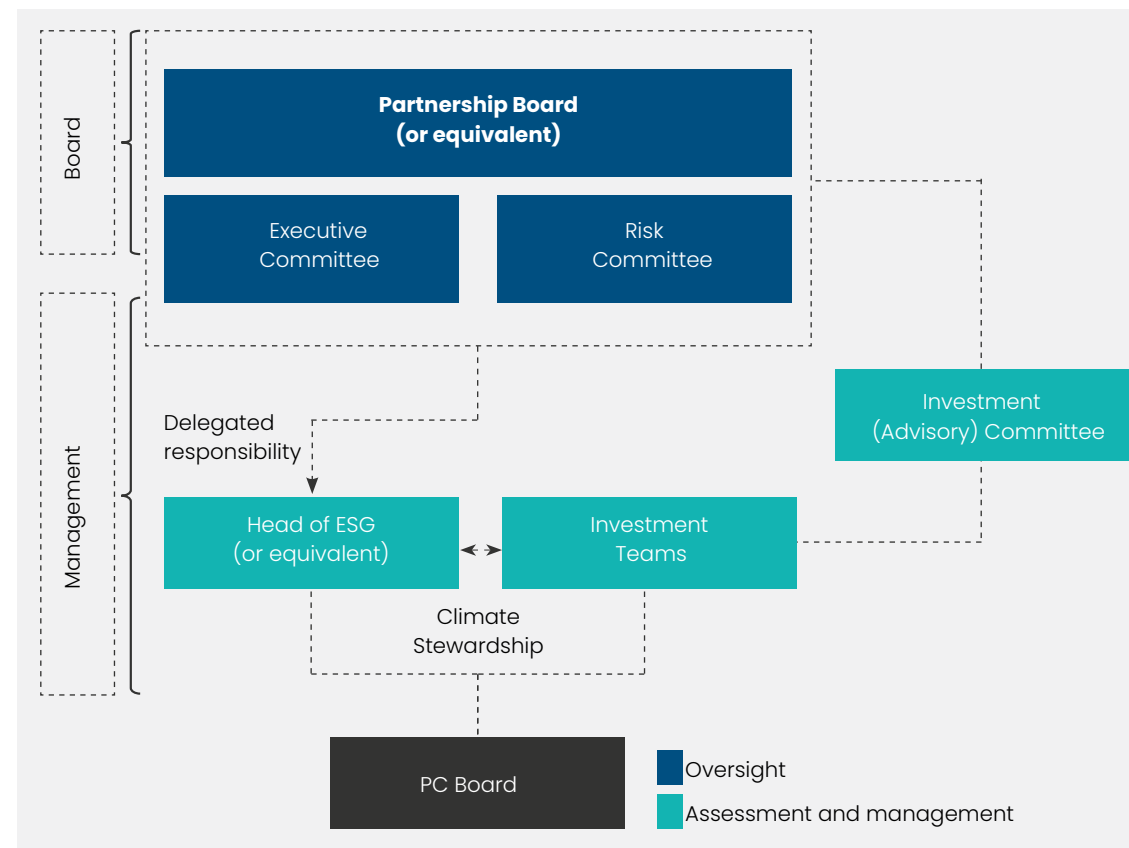
The Principles for Responsible Investment (PRI) has suggested a governance structure for PE firms to identify, manage and oversee climate-related risks, opportunities and impacts<sup>6</sup>. This structure has been adapted for this guide to highlight the responsibilities at each level of governance.

1. **Board level** - For example, a Board of a UK entity that is regulated by the FCA, or governing body of a parent company with responsibility for group-wide decisions.
  - It is responsible for considering sustainability-related risks and opportunities when overseeing the entity's strategy and risk management strategies; and
  - It oversees target setting related to significant sustainability-related risks and opportunities, and monitors progress against goals, including whether and how related performance metrics are included in remuneration policies.

2. **Management level** - The Management level has overall responsibility for the operations of the firm and oversees the implementation of the firm's strategic objectives, risk strategy and internal governance, whilst also monitoring the progress against goals and targets. Management is responsible for assessing and managing sustainability-related risks and opportunities, and may delegate that responsibility to, for example, a Head of ESG. Note that some members of management can also be part of the Board.
3. **Dedicated responsible investment or ESG team** - Provides updates and advice to senior leadership on climate-related issues and recommends approaches and actions to the firm's wider climate ambitions.
4. **Wider investment teams** - Responsible for considering climate risk assessment and management as part of their investment decisions.

The adjacent graph gives one example of organisational structure representing the roles and responsibilities of the board and management described above.

## Example of an organisation's governance of climate-related risks and opportunities



Source: Adapted based on [TCFD For Private Equity General Partners, UNPRI, 2020](#)



Governance structures throughout PE firms are likely to differ from firm to firm based on their size and geography. PE firms should consider the most appropriate structure for themselves whilst being in keeping with the spirit of the TCFD guidance, namely allocating responsibility for climate considerations to senior management and including climate on the Board's agenda.

Some firms will have greater capacity to assess and manage climate risks having built climate and ESG teams. Others may have a smaller team that considers climate as part of an additional role. Where this is the case, and where it is possible, the responsibility should be close to the core functions of the business, which in the case of PE may be in the investment team and CIO.

### **An 11-step plan to develop strong climate-related governance**

PE firms may consider using the practical steps overleaf, adapted for this guide from those provided by Ceres and the World Economic Forum (WEF) recommendations, for developing an appropriate governance mechanism for identifying, managing and reporting climate-related risks and opportunities<sup>17,18</sup>.

Note that whilst the below relates to PE firms specifically, the 'Action Point' mechanism may also be used as a sensible framework for underlying portfolio companies to adopt where relevant.



Guidance on establishing appropriate climate-related governance for PE firms	
Step/Action point	Description
<b>Step 1:</b> Alignment and commitment	<ul style="list-style-type: none"> <li>Perform an initial assessment of staff, senior management, and the Board's knowledge / expertise with respect to climate change, to understand baseline competencies and awareness</li> <li>Raise the awareness and knowledge of the partners, investment directors, investment teams and analysts about climate-related risks and opportunities through trainings, workshops, and publicly available materials</li> <li>Identify climate change as an organisational priority with clear connection of climate change with risks and opportunities throughout the deal lifecycle, i.e., pre-acquisition, during acquisition and post-acquisition</li> <li>Commit at the Board and senior management levels for sustained climate action and resource allocation. This may include incorporating climate change competencies in the evaluation of Board candidates</li> <li>Communicate Board and senior management commitments throughout the business as a priority to build organisation and staff buy-in</li> </ul>
<b>Step 2:</b> Integration with Board committees	<ul style="list-style-type: none"> <li>Include climate change priorities in the Board committee charter to make it part of strategic investment planning, risk management and decision making</li> <li>Integrate climate change consideration in the agenda of Board committees</li> <li>Establish a firm-wide climate policy and embed climate goals across all business activities and investment decision processes</li> </ul>
<b>Step 3:</b> Develop organisation structure	<ul style="list-style-type: none"> <li>Develop organisation structure with clear chain of command and reporting lines, covering Board and senior leadership, management committees, climate change working groups and investment teams</li> <li>Provide the adequate resources and funding to ensure effective implementation across the organisation</li> </ul>
<b>Step 4:</b> Institute Board oversight mechanism	<ul style="list-style-type: none"> <li>Identify and define dedicated Board level committee or position with overall responsibility for review, reporting and oversight on climate-related impacts, whilst developing climate change expertise across the Board</li> </ul>

Guidance on establishing appropriate climate-related governance for PE firms	
Step/Action point	Description
<b>Step 5:</b> Define role of management	<ul style="list-style-type: none"> <li>Identify and define management level committees or positions for driving the actions and response towards climate goals</li> <li>Build climate change capabilities in management committees</li> </ul>
<b>Step 6:</b> Outline functional roles	<ul style="list-style-type: none"> <li>Ensure accountability by allocating climate responsibility for assessment and management of climate risk and opportunities</li> <li>Develop investment team's climate change related skill set and competencies</li> </ul>
<b>Step 7:</b> Develop policies and procedures	<ul style="list-style-type: none"> <li>Define policies and adopt procedures to support risk and opportunity identification and assessment, set up goals and targets and monitor and review progress</li> <li>Define how and how often climate risks and opportunities are reviewed by management and the Board</li> </ul>
<b>Step 8:</b> Integration with performance management	<ul style="list-style-type: none"> <li>Align the achievement of climate-related targets with executive and investment team's remuneration incentives</li> </ul>
<b>Step 9:</b> Reporting and disclosures	<ul style="list-style-type: none"> <li>Define process for disclosure of climate-related risks and opportunities to relevant partners, investors, and regulators</li> <li>Report annually (or more frequently as required) to the GP's partners to inform them on climate-related risks across investment activities<sup>19</sup></li> </ul>
<b>Step 10:</b> Communication and Collaboration	<ul style="list-style-type: none"> <li>Communicate effectively organisations' climate position to wider public</li> <li>If not already, join PE industry working groups (including the iCI community) to share knowledge, communicate collaboration and benefit from best practice resources and tools</li> </ul>
<b>Step 11:</b> Continual re-evaluation	<ul style="list-style-type: none"> <li>Climate governance should be continually reviewed and updated, reflecting the change in the environment, climate science, regulations, and methodologies. Firms should set regular review points to revise their climate ambitions and internal management infrastructure</li> </ul>





## Governance – Considerations for PE firms

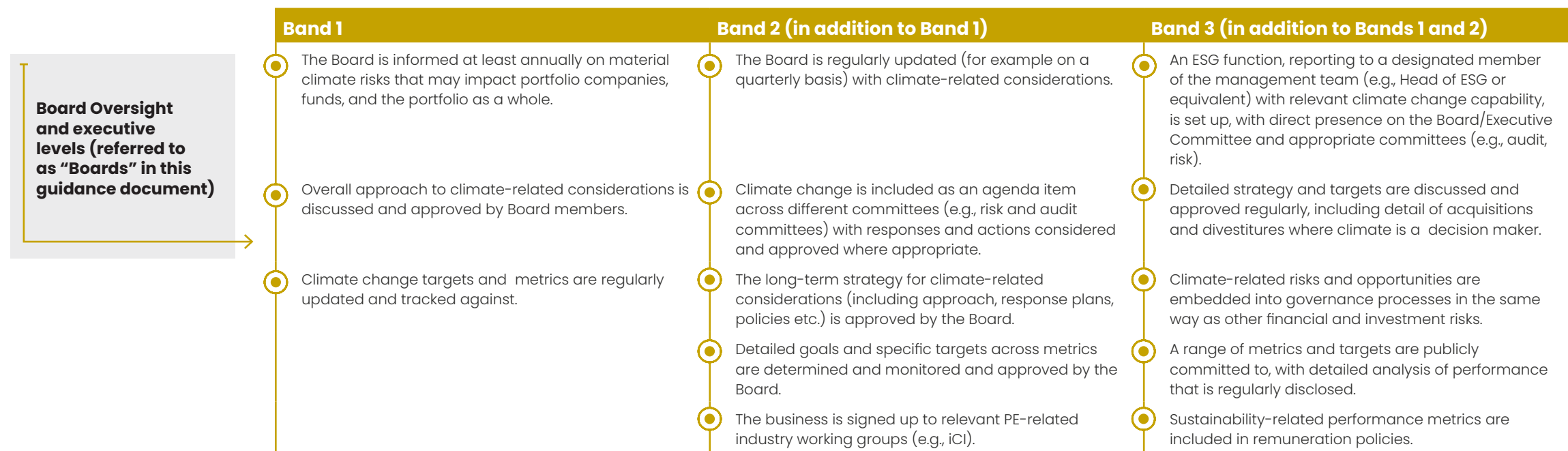
A clear direction from the Board and senior management is important in setting the tone for how climate considerations should be incorporated in PE firms' strategies and risk management, but also in portfolio companies. To enable change requires clearly defined roles and responsibilities, not just at Board and senior management level, but in other relevant functions as these responsibilities need to trickle down the organisation to the portfolio companies.

PE firms need to amend their processes to ensure that the board is informed on material risks and opportunities within the portfolio, funds, and strategies. These include escalation strategies. Portfolio company Boards and all teams involved in climate risk assessments need to receive training and support. Climate incentives could also be introduced to support the implementation of climate strategies.

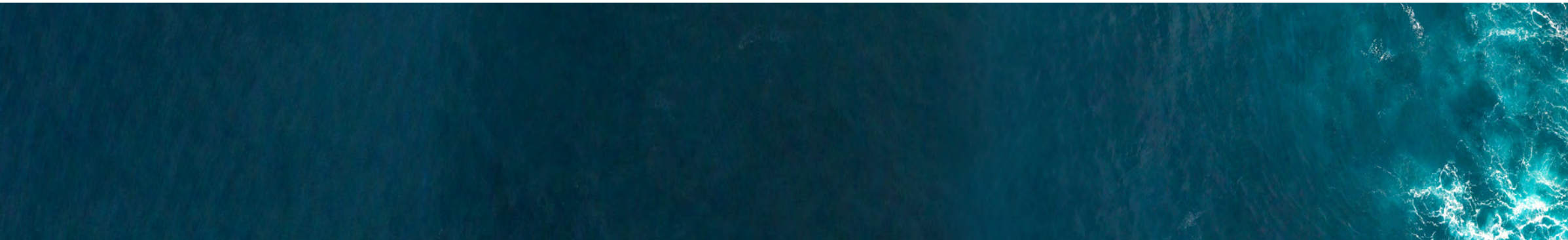
## Practical application guidance

As previously noted, the below tables show suggested actions and approaches that firms may wish to consider. They are not exhaustive and firms should consider the best approach for their business.

### Governance – Practical application guidance







**Management's role (Senior ESG and Investment professionals) in assessing and managing climate-related risks and opportunities**

Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
<ul style="list-style-type: none"><li>Climate-related responsibilities are allocated to management personnel who have an appropriate level of access to the Board.</li><li>High-level processes are in place so that management is appropriately informed of climate-related issues and that they are escalated where applicable (e.g., through regular portfolio/fund monitoring).</li><li>Processes are documented for how and when climate-related risks and opportunities are analysed.</li><li>The ESG/investment team engages with PC Boards on climate risks and opportunities.</li></ul>	<ul style="list-style-type: none"><li>A dedicated individual is responsible for climate-related issues across functions. They have regular access to the Board to raise climate-related issues.</li><li>Well documented processes/climate policies are in place to regularly inform wider management of climate-related issues (e.g., new regulations which may impact portfolio companies).</li><li>Regular training on climate-related topics is presented to staff and management.</li><li>Appropriate resource is allocated for climate-related initiatives.</li><li>PC Boards requested to include climate considerations as an agenda item.</li></ul>	<ul style="list-style-type: none"><li>Several management personnel have a climate component to their role, headed by a senior individual with access to committees and the Board.</li><li>Detailed processes are in place with management and the Board regularly updated with climate-related issues.</li><li>A transition plan is disclosed publicly alongside other disclosures (noting the requirements for transition plan disclosure as per the ISSB).</li><li>PC Boards requested to include climate considerations as part of strategic discussions, with updates of progress against goals.</li></ul>

## Case studies<sup>5</sup>

### Case study 1: USA, US\$330bn AUM

A large US-based PE firm, with approximately US\$330bn AUM has developed a three-tier governance structure to address its climate-related work and integrate that across wider business functions.

- Oversight: including the Board of Directors, Audit Committee, Enterprise Risk Committee and Executive Management Committee. This tier is responsible for climate-related oversight, risk management and broad strategic guidance, with periodic presentations from the Global Head of ESG.
- Climate Team: this cross-functional team is responsible for translating firm-wide climate-related objectives into function- and strategy-specific contexts. It serves as a link between the oversight and strategy setting senior management tier, and the implementation phase, performed by frontline employees (i.e., frontline investment and portfolio management professionals).
- Frontline Employees: this firm has taken an integrated, and holistic approach to its governance structure, recognising the importance and opportunity of engaging all employees with climate strategy. The frontline employees integrate climate-related considerations into their day-to-day work and feedback to the Climate Team areas of opportunity and development.

In addition to these three tiers, this PE firm has developed a volunteer programme across the business, with members who have committed to driving climate change integration into their respective investment platforms. This group meets virtually on a quarterly basis, and in-person annually.

There is firmwide effort to build capacity amongst senior management, as well as frontline employees, on climate change. This firm has done so by hosting climate change offsites, launching a climate training and development programmes, and hosting firmwide Town Halls with key external stakeholders.

### Case Study 2: USA, US\$120bn AUM

A PE firm based in the United States, with approximately US\$120bn AUM, has 60+ companies across four impact investment platforms across the globe became a signatory to the PRI in 2013 and has strengthened their ESG integration throughout the firm since. The PE firm has an ESG Strategy Council, which has representatives from across multiple functions including Legal and Compliance, Human Capital, and Operations, managing ESG performance for the company's funds. A dedicated ESG team was also founded to support the firm's ESG activities. For new investments, the PE firm is training the investment teams to assess climate risks and opportunities during due diligence.

In 2019, the company became a public supporter of the TCFD and has since been engaging with portfolio companies on climate risk and emissions reduction through the following initiatives:

- Held a TCFD Webinar for portfolio companies to support them with disclosure and reporting in alignment with the TCFD recommendations.
- Offering a pilot program helping portfolio companies measure their greenhouse gas (GHG) emissions footprint.
- Offering a suite of toolkits and primers on CDP, TCFD and Science-Based Targets Initiative (SBTi), scenario analysis and other relevant climate topics to portfolio companies and their Board members.
- Offering advisory and third-party support on climate risk assessment and strengthening resilience for companies with material physical climate risk.



### Case Study 3: Europe and North America, US\$40bn AUM

An alternative investment manager focused on PE, credit and real estate with a footprint across Europe and North America recently embarked on a TCFD-aligned climate journey. The company has approximately US\$40bn AUM, 10+ successive funds and 100+ PE investments. Climate risk analysis and insights generated across the business is overseen at the Executive level via an ESG Committee and is chaired by an ESG climate-specific Exco member. As outlined in the PE firm's ESG Policy, climate considerations are embedded in the due diligence process, the results of which are presented to the Investment Committee for consideration. Using a top-down approach, the Head of ESG, supported by the deal teams and external consultants, is tasked with the identification of climate risk factors. As they begin their TCFD journey, this firm has started with the PE arm of the business as this is most material from an AUM perspective.







## Background and purpose

The uncertainty of timing and magnitude of climate changes present challenges to PE firms as they seek to understand climate-related impacts on their strategy and portfolio. Scenario analysis can help them better understand how potential risks and opportunities may emerge and evolve under different sets of conditions, estimate the potential impact of these changes, and understand to what extent businesses are resilient under different scenarios.

PE firms will have significant changes in portfolio composition over the life of a fund. Scenario analysis may be used to help assess the impacts of climate change on individual portfolio companies, the fund and sectors it is invested in, and on the overall portfolio. No approach to scenario analysis will fit all PE firms but industry standards may help PE firms navigate the variety of approaches, models, scenarios and sources. For more information, readers of this document can refer to the online modules on scenario analysis by the TCFD published [here](#).<sup>20</sup> Standardisation across scenario analysis allows for comparison, benchmarking, and strategy development across the industry.



## The TCFD Guidance

### The strategy pillar of the TCFD guidance recommends firms:

1. Identify a range of climate risks and opportunities;
2. Describe the potential impacts of those risks and opportunities; and
3. Assess the firm's resilience to them.

No specific methodology is recommended so far but the TCFD encourages organisations to consider a range of future scenarios and how they may impact their business. Where companies are more exposed to climate risk, or potential opportunities, scenario analysis can help shape how they tactically respond to different scenarios.

The TCFD notes that organisations should determine materiality for climate-related issues consistently with how they would determine the materiality of other information. However, the guidance also cautions organisations from prematurely concluding that climate-related risks and opportunities are not material, based on perceptions of the longer-term nature of some climate-related risks. This is particularly true for PE firms as certain risks and opportunities may crystallise during the holding period, some risk may realise after the holding period but could impact the valuation of the business at time of exit. PE firms therefore need to consider the composition of their portfolio and their operations to decide how best to incorporate climate considerations.

The TCFD guidance on disclosures relating to the strategy pillar is as follows<sup>21</sup>

#### TCFD Guidance – Strategy Pillar<sup>22</sup>

##### TCFD Recommended disclosure

##### TCFD Guidance

#### **Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long-term**

A description of what they consider to be the relevant short-, medium-, and long-term time horizons, taking into consideration the useful life of the organisation's assets or infrastructure and that climate-related issues often manifest themselves over the medium and longer terms

A description of the specific climate-related issues potentially arising in each time horizon (short, medium, and long-term) that could have a material financial impact on the organisation

A description of the process(es) used to determine which risks and opportunities could have a material financial impact on the organisation

Organisations should consider providing a description of their risks and opportunities by sector and/or geography, as appropriate

#### **Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning**

Organisations should consider the impact on their business, strategy and financial planning in products and services, and in their supply chain and/or value chain

Organisations should consider the impact on their business, strategy and financial planning in adaptation and mitigation activities

Organisations should consider the impact on their business, strategy and financial planning in investment in research and development

Organisations should consider the impact on their business, strategy and financial planning in operations (including type of operations and location of facilities), acquisitions or divestments, and access to capital

TCFD Guidance – Strategy Pillar<sup>22</sup> (cont.)

## TCFD Recommended disclosure

## TCFD Guidance

**Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning**

Organisations should describe how climate-related issues serve as an input to their financial planning process, the time period(s) used, and how these risks and opportunities are prioritised. Organisations' disclosures should reflect a holistic picture of the interdependencies among the factors that affect their ability to create value over time. Organisations should describe the impact of climate-related issues on their financial performance (e.g., revenues, costs) and financial position (e.g., assets, liabilities). If climate-related scenarios were used to influence the organisation's strategy and financial planning, such scenarios should be described in the following areas:

- Operating costs and revenues
- Capital expenditures and capital allocation
- Acquisitions or divestments
- Access to capital

Organisations that have made GHG emissions reduction commitments, operate in jurisdictions that have made such commitments, or have agreed to meet investor expectations regarding GHG emissions reductions should describe their plans for transitioning to a low-carbon economy, which could include GHG emissions targets and specific activities intended to reduce GHG emissions in their operations and value chain or to otherwise support the transition

Asset managers should describe how climate-related risks and opportunities are factored into relevant products or investment strategies

Asset managers should also describe how each product or investment strategy might be affected by the transition to a low-carbon economy

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

Organisations should describe how resilient their strategies are to climate-related risks and opportunities, taking into consideration a transition to a lower-carbon economy consistent with a 2°C or lower scenario and, where relevant to the organisation, scenarios consistent with increased physical climate-related risks

Organisations should consider discussing:

- where they believe their strategies may be affected by climate-related risks and opportunities;
- how their strategies might change to address such potential risks and opportunities; and
- the potential impact of climate-related issues on financial performance (e.g., revenues, costs) and financial position (e.g., assets, liabilities); and
- the climate-related scenarios and associated time horizon(s) considered.



## Current good practices and relevant guidance

Based on our discussions with firms and commentary in published sustainability/TCFD reports, whilst some are conducting internal scenario analysis to aid strategy and risk management, few are publicly disclosing their methodology or results. As financial markets begin to integrate the potential value impact of climate risks and opportunities, investors will increasingly seek out businesses that have a robust approach to climate analysis.

This shift is expected by the market to accelerate in the short-term, as regulators start requiring the disclosure of the quantitative outcomes of scenario analysis to estimate the businesses' exposure to climate risk. For example, in the UK, the FCA (PS21/24) has set out a requirement for asset managers (including PE firms) to disclose, as far as reasonably practicable (i.e. as an additional rather than a core metric), a quantitative Climate Value at Risk ('CVAR') for individual products (or funds) (from 30 June, either 2023 (for firms with over £50bn AUM) or 2024 (for firms with between £5bn and £50bn AUM)) with details for the assumptions made during modelling and the degree of robustness in estimation methodologies. Further detail on the CVAR metric is provided later in this section and in the Metrics and Targets part of this guide. We anticipate that international regulation may be influenced by the FCA and other regulatory bodies may in the future take a similar approach.

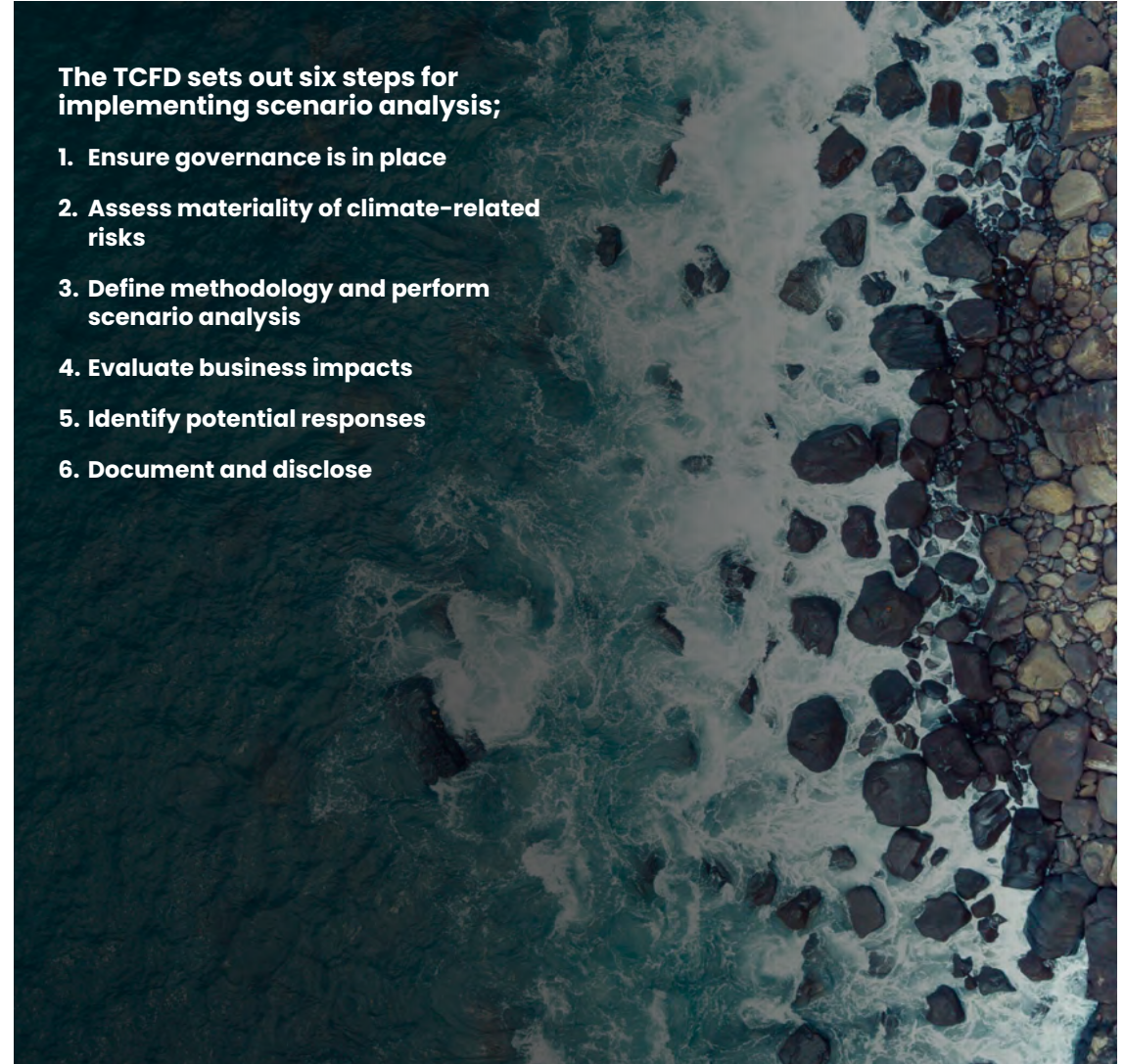
Climate analysis methodologies and tools are developing rapidly in the face of market demand and new regulatory requirements. Several specialist climate modelling providers have also emerged - they are often used by businesses, most of which do not have climate analysis capabilities in-house.

The use of scenario analysis represents a strategic and commercial tool for PE firms. Scenario analysis can be useful in the assessment of potential climate risks and opportunities and in designing appropriate responses. These will typically include:

- Engaging with portfolio companies to improve climate behaviours;
- Incorporating climate change considerations into strategic and investment decision making e.g. taking into account the impact of the evolution in carbon pricing legislation at pre-deal stage;
- Structuring products and funds (e.g. impact funds) to provide climate incentives;
- Increasing support for 'green businesses' and tailoring approaches to help develop 'brown businesses'; and
- Considering how best to adapt operations to reduce a carbon footprint (e.g. energy / water efficiency).

### The TCFD sets out six steps for implementing scenario analysis;

1. Ensure governance is in place
2. Assess materiality of climate-related risks
3. Define methodology and perform scenario analysis
4. Evaluate business impacts
5. Identify potential responses
6. Document and disclose



## These steps are described in detail below:

### 1. Ensure governance is in place

Climate change can be complex, and the governance around the use of climate-related scenario analysis should be robust enough, particularly when the results are used to influence business and investment strategy, and capital decisions. The TCFD recommends that a sponsor is established at a Board level or equivalent. For a number of PE firms, models of similar complexity (e.g. financial/valuation models) are subject to internal model governance frameworks which require Board level approvals, and in some cases, external model validation to provide investors visibility over the validity and appropriateness of the model. An appropriate level of oversight, review and sign-off is therefore required.

PE firms should consider their existing model governance requirements and ensure that climate change models are appropriately aligned, with model sponsors in a position to relay the results of scenario analysis and suggest potential responses to be implemented in business plans.

### 2. Assess materiality of climate-related risks

Whilst the TCFD is not prescriptive, scenario modelling should ideally be performed at the portfolio company, fund and firm level. Indeed, in the UK, PS21/24 requires that asset managers be able, on an 'on demand' basis (as explained above), to prepare a quantified CVAR amongst other forward looking metrics. This requirement is

"as far as reasonably practicable" for qualifying managers relating to each 'product' they manage (i.e. at a fund level). However, it is likely that performing scenario analysis at different levels of aggregation may be prohibitively challenging for some firms due to the effort involved, and it is therefore important that each firm consider a level that is most suitable given regulatory requirements, and chosen approach.

However, pragmatic initial steps can be taken to first assess the materiality of climate-related risks and opportunities, and this may be appropriate to identify different portfolio companies and funds for which more analysis may be required.

**For example, for a fund which is more heavily weighted towards investments that are more likely to be impacted by climate change (e.g. energy/mining), the spread of potential performance outcomes over different scenarios is likely to be greater, and therefore more analysis may be beneficial. The TCFD recommends that firms determine materiality for climate-related issues in a manner consistent with how they determine the materiality of other risks.**

These assessments are likely to be qualitative in the first instances, and the processes/controls on determining funds suitable for more detailed modelling should be carefully implemented to ensure a consistent approach across a firm. This is important for PE firms as it may help to identify funds or specific investment strategies that may be more exposed than others.

Given the above considerations, the next steps represent an approach that is usually performed by financial institutions currently, but is also compliant with some of the most advanced climate regulations:

- PE firms at first perform scenario analysis at a fund level (which can be aggregated up to a portfolio level as required).
- Analysis of a fund can at first be based on a sectoral approach. This may be easier than modelling individual portfolio companies and is beneficial when using modelling techniques that use Computable General Equilibrium ('CGE') models (see appendix 6 for more detail).
- Where a fund's climate change exposure is particularly driven by a small number of portfolio companies, PE firms may consider performing a deep dive at a specific portfolio company level to identify any nuances or adaptation plans that could influence the fund, that would not otherwise be captured by doing sector modelling only.

### For example:

- **A fund is comprised of 30 portfolio companies, which includes a large weighting to the oil and gas industry.**
- **Sectoral analysis is performed for the oil and gas sector, and the potential impact on the fund is calculated.**
- **Of the oil and gas portfolio companies, a large proportion of the fund's value is attributable to a single entity. Further analysis is conducted on the entity, taking into specific exposures, adaptation plans, etc. If the single entity is projected to perform as the average sector participant would do, no change to the sectoral analysis result from the previous step. Where the entity is expected to perform differently to the average, this is factored into the potential impact on the fund.**



By undertaking this type of approach, firms can identify and estimate climate risks and opportunities at various levels and have the option to delve deeper where required. As modelling techniques become more developed, they can evolve into more of a counterparty basis that can then be aggregated up as required. However, fund level, sectoral analysis currently represents a suitable starting point.

### 3. Define methodology and perform scenario analysis

#### 3.1 Climate modelling methodologies

It is important that PE firms understand the types of climate models that underpin third party specialist offerings and what the judgements and limitations are, to select the most appropriate solution. Equally, if internal modelling represents a more suitable solution for PE firms with an ambition to develop their own capabilities, understanding the advantages and disadvantages of each model type should be carefully considered.

Climate model methodologies can broadly be disaggregated between micro- and macro-econometric models which leverage data provided externally from climate scientists, each of which are based on established economic theory. A detailed overview of how each modelling approach is performed, and the advantages and limitations of each type of approach is provided in Appendix 6.

#### 3.2 Climate scenarios

The range of possible climate scenarios that could be realised is infinite, and the timing and magnitude of climate impacts is uncertain. However, guidance has been provided by several climate bodies to provide structure to scenario selection. The scenario development uses guidance from the Intergovernmental Panel on Climate Change ('IPCC'), which takes potential macroeconomic and political states of the world and augments them with carbon constraints to achieve a long-term temperature pathway. Further details on the various scenario options can be found in the Appendix 5.

The TCFD guidance does not prescribe the number of scenarios that a firm should consider, nor which scenarios should be included in modelling. However, a selection of scenarios is recommended (not just one) and should include favourable and unfavourable future outcomes that are most relevant to the circumstances of the business being considered. Moreover, the guidance put forward by the FCA in PS21/24 for in-scope UK asset managers (those with over £5bn AUM) requires that a firm should disclose the outcome of their analysis under three scenarios: a temperature increase of less than 2°C in an orderly global response; a temperature increase of less than 2°C in a disorderly response, and a 'hot-house' scenario in which the global response is limited.

References to 'orderly' or 'disorderly' change refer to when the response to climate change materialises. 'Orderly' means an immediate

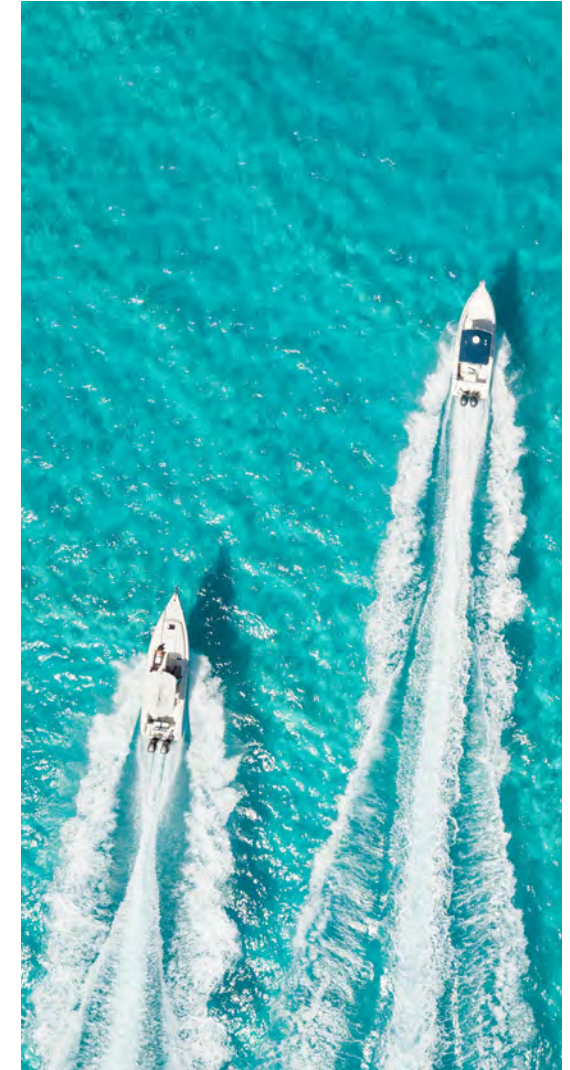
change in action which will result in a steady transition to a lower carbon economy. A 'disorderly' scenario arises in which the global limit on temperature rise is still met, but a period of immediate inaction is subsequently followed by a more extreme global decarbonisation to meet the target.

Given that other international regulatory bodies may follow the approach of the FCA in the UK, it would therefore seem appropriate for PE firms to at first consider these scenarios for consideration.

#### 3.3 Publicly available scenario resources

The depth of scenario analysis will depend on the regulation that a PE firm is subject to, the materiality of climate issues, the maturity/ambition with respect to climate modelling, and the choice or partner/in-house approach taken.

As previously noted, third party climate specialists use different modelling techniques. However, a simplified approach (and perhaps pragmatic solution for PE firms which are new to climate modelling) is to use pre-modelled outcomes where third party bodies such as the NGFS ('Network for Greening the Financial System'), and the International Energy Agency ('IEA') have modelled potential scenarios, and freely provide outputs in datasets online (further detail provided in Appendices 2 and 7), such as sectoral Gross Value Added ('GVA') data (i.e. GDP attributed and scaled to a particular sector). NGFS uses publicly available CGE models to derive these results.



The NGFS sets out six different scenarios (all based on CGE modelled outputs from SSP2 building blocks as described in Appendix 5), which are aligned to the FCA's ESG Sourcebook (orderly, disorderly, hothouse) as follows:



Source: [NGFS Climate Scenarios Database – Technical Documentation](#)

PE firms at an earlier stage of their climate modelling capability development may use modelled GVA pathways to infer a financial impact on their asset portfolio on a sector-by-sector basis.

This represents a simple alternative to detailed modelling, however the following points should be considered:

- The number of sectors modelled by NGFS is still developing and may therefore not provide detailed coverage to analyse a PE firm's entire portfolio.
- This approach does not enable PE firms to parameterise the underlying assumptions of the model



### 3.4 Time horizons

Scenario testing can be performed at a variety of time horizons. The year 2050 is often used as a benchmark which reflects global net-zero commitments, and temperature pathways are usually in relation to the change in temperature by the year 2100. The TCFD notes that firms may find it useful to disclose results with reference to 2030 and 2050, which have become major target dates based on the IPCC's Special Report on Global Warming of 1.5°C. Furthermore, in its April 2022 report<sup>23</sup>, the IPCC indicated limiting global warming to around 1.5°C requires GHG emissions to peak before 2025 at the latest and be reduced by 43% by 2030 to reach "net-zero" by 2050.

However, most PE firms have investment cycles that are considerably shorter than these time scales, and therefore the modelling should also be performed at a time horizon where the output is aligned to the use case for the PE firm<sup>24</sup>. These can be broadly split into four categories:

**Pre-hold / Due diligence stage** – Performing scenario analysis during the due diligence phase may serve as a useful tool for PE firms to understand potential exposures that may exist, how severe an impact climate change could cause on the business, and what this could mean for investment decisions. Pre-acquisition scenario analysis may be at a higher level because of limited access to data, including sensitivity and 'what if' type analyses as part of a climate risk assessment, and the depth of analysis will also depend on the type of target being considered (i.e. a business in a high emitting sector versus a business which is less exposed to climate risks/opportunities).

**Asset hold period (Short term – 3 – 7 years)** – Performing scenario analysis for the hold period of an asset is useful for a PE firm in that it helps identify and quantitatively estimate the potential impacts of climate change on the operations of the asset. The risks and opportunities which crystallise during ownership may require an immediate response from management, and this may differ from a pre-determined business strategy/ plan.

**Post-hold period (Medium term – 7 – 15 years)** – As previously noted, some climate-related risks and opportunities will not crystallise during the hold period of an asset, but they may be realised in the medium term after exit. Performing scenario analysis for a medium term will help to understand the value of these changes and when they will materialise, and this may influence potential impacts on valuation on exit and/or the optimal time to divest from a position.

For medium-term climate decarbonisation strategy, a 2030 reference point may be useful in public disclosures for aligning to global targets (e.g. the 45% reduction noted by the IPCC).

**Longer term period (2050 horizon with 2030 interim time frame)** – Given the increased expectation (by the market and regulators) to set net-zero targets by 2050 and to align to the IPCC's warning, PE firms should consider the longer-term impact that their funds are having on the environment. Increasingly, many LPs will expect to be able to compare the climate change impact of their investments, and this will include their investments in PE funds.

As detailed in the Metrics and Targets section, the TCFD recommends that asset managers consider an intensity metric, but also a fund or portfolio metric (e.g. Implied Temperature Rise ('ITR') which measures what temperature pathway the portfolio is aligned to when compared with other temperature pathways) and performing this for a longer-term period will help investors to understand how the current portfolio compares with longer term targets. For example, a PE firm with a high ITR and a net-zero target will need to change their asset portfolio more substantially than one with a lower ITR or develop the assets within the portfolio to a lower carbon operating model.

Moreover, whilst investor information and alignment to net-zero goals is likely to be the primary use of longer-term analysis, it may also help to define longer-term strategy, including identifying sectors that may be exposed to specific climate risks, or which are expected to perform well in a low-carbon economy. Similarly to medium term analysis, a climate risk that may occur in the long-term may also impact exit price and valuation of a portfolio company in the short to medium term, and greater foresight of this change may help to influence exit strategy. For example, the exit price of an asset in seven years will still incorporate considerations of risks that may occur in 2040 and beyond.

### 3.5 Frequency

Based on the portfolios of the PE firms that were consulted, performing scenario analysis every 2-3 years may represent a suitable starting frequency for firms given the level of change in portfolio

composition over time, noting that the UK's FCA requires annual reporting of a firm's *approach* to scenario analysis. However, PE firms may wish to perform scenario analysis more frequently where portfolio composition changes more frequently, but also in respect to company acquisitions in material cases. Given the effort required to perform scenario analysis, widescale (e.g. fund or portfolio) analysis may not be appropriate to undertake on a frequent basis, however high level scenario analysis can be useful in certain instances. For example, this may include:

- During target horizon scanning – PE firms may wish to perform scenario analysis (even at a higher level or qualitatively) when considering companies to invest in to assess whether the impacts of climate change may impact potential returns, or not be in line with investor sentiment; and
- During/after the diligence phase – Increasingly, ESG (and specifically climate change) due diligence is included in investment due diligence. PE firms may wish to include climate due diligence to assess the financial considerations impacting targets, and how climate change regulations are likely to impact business forecasting and provisioning. Where bids are competitive, firms may want to perform this as part of confirmatory, or post-deal due diligence.

Materiality considerations are likely to precede the undertaking of climate-related due diligence. For example, more detailed due diligence may be relevant for targets in sectors exposed to climate-related changes (e.g. energy), whilst may not be as relevant for targets in sectors that are not as exposed. PE firms need to consider the threshold for when climate due diligence should be in acquisition processes.

Where climate due diligence is performed and risks/opportunities are identified to impact the target, PE firms may wish to consider how this impacts their bid and/or whether specific conditions to the bid may be included. This could include certain actions that would need to be taken by the target to mitigate an identified risk, conditions of management earn-outs, or specific warranties and indemnities where applicable.

Material acquisitions may also change the overall climate exposure of a given fund or portfolio. Where mergers and acquisitions (M&A) activity or changes in ownership results in a significant change, PE management may wish to re-run climate models to assess (and potentially disclose) changes in exposure to the extent that this would be useful/appropriate for investors, and this may be based on the portfolio, or just on new additions to the portfolio. This may be more common in jurisdictions like the UK, where on-demand product (fund) level TCFD reports are required by some firms. See a summary of the FCA's rules for product level reporting earlier in this document.





### 3.6 Modelling approaches – High level analysis, Outsourced, Partnership, Model development

Level of complexity →

## A

#### Performing high level analysis in-house

Several global institutions provide pre-modelled scenario output data publicly free online, which PE firms can use to apply to their portfolio. This includes the Climate Financial Risk Forum ('CFRF') Climate Narrative Tool and the NGFS, more detail of which is provided in Appendix 7. The CFRF tool provides 'Institutional' and 'Sector' level reports including quantitative and qualitative analysis of industries and sectors and climate risks and opportunities they face. PE firms may use this information (and the freely accessible data supporting analysis), to assess the impact of climate change under several scenarios on portfolio companies.

Firms may also conduct more simplified scenario analysis based on publicly available climate disclosures of portfolio companies such as GHG emissions. For example, a PE firm may conduct a gap analysis between the portfolio company's current emissions and a target set of emissions for a given scenario and time frame. Based on the efforts to reduce the gaps (and the size of the gap itself), a PE firm may apply a rating or heatmap on how reducing emissions may impact the financials of a portfolio company.

## B

#### Engaging climate modellers to perform assessment/scenario analysis

As previously noted, PE (or indeed other) firms typically do not currently have the capabilities or expertise to model climate change in detail. As a result, a number of firms across the corporate and financial institutions industries (e.g. banks, insurers) outsource modelling to external specialists. Outsourced arrangements can be beneficial in leveraging companies with existing expertise and may also be a cost-effective solution. Climate models ingest climate science data that is continually developing as the field becomes better understood, data sources improve in accuracy, modelling techniques become more sophisticated, and the climate changes year on year. Climate modelling specialists often pay licensing fees for data inputs and therefore may benefit from potential economies of scale compared to PE firms.

Climate modelling specialists usually offer a range of services depending on a firm's capabilities or appetite to develop their own methodologies. Climate models can be hosted and analysed by the external parties (the consultant), with portfolio data provided by a PE firm. The outputs of scenario analysis is presented in a report and/or data model.

## C

#### Hosting externally provided climate models

More sophisticated firms may wish to pay a licensing agreement to the external provider to host the model themselves on internal systems (and therefore have the freedom to perform model runs at will) which may be useful for PE firms where regularly changing portfolios are commonplace.

A few climate modelling specialists offer partnership models and advisory services, and this may be useful for firms that intend to develop their own modelling capabilities in the longer term. Services are often structured in a way where consultants work with PE firm experts to upskill them over time.

## D

#### Developing own models

Finally, some firms may wish to consider developing their own climate models. Whilst this will represent the minority of financial institutions for the immediate future, those with experience in long-term modelling (e.g. an insurer who has developed a Solvency II internal model) may seek to leverage their existing capabilities to ensure consistency in approach and assumptions.

Climate change modelling is rapidly developing as organisations seek to enhance their climate capabilities. As a result, different approaches may be taken by PE firms, with differing level of complexity, need, and ambition. The above illustration presents four such options that PE firms may wish to consider.

#### 4. Evaluate business impacts

PE firms should evaluate the impacts of climate change using both a qualitative and quantitative approach. This should be considered at a portfolio and fund level of granularity, and on a portfolio company basis where appropriate (i.e. because the specific portfolio company is particularly exposed or has a material impact on the fund, or modelling has been performed to a counterparty level of granularity and therefore the more detailed analysis provides additional insight for investors).

Considerations should include impacts on revenues, costs, capital, and business strategy, considering the nature of different business units and across geographies. Practitioners should explicitly consider a range of physical and transitional impacts linked to the materiality assessment across short-, medium- and longer-term. Quantitative disclosures should be performed over several climate metrics, such as an emissions intensity metric e.g., Weighted Average Carbon Intensity ('WACI'), CVAR, and a portfolio metric such as ITR (required, as far as reasonably practicable, by the FCA in the UK). Further detail on quantitative Metrics and Targets to be considered are detailed further in the Metrics and Targets section of this document.



## 5. Identify potential responses

Responses to an identified climate risk or opportunity should be consistent with the level of effort applied by the business in dealing with other types of risks and opportunities of a similar financial materiality. The level of response will therefore vary across a range of actions, but may include:

**5.1 Portfolio company engagement** – The first response to an identified climate impact should be to engage with portfolio companies where possible. Where portfolio companies are exposed to a certain type of risk, this may not be known to portfolio company management, or to what extent the risk will have an impact. Conversely, larger portfolio companies or listed entities are likely to have conducted scenario analysis themselves, and therefore an assessment into the different approaches taken may be considered.

PE firms are often particularly well positioned to influence change, and where this may have a positive climate impact, this will resonate well with investors. Some ways, as identified by the Institutional Investors Group on Climate Change (IIGCC), to engage with portfolio companies might be<sup>25</sup>:

- Measurement – encourage portfolio companies to measure and report the carbon emissions and carbon intensity associated with their operations;
- Integration – evaluate the extent to which the exposure is a risk factor for the portfolio company's business and how it is managed across its strategy and operations. This should

include consideration of how the impact of climate change may impact customer preferences and behaviours over time, and hence demand for the products and services produced by a portfolio company;

- Policy engagement – enquire into the portfolio company's position on climate policy and its involvement in related groups or activities that seek to influence climate policy outcomes;
- Collaboration – evaluate the extent to which the portfolio company is collaborating with other companies and industry participants to improve climate outcomes, particularly for larger companies that have a greater ability to enact significant change;
- Consider joining forces with other investors and industry groups to encourage greater transparency and action; and
- Targets – request that portfolio companies set meaningful targets to reduce climate-related risk, and measure this over time.

**5.2 Transitional portfolio alignment** – PE firms should align their investment approach with their climate strategy, and whilst engagement should represent the most appropriate action in many cases, over time (and as climate risks continue to crystallise), it is expected by the market, investors and regulators that PE firms will transition their portfolio to a less carbon intensive state, with guidance from the investment advisory committee of a firm.

This may impact planned exits (i.e. by bringing them forward), and sector exposure limits or

exclusions. Whilst this is unlikely to result in blanket sector wide reductions in exposure, PE firms may become more targeted in their assessment of assets in certain sectors or conduct a deeper level of climate analysis. With respect to portfolio alignment, the IIGCC<sup>26</sup> sets out the following steps for consideration:

**Measure exposure** – estimate the exposure of the portfolio to companies, sectors or assets that are not aligned with climate goals or targets;

**Assess risk of retaining** – evaluate the potential financial and reputational risk of exposure to assets that are not aligned to climate targets or market expectations of decarbonisation through undertaking scenario analysis;

**Assess risk of reducing or removing** – consider the potential costs of reducing or removing exposure to the companies and assets; and

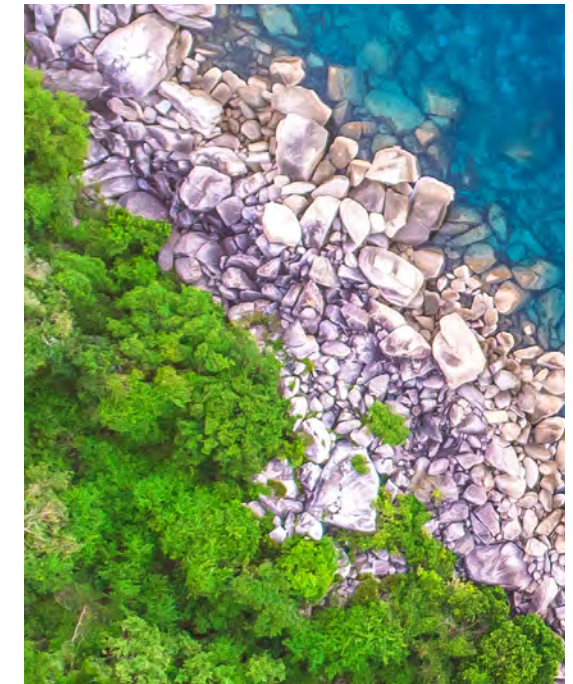
**Consider options for reducing or removing** – if the conclusion from the assessment is that the risk exposure is above the firm's appetite or tolerance, firms may take a few actions:

- Exclude assets with high risk exposure;
- Place a % cap on the exposure to high-risk sectors, geographies etc.; or
- Exclude all assets with high-risk exposure.

PE firms should however recognise that this approach may not be appropriate in all cases. For example, during the transition to a lower carbon economy, opportunities will occur in taking existing higher carbon intensity businesses and developing them to make use of climate-related

incentives. In this case, PE firms may see funds go through a cycle of emissions / carbon footprint changes. This type of investment strategy should therefore be clearly communicated to investors and incorporated into the targets and timelines for change as set by management.

**5.3 Sector targeting** – Climate scenario analysis may identify material opportunities for PE firms, and where this exists, PE firms may wish to consider additional acquisitions, investment, or targeting of sectors expected to benefit from climate changes (e.g. regulatory/policymaker change).





## 6. Document and disclose

The full process and results of performing steps 1 – 5 of scenario analysis should ultimately be disclosed for the use of investors. However, these should centre around the following key points;

- What the risks and opportunities are at a portfolio company, fund, and portfolio level, when they are anticipated to materialise, and what sector/geographies are projected to be most exposed. This is expected by the TCFD to be a combination of both qualitative and quantitative disclosures, including drivers of climate impacts (e.g. new climate-related regulation impacting a certain sector);
- What processes and modelling approaches have been used to perform climate modelling, including assumptions, judgements and limitations (e.g. data availability);
- What the results of the analysis mean for investment strategy (at a fund and portfolio level); and
- The degree to which funds/portfolios are resilient to climate change under various scenarios, and notably in a 2°C or lower scenario (in which transition risks are more likely to crystallise earlier, partly mitigating future physical risks), including an overview of tactical responses.



## Other asset class considerations

### Private Credit

**Use case considerations** – The use cases for private credit providers have similarities to the use cases for those investing in equity positions, but with a few nuances for consideration. Whilst climate change will impact underlying businesses independently of how funding is provided, the effect on the provider of the funds is realised differently.

PE providers are directly exposed to the positive and negative impacts of climate change, as the return on investment is inherently linked to the enterprise value of the investee business. Credit providers however are only exposed to the extent that climate risk affects the ability of the investee business to repay its creditors.

For private credit providers, climate change manifests itself financially in one of two ways; by way of default, or by way of a change in credit quality resulting in an increase in credit provisioning for the provider, and therefore capital.

For each use case (as previously described), this nuance of private credit should therefore consider the following:

**Short-term time frame** – For private credit, the short-term use case equates to the hold period analysis as described for PE and should be considered as the length of the loan agreement

that credit is provided for. The output of climate modelling during this time frame can be translated from projected stressed cashflows into an assessment of the investee company to be able to service its debt. Firms can then build this into their credit models to assess balance sheet and capital impacts.

**Medium-term time frame** – The medium-term time frame for assessment equates to the post-hold period as described for PE (i.e. the length of the loan period, but after the conclusion of the original loan). In the selection of investee companies, lenders will look for entities which are expected to perform well and grow in the future. Investee companies with better performance/growth expectations are likely to represent a lower credit risk but are also ideal businesses to provide continued funding through to sequential loans.

Performing scenario analysis for a medium-term time frame is therefore still relevant for credit providers in that it helps to assess the viability of further credit arrangements, in addition to sensitivities of future credit risk attributable to climate risk and opportunities.

Modelled outcomes that identify a climate risk or opportunity that may materialise beyond the initial credit term may be used as a tool for credit providers to tailor the terms of funding, or to not provide funding to investee companies at all. This

may help to protect credit providers from entering arrangements which could lead to financial challenges, but also reputational considerations. In a competitive process, investee companies typically seek funding from providers that have a history of providing continued support (i.e. through multiple/sequential loans), and providers that are seen to not provide repeat lending (i.e. because of a risk identified beyond the initial loan term) may not be viewed favourably. Therefore, by assessing the climate risks in the medium term, firms can avoid situations where they are not able to offer a sequential loan.

**Long-term time frame** – The use case of long-term scenario analysis to assess a portfolio against long-term climate-related goals should be consistent between PE and private credit, as credit providers seek to quantitatively estimate (and reduce) the emissions that they are financing.

### Responses to identified climate risks and opportunities

Because of the structure of debt products, private credit firms are not typically able to exert as much influence on investee companies as those providing equity commitments. As a result, credit providers need to consider how best to help and incentivise investee companies to respond to climate-related risks and opportunities identified during climate analysis.

As previously described in the responses section above for equity providers, engagement with underlying businesses should be encouraged as the first option in response to identified climate risks and opportunities, with firms also setting longer term portfolio alignment criteria (e.g. a movement away from heavy emitters) over time.

This can be undertaken through utilising all routes of engagement available, which may include leveraging engagement with sponsors, or with other equity holders (e.g. PE firms) that are also invested in the investee company who can further exert their influence. Engagement with direct equity holders such as PE firms should also be considered for other credit products where a funding provider is further removed from the underlying business, such as Collateralised Loan or Debt Obligations ('CLO's', 'CDO's').

## Product structuring

Whilst credit providers tend to have less influence than equity providers, firms do have the capability to structure products in a way that incentivises good climate-related behaviour. This serves two purposes, to financially incentivise investee companies to avoid climate risks and make use of potential benefits (leading to reduced credit risk for the funding provider), and to encourage climate action as part of a longer-term stewardship role. Private credit providers should therefore consider using climate-related components in their products as a response to climate risks and opportunities identified during climate analysis and modelling.

Debt products may be structured in a number of ways to incentivise appropriate climate-related behaviour however, two of the common approaches currently undertaken by firms are via 'sustainability ratchets' and 'green loans';

**Sustainability ratchets** – Performance ratchets are common for a few debt providers that are structured to incentivise investee firms to target specific performance criteria. Similarly, a sustainability ratchet may be included using a set of climate-related criteria. For example, an investee firm that reduces its GHG emissions, changes its operations, reduces its exposure to climate risk, or targets climate benefits, could be financially rewarded with a reduction in debt servicing costs (e.g. rate reduction).

**Green loans** – Green loans represent a tool that debt providers may use to encourage climate-related development. These products typically provide credit to be used exclusively to finance a climate-related project or action. For example, investment in a green technology.

Ratchets and other climate features can be positively and/or negatively incentivising (i.e. rate increases for negative climate behaviour, and rate reductions for climate actions), and firms should consider this as a beneficial tool when bidding to provide credit in a competitive tender. Products that are more punitive for negative behaviour may impact the competitiveness of a package during a tender and this should be considered and balanced with incentives to increase take up rates.

Whilst these options are currently being used by credit providers in the market, firms may wish to consider other methodologies for embedding climate strategies into credit agreements, and we expect these to continue to develop over time.

## Venture Capital ('VC')

Because of the nature of VC investments (i.e. at an early development stage of a business), using scenario modelling and climate analysis as a strategic tool may be more limited than for PE and private credit. This is partly because of the stage of growth, where the spread in performance trajectory (between growing into a larger scale operation and not) is wider than for an established business, but also as a reflection of the level of

influence that a VC provider is likely to have. New firms that are in early stages of development are more likely to start by establishing business fundamentals, rather than seeking strategic support from funding providers.

the extent that this is not already considered as part of detailed business plans. A comprehensive case study of a South African VC firm at the initial stages of TCFD considerations is documented in Appendix 10.

### For VC firms, strategy considerations will include:

- **Adhering to regulatory compliance, where applicable, as a minimum requirement;**
- **Setting appropriate investment guiderails for new ventures (e.g. setting restrictions on start-ups in higher emitting sectors, versus targeting ventures intending to accelerate climate change), with long-term targets for portfolio decarbonisation;**
- **Considering the materiality of climate risk on a venture (e.g. for a technology business versus an energy provider); and**
- **Performing a more qualitative assessment of potential climate impacts on start-up businesses and undertaking high level sensitivities. For example, the impact of lower climate temperature scenarios (e.g. 1.5°C), versus higher climate temperature scenarios.**

VC firms may wish to perform more detailed analysis during the initial diligence stage of funding for firms which are particularly exposed to a climate risk or opportunity. For example, for a start-up venture selling heat pumps in the UK, the performance of the business will probably be influenced significantly by current and future plans for government subsidies for households, to



## Funds of funds

Fund of funds invest capital into funds managed by GPs who invest directly in the underlying portfolio company. An investment in a fund of fund is one step removed from the portfolio company and therefore does not have the same level of access to data, or ability to influence the portfolio company's operations.

The approach to climate change for PE firms operating in the fund of funds space therefore needs to be treated differently to a direct PE investment. Approaches to consider include:

### Performing analysis on the GPs being invested in

Fund of funds investors should understand the GP's approach to climate risks and opportunities.

This is likely to be through analysis of the GP in terms of how they integrate climate risk into their screening and due diligence process, how regularly they engage with portfolio companies on climate change considerations, and to what extent they set climate-related goals and targets. From this analysis, fund of fund participants can generate a heat map, score, or RAG (Red-Amber-Green) rating for GPs based on their approach to climate change considerations and how they (and their investments) may perform under different climate scenarios.

### Perform sector modelling and monitor GP metrics

Given the volume of portfolio companies in a typical fund of funds, the fund of funds manager may decide to conduct scenario analysis on a sector basis. As previously described, sectoral modelling can still result in quantifiable stressed scenario outputs. This may then be used by a fund of fund manager to make tactical decisions on where future investments should be made to align to their own climate goals.

A sensible metric to support this assessment would be a portfolio alignment metric (see Metrics and Targets section) such as an ITR on a per GP basis. This would provide a degree of comparability among GPs and help support funding decisions over the short-, medium- and longer-term.

### Engage and influence GPs

In a similar manner that an LP influences a GP to embed climate risk and opportunity into their investment decisions, fund of funds participants may engage with GPs as part of a longer-term stewardship role towards a better climate solution. This could be through questionnaires to understand their approach to climate change, or as part of a longer-term dialogue to encourage appropriate climate behaviour which may include target setting and required climate action.



## Secondaries market

Similarly to the fund of funds space, firms investing in secondaries should take into account several practical considerations when setting their climate strategy and approach. Secondary transactions are typically either:

1. **GP led transactions; or**
2. **LP led transactions**

The ability to engage for LP led secondaries is more limited given the larger volume of underlying portfolio companies that may exist. Furthermore, certain funds may be of previous vintages with pre-existing strategies which may not incorporate the same degree of monitoring with respect to climate, or be less of a focus for managing GPs. GP led secondary transactions, similarly to fund of funds, are more likely enable a PE to exert influence given their proximity to the underlying asset.

Firms acting at a layer removed can still assess the approach of the primary GP, including their policy towards client engagement with respect to climate, setting targets, etc. Analyses of these companies will depend on the data available, and where there are fewer layers of controls, firms may be able to request specific climate-related data for modelling. However, where this is not available, sector level modelling may be a more pragmatic approach.

For firms taking part in the more traditional-style secondary market, data availability of underlying portfolio companies may be limited given the potential for multiple layers to exist between the investor and the end business. Examples include investing in a fund of funds secondaries markets, or in structured products (e.g. CLOs, CDOs) where the underlying portfolio company may not be disclosed or where significant data gaps exist. In these cases, firms may likely need to use proxy methods to assess climate considerations, such as sectoral analysis.

Similarly to fund of fund approaches, firms may also want to consider assessing underlying GPs and scoring them based on their climate approach and sector preferences. Calculating an indicative ITR for these investments (e.g. by GP) may serve as an appropriate metric for monitoring climate risk exposure and is currently being used by secondaries' specialists in developed markets (e.g. the UK).

Whilst the secondaries market may encounter difficulties in identifying and quantitatively estimating climate-related risks, proxy methodologies can still act as a useful tool for firms. For disclosure purposes, firms taking part in secondaries may also wish to include information on the limitations and assumptions of their analysis, where data gaps currently exist, and the extent to which climate action can be influenced.



## Business valuations

### Overview

Climate risks and opportunities are likely to have both positive and negative impacts on the value of a business over time. Therefore, it is increasingly important for PE firms to consider climate risks and opportunities at the due diligence / acquisition stage, in the regular valuation processes (i.e., quarterly fund valuations), and at the point of exit.

In doing so, PE firms will be better equipped to incorporate climate change into bid prices, estimate the climate risks and opportunities that may occur in the future (i.e., extreme weather, changing regulations, resource scarcity, geopolitics etc), but also by incorporating climate considerations into regular fund valuations for investors and to influence exit models and strategies.

The core principles of valuation are prescribed by the International Private Equity and Venture Capital Valuation Guidelines (IPEV) and further information can be found on the IPEV website<sup>27</sup>.

Whilst detailed methodologies for building climate considerations into valuations are developing, firms are already considering how climate risks and opportunities can impact business valuations, particularly in sectors and geographies that are more exposed to the effects of climate change. For others, the impact of climate considerations may be less material and therefore the analysis of the impact on valuations may be at a higher level. In either case, climate risks and opportunities represent an additional future uncertainty that

firms may want to consider in the same way that they would consider any other potential influence on the performance of an underlying portfolio business.

### Approaches to valuation

A PE firm may wish to consider several approaches to valuations. The granularity of assessment is likely to reflect the materiality of an underlying business' anticipated exposure to climate change. For example, PE firms may first consider using qualitative assessments to identify potential targets or existing portfolio companies that are likely to be more impacted by climate change and use this as a tool for identifying where valuations may be impacted or where further analysis is required. For more exposed businesses, particularly for larger holdings where the crystallisation of risks or opportunities would represent a greater financial exposure for investors, PE firms may want to consider a deeper assessment of the potential impacts.

The Private Equity Sustainable Markets Initiative Taskforce ("PESMIT") is currently developing guidance—to be released later this year—on incorporating climate change, and specifically carbon, into company valuations. As detailed in the guidance, some of the categories where climate change can impact the valuation of businesses include:

**Direct climate-related costs** – For some businesses operating in certain jurisdictions (e.g., high emitting industries in the EU), companies are

exposed to direct costs with respect to climate considerations. These include exposure to carbon taxes, carbon credits and trading schemes which place a cost on emissions generated and results in a direct impact on earnings. As these are costs that will already be included in the results and projections of a business, the impact is likely to already be implicit in the valuation.

Valuers may also wish to consider (over the short-, medium- and longer term), the ability for portfolio companies to reduce their emissions. Those which are more capable of substituting their operating model to a lower carbon intensity structure will benefit directly from a reduction in carbon cost outflows (e.g. through lower carbon tax payments).

**Internal / expected climate-related costs** – In order to achieve global carbon reduction targets, it is widely expected by the market and industry bodies that carbon taxes and trading schemes are likely to widen in remit (in terms of companies being subjected to paying for the emissions they generate), and the price of carbon to increase over time. As such, PE firms may wish to consider that new target businesses, or existing portfolio company, may become liable to pay a carbon price in the future, either during the hold period or beyond, which in turn may lead to a resultant impact on the valuation or on the exit strategy.

To assess this, PE firms may wish to consider setting a shadow or internal carbon price to be factored into business valuations. This may be reflective of current market or regulatory prices or, depending on the timeframe being considered,

may also consider projected or estimated changes in the price of carbon over time.

Portfolio companies may also have committed to climate-related targets (e.g. net-zero), and this may require the purchase of carbon offsets to meet their commitments. As a potential future cash outflow, this should be incorporated into a businesses' valuation where applicable.

**Direct changes in cashflows because of climate change** – Business valuations may also wish to consider the direct impacts on earnings / cashflows arising from climate risks and opportunities.

For example, a company that transitions to a lower carbon model may benefit from developing new products, obtaining lower cost financing (e.g. from sustainability loans or debt with climate-related incentives) or from operational efficiencies (e.g. lower costs of energy used in production). Conversely, a company that is less able to transition may experience a negative impact on earnings as a result of product redundancy (either as a regulated change or consumer demand-led), higher financing costs, or higher costs throughout the supply chain as carbon prices are passed on.

The impact on cashflows and earnings will (to an extent) be different under different circumstances, particularly when assessing a businesses' longer-term earnings potential.

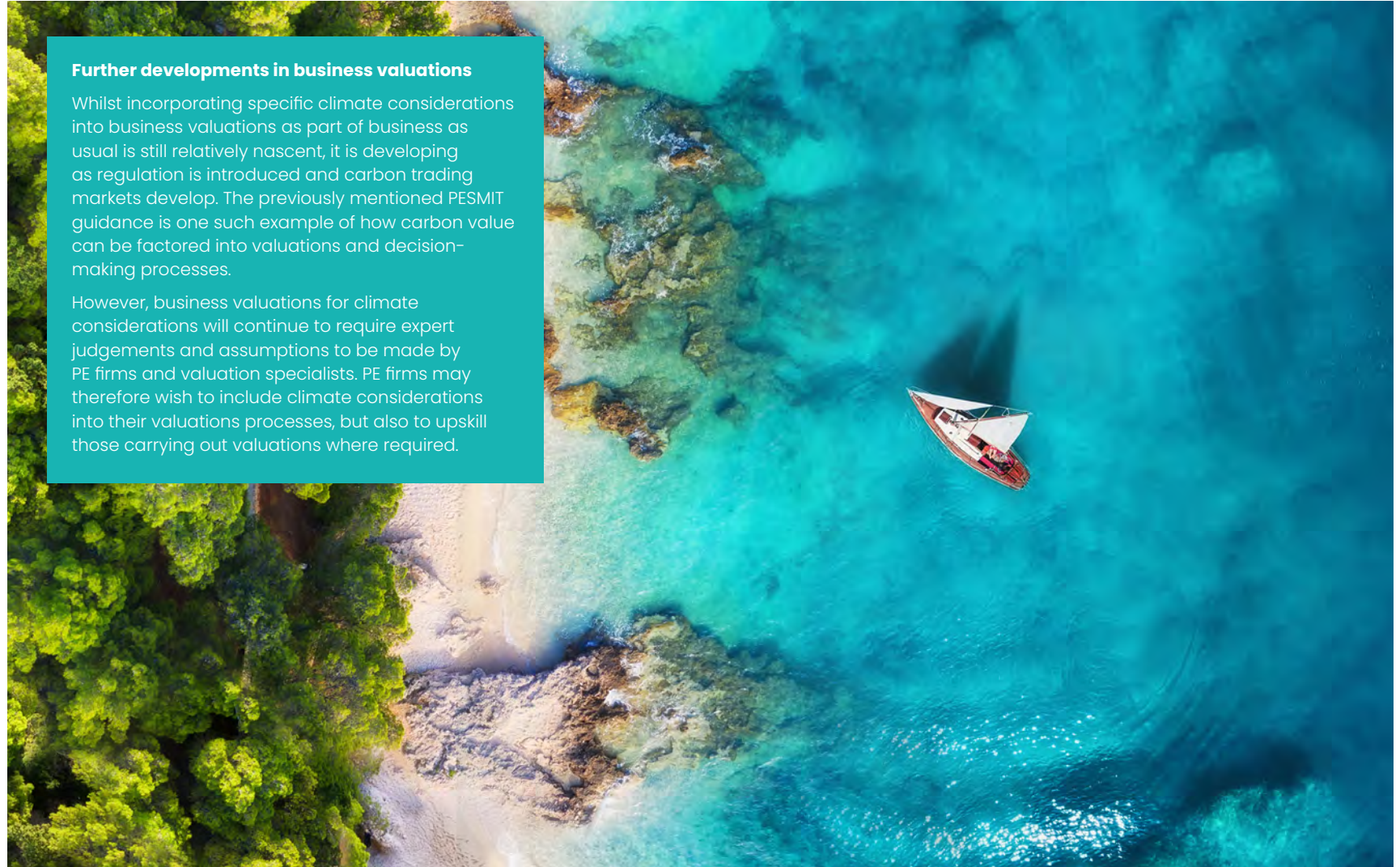
**Impacts on valuation multiples** – Whilst changes in projected or modelled cashflows can be helpful in assessing a businesses' valuation, PE firms need to also consider to what extent climate considerations should impact the multiple (of earnings) that is applied to projected earnings.

For example, if a valuer is using a market comparable company valuation analysis, the extent to which the multiple incorporates climate change is likely to depend on the sector and geography of the underlying business, but also the maturity of the jurisdiction in which it operates. A high emissions business operating under an ETS in the EU is likely to trade at a multiple that incorporates projected changes in carbon costs, whereas a similar business in a less regulated jurisdiction may not include this consideration. Here, valuers need to use judgement as to any overlays to the multiple that should be included.

#### Further developments in business valuations

Whilst incorporating specific climate considerations into business valuations as part of business as usual is still relatively nascent, it is developing as regulation is introduced and carbon trading markets develop. The previously mentioned PESMIT guidance is one such example of how carbon value can be factored into valuations and decision-making processes.

However, business valuations for climate considerations will continue to require expert judgements and assumptions to be made by PE firms and valuation specialists. PE firms may therefore wish to include climate considerations into their valuations processes, but also to upskill those carrying out valuations where required.





## Strategy – Considerations for PE firms

The core principle of the Strategy pillar is that scenario analysis should not be performed exclusively for the purpose of disclosure, but to actively influence strategy that can generate both financial and climate-related gains, and to provide a degree of comfort to investors on the resilience of a portfolio to climate change.

PE firms should therefore identify their own use cases for climate modelling, and structure scenario modelling such that it is useful for management and investors.

Overleaf, we have presented a practical application guidance for implementing scenario analysis. Not all PE firms will, or should, aspire to the higher band levels. For several PE firms, underlying portfolio companies may not be exposed enough to climate risks and opportunities that detailed climate modelling will have a materially tangible benefit. In these cases, more simplified approaches (e.g., an alignment to Band 1), may represent an appropriate level of complexity.

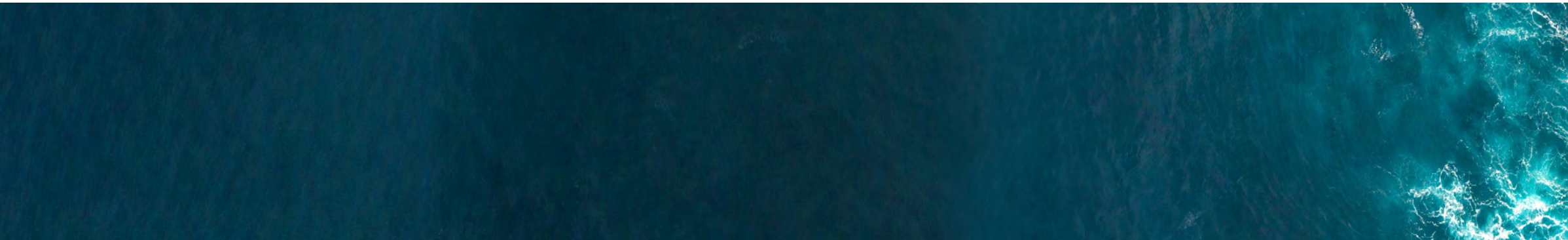
## Practical application guidance

As previously noted, the below tables show suggested actions and approaches that firms may wish to consider. They are not exhaustive and firms should consider the best approach for their business.

### Strategy – Practical application guidance

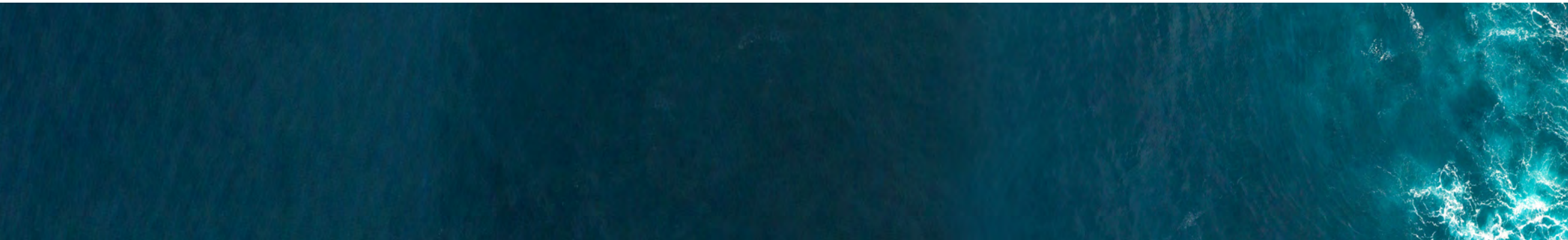
Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
<p><b>Description of the climate-related risks and opportunities identified over the short, medium, and long term</b></p>	<ul style="list-style-type: none"> <li>● At an entity level, PE firms disclose the types of risks/opportunities and potential impacts of climate change on the firm’s overall strategy and financial planning over time. For example, the extent to which a PE firm may change its investment strategy over different time horizons to account for the crystallisation of transition and physical risks.</li> <li>● Firms provide detailed descriptions of the types of climate-related risks and opportunities considered over varying timeframes and which aspects are expected to be most material for a fund or wider portfolio. For example, the types of physical (both acute and chronic) risks and transition risks most likely to impact portfolio companies in the short-, medium- and longer-term horizons, on a per sector/geography basis.</li> <li>● Firms provide an overview of the processes and approaches used to identify the above climate-related risks and opportunities.</li> </ul>		
<p><b>Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning</b></p>		<ul style="list-style-type: none"> <li>● For the identified risks and opportunities, firms disclose the potential impacts of mitigation and adaptation strategies for material portfolio companies and fund investment strategies more broadly.</li> <li>● Firms provide detail of their climate-related goals and targets (e.g., GHG emission reduction commitments), and present how the firm intends to achieve the described goals.</li> <li>● Firms provide an overview of what impact these climate-related issues may have on the financial performance and position of the firm.</li> <li>● Climate change, where considered to be material for a portfolio company, is considered at a high level for business valuations both at due diligence stage, and during the hold period.</li> </ul>	





**Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning (cont.)**

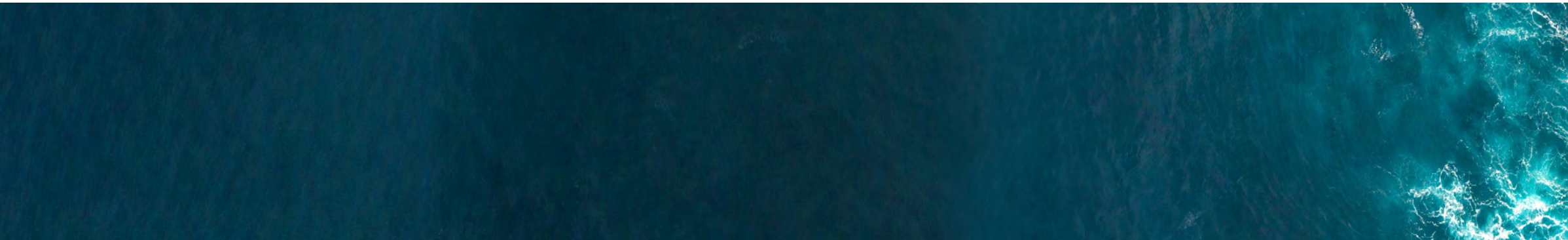
Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Rationale for scenario modelling	<ul style="list-style-type: none"> <li>Disclosure requirements and to help influence the high-level strategy of a PE firm to climate change.</li> </ul>	<ul style="list-style-type: none"> <li>Use cases are strategic, with outputs used to monitor risks and opportunities for portfolio companies, and to influence exit strategies where appropriate.</li> <li>Portfolio alignment analysis is conducted to help influence long-term climate goals.</li> </ul>	<ul style="list-style-type: none"> <li>Scenario analysis for climate change is used as a BAU tool for identifying opportunities.</li> <li>Short- and medium-term scenario analysis is regularly performed to assess risks and opportunities.</li> <li>Long-term analysis is used to influence acquisition strategies and set goals for public disclosure.</li> </ul>
Responses to climate analysis	<ul style="list-style-type: none"> <li>Sector analysis is used to identify particular industries which are projected to be materially impacted by climate change, and this helps to influence long-term targeting/avoidance of certain sectors (e.g., new green industries benefiting from government subsidies versus coal extraction industries).</li> <li>Material portfolio company holdings which are more significantly exposed to climate change are engaged with regularly to understand business strategy and responses to identified risks.</li> <li>Outputs from scenario analysis influence investment strategy and a gradual alignment of the portfolio towards industries projected to benefit from climate change, and away from those adversely impacted.</li> <li>Climate-related diligence is included pre-transaction and in more detail during processes.</li> <li>Based on the results of scenario analysis, an active role is taken in encouraging and influencing portfolio companies to act in a more sustainable manner, with supporting evidence for potential financial risks or benefits.</li> <li>Planned entrances/exits from sectors and industries are determined in order to align the portfolio to long-term climate goals, with strategies for long-term alignment (e.g., timing of reductions in sector/industry exposures) communicated to LPs.</li> <li>Where company engagement is not a suitable course of action, for example because the inherent nature of the business is not aligned to the climate goals of a firm and cannot be appropriately developed/alterd (e.g., thermal coal energy), climate modelling is used to help influence exits.</li> </ul>		



**Description of the impact of climate-related risk and opportunities on a business, strategy and financial planning (cont.)**

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Valuations process	<ul style="list-style-type: none"> <li>Climate change, where considered to be material for a portfolio company, is considered at a high level for business valuations both at the acquisition stage, and during the hold period.</li> </ul>	<ul style="list-style-type: none"> <li>Climate change is factored into acquisition decisions and regular fund valuations.</li> <li>Potential changes in cashflows arising from climate-related risks and opportunities are incorporated into valuation considerations.</li> <li>Some consideration of future developments and carbon pricing is included in valuations.</li> </ul>	<ul style="list-style-type: none"> <li>Climate considerations are fully integrated to acquisition valuations and regular fund valuations.</li> <li>Valuations consider future cashflows at different time horizons arising because of direct climate-related costs, internally set or shadow costs, expected changes in the price of carbon emissions, and the expected changes in future cashflows arising from climate-related opportunities and risks.</li> <li>Firms consider adjustments to valuation multiples to incorporate climate-related uplifts where the projected impacts of climate in future periods are not already priced into comparable market multiples.</li> </ul>





**Description of the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario**

Sub-component	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Disclosure of resilience	<ul style="list-style-type: none"> <li>Firms provide an overview of how resilient the firm, and overall strategy of the firm, is to climate-related risks and opportunities under different climate scenarios over time with additional detail on where investment strategies may be exposed and how investment strategies may change in response to climate change.</li> </ul>		
Climate modelling approach	<ul style="list-style-type: none"> <li>High-level climate analysis is performed. This includes performing sensitivity analysis or qualitative analysis.</li> <li>Firms may consider mapping pre-modelled projected GVA changes (e.g., via the NGFS scenario explorer data) to portfolio sector exposures.</li> <li>Scenario analysis is performed every 2-3 years and reviewed annually.</li> </ul>	<ul style="list-style-type: none"> <li>Climate modelling is more sophisticated, using external consultants where skills/capability gaps exist.</li> <li>Models are either hosted on internal systems or output is analysed and produced by external specialists.</li> <li>Models are run regularly (e.g., annually) with the outputs (e.g., the impact of climate on portfolio companies, funds or investment strategies) disclosed where appropriate in a firm's TCFD report.</li> </ul>	<ul style="list-style-type: none"> <li>A bespoke tool exists as part of BAU software and strategic modelling techniques.</li> <li>The modelling solution is well aligned to the use cases, and this influences the model development/selection (e.g., micro-/macro-econometric models).</li> <li>Model inputs are parameterised to internal judgements and assumptions for consistent financial modelling.</li> <li>Scenario modelling can be performed regularly and can be performed on demand where appropriate (e.g., after a material change in portfolio.)</li> </ul>
Scenario selection	<ul style="list-style-type: none"> <li>A baseline set of pre-modelled scenarios is used to influence strategy, such as the orderly and disorderly 2°C scenarios (where data is available from several free public models such as NGFS).</li> </ul>		<ul style="list-style-type: none"> <li>A wider range of scenarios is considered and modelled where appropriate. Given an internally hosted model, assumptions and judgements can be updated on demand.</li> </ul>

## Case studies<sup>5</sup> – Private Equity

### Case study 1: Australia, US\$1.1bn AUM

Depending on a firm's geography, and the geographic reach of one's portfolio, transition risks and physical risks will vary. And while in Western Europe and North America, transition risk has been identified as more immediate or pressing, this is not true of the rest of the world. An Australian based PE firm (approximately US\$1.1bn AUM), for instance, has conducted qualitative scenario analysis to find that, in their geographic context, the projected outcomes of 2040 and 2050 do not differ materially – therefore accelerating their thinking on portfolio alignment. They have RAG rated their portfolio companies against physical and transition risks, to ascertain where to prioritise engagement management across the portfolio.

### Case study 2: Europe, US\$20bn AUM

An asset management firm with a PE business of approximately US\$20bn AUM conducts pre-investment ESG due diligence for all investment proposals, as well as a climate risk screening and rating, with additional review for high-risk exposure companies. This ESG due diligence is conducted by a third-party expert with an integrated climate risk assessment. The firm also conducts sell-side ESG due diligence prior to exit to include climate risk assessment and review of performance. Whilst the firm has ambition to roll this out across all PE strategies, it has had strongest success so far in its European and Asia Pacific Corporates practice.

### Case study 3: USA, US\$120bn AUM

An alternative PE firm with approximately US\$120bn AUM has recently completed a qualitative scenario analysis of the portfolio to assess climate-related risks under different scenarios and timescales. The PE firm looked at the impact of physical risks on assets, in the portfolio companies' industry and regional operations. In line with the TCFD recommendations, the organisation also looked at transition risks such as changes in market demand, and regulatory landscape, covering both industry and geographical risk angles.

Pre-investing ESG due diligence is performed across all investments. ESG goals are also integrated into the evaluation of investment teams and the management of portfolio companies. In 2021, the PE firm launched a dedicated climate investing platform, which invests in sectors and/or assets that will benefit from the transition to a low-carbon economy and invest in five climate sub-sectors: clean energy, enabling solutions, decarbonised transport, green industrials and agriculture and natural solutions.

### Case study 4: Europe and North America, US\$40bn AUM

A European and North American-based PE investment manager with approximately US\$40bn AUM, of which 90% is attributed to PE has an overall business strategy to avoid high emission sectors such as aviation, mining and fossil fuels making their strategy relatively more resilient than other private equities. From a transition risk perspective, the PE firm has used scenario analysis to understand material exposures of portfolio companies to future carbon pricing.

Their methods entailed first calculating Scope 1 and 2 emissions to establish a baseline emissions profile. Data gaps were filled with sector and revenue-based estimates. Each portfolio company was then assessed to GHG regulation schemes and the exposure, as a function of revenue, was modelled to multiple

possible future carbon pricing scenarios. The results of the exercise indicated a little over 10% of portfolio companies were impacted allowing the PE firm to better direct emission reduction initiatives.

For physical climate risk, a site-level approach was undertaken, sampling 500 facilities across different companies and geographies. In the near-term, aligned with the company's investment time horizon, the results showed no differentiation between scenarios as physical climate impacts are already set in motion however as the timeline progresses to 2100, three of 27 companies showed risks to variables such as heat, drought, wildfire, flood, and sea level rise. The assessment could therefore lead to more work on the companies at risk.



## Case study 5: CVAR example

A UK based GP engaged with a climate modelling specialist to estimate the CVAR of a specific fund within its portfolio. The fund included a small number of portfolio companies specialising primarily in the consumer goods and manufacturing sector. The GP selected two scenarios to model the CVAR against, choosing a 1.5°C Paris-aligned scenario and a 4°C hot house scenario to act as 'book ends' for an ambitious scenario and an unfavourable scenario. The counterfactual considered was a scenario in which no consideration of climate change was modelled (e.g., nil impact).

Given the size of the fund (less than 15 medium sized portfolio companies), the GP elected to perform scenario modelling on a per portfolio company basis. The data provided to the modelling specialist was:

- A list of names of the portfolio companies, with two years of financial information (e.g., balance sheet, cash flow, and profit and loss statements) with sector codes (e.g., SIC, NACE codes);
- A list of major asset locations for the largest 3 portfolio companies within the fund, including major supplier locations; and
- A list of defined timeframes for the planned hold period for each portfolio company, and the expected post-hold period per entity.

- The climate modelling specialist used this information to generate a set of stressed financials for each portfolio company under each scenario. The results for the fund in aggregate were:
- Next 4 years (average planned hold period for the fund): CVAR (expressed as a spread around the counterfactual scenario) was +1.2% under a 1.5°C scenario, and -0.6% under a 4°C scenario.
- Years 4 – 10 (post exit expected period in which a subsequent PE buyer would hold the asset for): +2.5% under a 1.5°C scenario, but -5.7% under a 4°C scenario.

On further analysis on the drivers of the increase in the CVAR in the post hold period compared with the remaining hold period, the modelling identified that a significant reason for the change could be attributed to a particular portfolio company, an international manufacturing business.

The climate analysis identified two major coastal-based manufacturing sites based in Indonesia which acted as major suppliers for the businesses' UK operations driving the change. These sites were modelled to become increasingly exposed to coastal flooding in the latter years of the post hold period, causing significant disruption to supply chains and leading to reduced revenues from business interruption.

In response, the GP engaged with the underlying portfolio company to highlight the potential future risk and encouraged the portfolio company to diversify its supplier base.



# Risk Management

## Background and purpose

Risk management processes are a core component in the operation of any type of business, and this is no different for private market firms. Effective processes provide a degree of protection for GPs and LPs in identifying, assessing, and appropriately managing risks. Climate risks should be the same as other risks considered by a PE risk function, and therefore suitable structures and controls should be established to provide visibility for internal and external stakeholders.

**PE firms will encounter a variety of climate-related risks and opportunities that are linked either to their own operation or to portfolio companies, however 62% of PE firms that we surveyed noted that they have not yet fully factored climate-related risks into its risk assessment.**

It is uncertain how climate risk (for both transition and physical risk) will materialise, particularly in relation to the timing, impact and the magnitude of the risk. Examples of this are provided below, with further background of transition and physical risks presented in Appendix 2.

### Transition risk

As previously noted, the crystallisation of transition risks is the most likely immediate threat in the short-term for many jurisdictions as policies (e.g., government/regulatory) are implemented to help the world to transition to a low-carbon economy.

The timing and severity of transition risks however are uncertain. As previously noted, a slow global response to climate change is likely to lead to less severe immediate transition risks but could result in more extreme transition risks crystallising in the medium-term to counter the effect of materialising physical risks. Conversely, a faster response would represent higher short-term transition risks, but this would likely lead to a smoother transition to a low-carbon economy.

The crystallisation of these risks represents a direct impact on the enterprise value of portfolio companies that a PE firm holds, and therefore the value of a fund to investors. Funds of all types could be affected. For example, funds exposed to heavy industrials would fare better under a slower global response, whilst impact funds would benefit immediately from a faster response.

Furthermore, stakeholders increasingly demand and expect to invest in businesses which are more aligned with climate goals, and this pressure is

encouraging PE firms and asset managers to factor these considerations into their investment strategy.

Whilst climate modelling and scenario analysis can help explain how transition risks may impact portfolio companies and funds over time, the specific timing and types of policies will vary and need to be regularly monitored.

For example, a country-wide ban on ICE vehicles is a material risk for car manufacturers worldwide, but the timing of the change may vary country by country, from a slow phased out approach, to a shorter time frame where less planning time is available. The severity of the change will also vary, such as a gradual switch from ICE vehicles, to hybrid, to electric etc., versus an immediate ban on all non-electric cars.

The impact of transitional changes on businesses and the economy is also challenging to assess. The result of a policy change is likely to have an impact on complex market dynamics. In the motor vehicle case, a phase out of ICE vehicles is likely to have a material impact on connected industries and companies. In this example, the change will require updates to infrastructure to charge cars, battery imports will increase, petrol and diesel supply contracts will reduce, insurance premiums on cars will change, and there will be

an economic consequence as a result of changes in the resultant household consumption and government investment.

Given that transition risks may materialise in the short-term, PE firms need to be aware of the risks, and understand an appropriate methodology for mitigating the risks to an appropriate level on a timely basis.



## Physical risks

Physical risks are projected to be borne out in the medium- to long-term through acute and chronic risk events, however the uncertainty of which climate scenario will materialise, how humanity and the planet respond, and the complex secondary impacts a physical risk event may trigger should be considered. In certain geographies, physical risks are already being realised and, in cases, are having a material impact on businesses.

PE firms can build a robust climate risk management system by integrating climate risks and opportunities in existing processes and controls, strategic decision making and investment strategy. Firms need to understand and consider, in the context of each investee / portfolio company, the unique characteristics of climate risk to achieve efficient integration with existing risk management process. The next points represent some of the considerations that form the basis of a climate risk assessment;

- The impact of climate-related risks and opportunities occur on local, regional, and global scale and may vary based on business, product and services, value chain, operations, etc.;
- Climate-related risks may materialise over a long-time horizon, that is usually longer than conventional business planning or investment cycles. Risk management should therefore consider the risks over appropriate timelines (e.g., short-, medium-, and long-term);

- The nature of climate change is dynamic and uncertain, mitigation measures are complex, and the indirect consequences of climate change are broad;
- The severity and scope of impacts may manifest at different scales over time, and after a tipping point the impacts are irreversible, long-term and large; and
- Climate change risks are interconnected across socio-economic and financial systems and need a multi-dimensional perspective to assess implications.

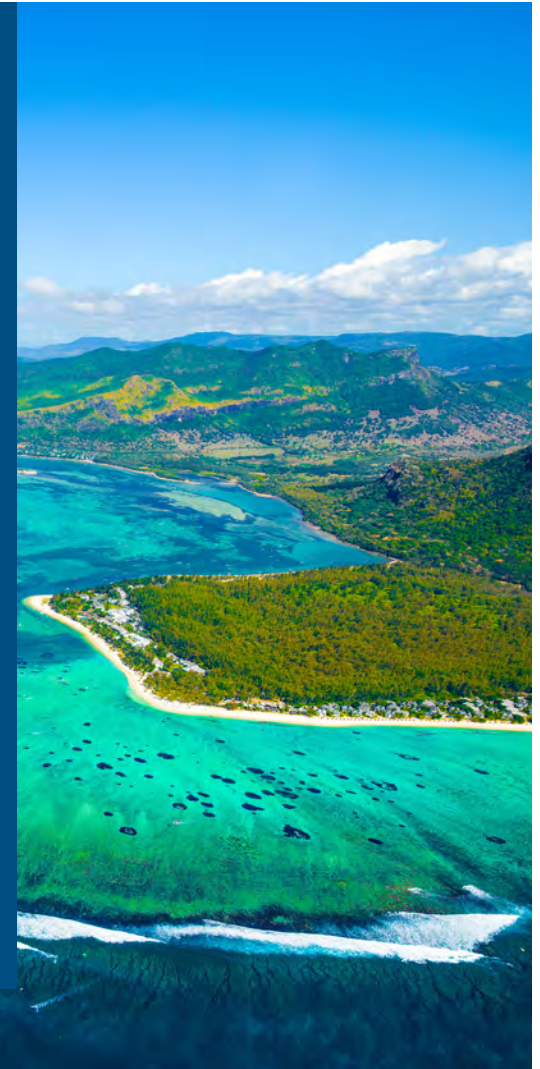
The crystallisation of physical risks therefore also has a direct impact on the value of portfolio companies and the return for investors. PE firms that fail to identify, assess, and mitigate physical risks may be exposed to significant financial detriment, whether it be through the damage of portfolio company assets, the capital expenditure required to protect against physical risks, the business interruption caused by extreme weather events, or the reduction in the value of the portfolio company at exit.

## The TCFD Guidance

**The risk management pillar of the TCFD guidance is structured around three core considerations which should drive the disclosures produced:**

- 1. What are the processes used for identifying and assessing climate-related risks?**
- 2. What are the processes for mitigating the identified climate risks?**
- 3. How are climate-related risk management procedures incorporated into a PE firm's risk management framework?**

Given the broad nature of the TCFD audience (including those with developed risk management functions versus smaller entities), the guidance provided is not prescriptive on how climate risk should be considered as part of risk management processes. Instead, it recommends processes for identifying and managing climate-related risks and integrating these into the overall risk management processes.



The TCFD guidance on disclosures relating to the risk management pillar is as follows:

TCFD Guidance – Risk Management Pillar <sup>28</sup>	
TCFD Recommended disclosure	TCFD Guidance
<b>Describe the organisation’s processes for identifying and assessing climate-related risks</b>	Organisations should describe their risk management processes for identifying and assessing climate-related risks. An important aspect of this description is how organisations determine the relative significance of climate-related risks in relation to other risks
	Organisations should describe whether they consider existing and emerging regulatory requirements related to climate change (e.g., limits on emissions) as well as other relevant factors considered
	Organisations should also consider disclosing the following: <ul style="list-style-type: none"> <li>• processes for assessing the potential size and scope of identified climate-related risks</li> <li>• definitions of risk terminology used or references to existing risk classification frameworks used</li> </ul>
	Asset managers should describe, where appropriate, engagement activity with investee companies to encourage better disclosure and practices related to climate-related risks in order to improve data availability and asset managers’ ability to assess climate-related risks Asset managers should also describe how they identify and assess material climate-related risks for each product or investment strategy <sup>29</sup> . This might include a description of the resources and tools used in the process
<b>Describe the organisation’s processes for managing climate-related risks.</b>	Organisations should describe their processes for managing climate-related risks, including how they make decisions to mitigate, transfer, accept, or control those risks. In addition, organisations should describe their processes for prioritizing climate-related risks, including how materiality determinations are made within their organisations. In describing their processes for managing climate-related risks, organisations should address the risks included in the risk tables
	Asset managers should describe how they manage material climate-related risks for each product or investment strategy
	Asset managers should also describe how each product or investment strategy might be affected by the transition to a low-carbon economy
<b>Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation’s overall risk management.</b>	Organisations should describe how their processes for identifying, assessing, and managing climate-related risks are integrated into their overall risk management



## Current good practices and relevant guidance

This section gives examples of at what stage and how PE firms can assess climate-related risks and how to mitigate them. It also explains how climate change is incorporated into PE firms' risk management processes. Given the differences between PE firms, these are examples that should be tailored depending on the sectors the firm and its different funds invest in. Differences in approach for specific investment strategies or funds should be disclosed separately to enable investors to understand fund/strategy-specific actions taken.

### Approach to identifying and assessing climate-related risks

#### How to determine and identify significant risks

The risk function of PE firms will need to establish a materiality threshold of climate-related risks. This is likely to be driven by several factors, such as the degree to which a portfolio/fund or portfolio company is exposed to climate risks, the time frame of risk crystallisation, and the magnitude of the financial impact that could result. Risks should therefore be relevant to the level of aggregation being considered, for example, what risks are material to a specific portfolio company, what risks are material to a fund, and what are the risks that could have a significant bearing on a whole portfolio or GP.

These risks should be aligned to the use cases identified in the Strategy pillar, namely:

- **Pre-acquisition / Due diligence stage** – The assessment of climate risk (and opportunities) for PE firms may be useful even before an underlying portfolio company has been acquired. PE firms should consider how climate risks are projected to impact the value of an

investee company, and this assessment can help to make better investment decisions. Depending on the exposure of the underlying asset to climate change, PE firms may adapt their approach based on a materiality threshold (e.g., an investee company with a pending regulatory change in one of its main markets would warrant more detailed analysis than a company with a lower exposure to climate risks).

- **Hold period / Post-hold period** – PE firms should assess the risks expected to arise during the hold period of an asset, or in the period after planned divestment (to the extent a risk may impact sale price). Management and the Board should conclude an appropriate value of climate risk that should be retained for a fund/portfolio company, and what the thresholds are before action is taken, whether this be engagement with the entity, or influencing divestment strategy/timing. This may take the form of monitoring relevant metrics (e.g., a CVAR threshold) or, where metrics are not regularly calculated, a qualitative assessment of risks based on the regulatory/political landscape for the relevant period.
- **Long-term portfolio alignment** – PE firms should assess long-term climate risk to the extent that it may impact the transition to a long-term climate goal. For example, if a PE firm has committed to reducing the emissions of a portfolio with a 2030 and 2050 target, PE firms should continually assess the feasibility of achieving their goals, or how the current portfolio trajectory differs from the target end state. Understanding this risk, and being able

to disclose it to LPs, will help in monitoring the portfolio's long-term trajectory.

The processes for identifying and monitoring these risks should be established at a management level (e.g., within the risk function or a specific climate individual/ESG team), but should be regularly escalated to a Board level, as discussed in detail under the Governance pillar.

For private credit providers, the process is similar given that the use cases are broadly aligned. The difference being the translation of climate risks into credit considerations and provisioning.

For VC businesses, climate risks should be considered in the same manner as any risk to the business would be evaluated. In most cases, it is likely that climate risks would be a proportionally smaller area of risk for a new business compared to other business fundamentals (e.g., cash burn / liquidity) but should still be considered. This is particularly true for new businesses seeking to directly exploit opportunities arising from climate change. For example, by making use of government subsidies to enter a new low-carbon technology.

#### How external regulatory considerations are monitored

The TCFD guidance recommends that firms should document and disclose how regulatory considerations are monitored. This is more straightforward for corporate entities, as they are likely to only need to monitor a narrow set of regulations. However, this is more complex for a PE firm, where the regulations impacting portfolio companies may be broad depending on the sectors spanning the fund/portfolio.

Risk functions (or specific climate functions/subject matter experts), charged with establishing risk assessment processes need to consider the range of relevant policies which could impact portfolio companies and monitor these regularly. As noted, whilst scenario analysis can help to explain the impact of transition risks and when they may happen, specific sector and country changes in policy need to be assessed outside of this process, as these will be realised at discrete points in time (i.e., a step change rather than a smooth transition).

#### How asset managers engage with investee / portfolio companies to encourage climate responsible action and to increase the quality of climate-related disclosures

As described in the Strategy pillar, the first response to an identified climate risk (or opportunity) should be to engage with portfolio company management to understand potential mitigation and improvement actions. PE firms often have a significant ability to influence management actions, and this approach should be included in TCFD disclosures. Processes should include trigger points for when engagement is appropriate, and how portfolio company management are communicated with.

As an asset manager, PE firms have a responsibility (and incentive) to encourage portfolio companies to disclose detailed and robust climate-related data. An increase in transparency of climate risks and opportunities for investee companies can influence investors (including PE firms) investment decisions.

### Processes for mitigating climate-related risks

In respect of mitigating the impact of climate risks, risk functions need to set out materiality thresholds to determine trigger points for acting. This includes a consideration of what risks can be suitably managed, transferred or accepted, and what the responses should be. Broadly, this should primarily determine the appropriate level of engagement with a portfolio company and the types of actions that are encouraged of management (of the portfolio company). By setting out a clear process

with defined trigger points, PE firms can develop a degree of consistency when responding to climate change, with policies reviewed and updated regularly.

The determination of what is considered 'material' should be approved at a Board level, and the level of materiality should be considered at a fund level or at a portfolio company level where applicable (e.g., where there is a degree of concentration risk in a fund).

### How risk management procedures are included in the risk management framework

As previously noted, climate-related risks should form part of normal risk management procedures. This includes at a portfolio company Board and PE Firm management level, for processes and controls relating to climate-specific analysis (e.g., scenario modelling and metrics calculations), and as an additional overlay to risks already monitored (e.g., market risks, operational risks).





The below table sets out the risk considerations across each of the four TCFD pillars:

Risk management considerations across TCFD pillars	
Pillar	Considerations
Governance	<ul style="list-style-type: none"> <li>• <b>Board/management escalation processes</b> – Processes and controls in place for escalating identified climate risks to management and Board levels, including regular communications/standing agenda points and the appropriate signoffs required for responses to be initiated.</li> <li>• <b>Portfolio company Board/ PE Firm management training and support</b> – Climate risks (particularly those associated with regulations and policies) are changing, and this is exacerbated by changing portfolios. Decision makers (including members of management and the Board) should be regularly informed and trained as required, with support available on demand.</li> <li>• <b>Responsibilities for climate risk management</b> – Individuals and functions that are responsible for assessing and monitoring climate-related risks, and maintaining the processes to perform this role, should be clearly defined. Suitable controls should be maintained with a clear line of escalation to the Board.</li> <li>• <b>Climate-based incentives</b> – Increasingly, asset managers and long-term savings businesses are linking climate-related performance (e.g., the reduction in exposure to climate risks or an increase in alignment to a ‘greener’ portfolio) to incentives where applicable. PE firms may wish to consider the alignment of incentives to climate-related goals to encourage their long-term strategy.</li> </ul>
Strategy	<ul style="list-style-type: none"> <li>• <b>Ownership, processes, and controls – climate modelling and scenario analysis</b> – Whilst some climate analysis can be performed at a high level, detailed climate scenario analysis can become complex, with several inputs and calculation methodologies. Suitable governance and controls should be incorporated end-to-end throughout the process (including in the use of external data and consultants), with responsible individuals identified.</li> <li>• <b>Due diligence and M&amp;A considerations</b> – Depending on specific targets, climate-related due diligence may or may not be relevant for M&amp;A processes, and PE firms need to assess the level of diligence required. PE firm’s corporate finance functions should establish processes for how climate considerations are included in M&amp;A, where high level target analysis should be performed, and where more detailed due diligence is required.</li> <li>• <b>Processes and controls for responses to climate risks</b> – As noted previously, PE firms should establish appropriate triggers and process for portfolio company engagement, or where necessary, how specific industries/geographies are included as part of avoidance/exclusion policies for future portfolio alignment and future investment decisions.</li> </ul>

## Risk management considerations across TCFD pillars

Pillar	Considerations
Risk management	<ul style="list-style-type: none"> <li>• <b>Establishment of climate/risk function</b> – The approach for climate risk responsibility will vary with the level of maturity of PE firms with respect to climate change considerations. Climate risk management may form additional responsibilities for existing risk function personnel or may be included as part of a specific ESG team. Those responsible for climate considerations should be identified and the relevant processes and controls disclosed in TCFD reporting. This includes escalation pathways to the Board, senior management, and other relevant committees (e.g., audit, risk).</li> <li>• <b>Inclusion of climate risk as an overlay to existing risks monitored by the risk function</b> – Climate change impacts are projected to have several impacts across risk metrics that are likely to be monitored by PE firms as part of BAU. Examples of how climate risks can impact firm-wide risks include: <ul style="list-style-type: none"> <li>• Credit risk – The credit risk of portfolio companies that are more exposed to climate risks may be impacted as realised risk events cause financial detriment that could lead to difficulties in servicing debt.</li> <li>• Foreign exchange risk – The realisation of transitional changes and physical risk events will have an impact on global trade as demand and supply for goods and services aligns to a lower carbon global economy and extreme weather events occur. This change in global trade will impact currencies' values and this may lead to financial impacts for portfolio companies with specific foreign exchange exposures.</li> <li>• Concentration risks – Certain PE firms' funds may be more (or less) exposed to climate risks than others. Depending on the spread of industries invested in across funds, concentration risk may arise where a few fund component entities are impacted by similar climate-related issues.</li> <li>• Operational risks – Climate transition and physical risks may impact the operating capabilities of portfolio companies. For example, the realisation of acute physical impacts could lead to business interruption and result in lost revenues.</li> <li>• Macroeconomic and political risk – Different governments and regulators are likely to respond differently to climate change in terms of level of action and timing. For example, changes in government grants for green industries, sanctions for more carbon intensive industries, tariffs, carbon trading schemes etc. may have a material impact on portfolio companies.</li> <li>• Reputational risk – Increasingly, asset managers and other financial institutions are aligning their portfolios with low-carbon economy goals. PE firms which are seen to over invest in higher carbon intensity industries when compared with peers may not be viewed favourably by investors. Similarly, portfolio companies that are not setting responsible climate targets may also be negatively viewed, and this may impact business value.</li> <li>• Technology risks – Changes in technologies may represent risk and opportunities for portfolio companies. For example, the electrification of vehicles, changes in energy sources and power contracts, etc.</li> <li>• Funding / Disclosure risks – Increasingly, firms are required to publish climate-related metrics and performance to substantiate their eligibility for sustainability-linked loans and financing. Where firms do not meet pre-defined thresholds, they may be liable to incur increased financed costs. This risk should be incorporated into private market firms' considerations, both in instances where a credit product has been provided directly, or where sustainability-linked finance has been provided to the investee company by a third party.</li> </ul> </li> </ul>
Metrics	<ul style="list-style-type: none"> <li>• <b>Development and reporting of climate metrics</b> – As with the calculation of financial and other non-financial metrics, appropriately robust processes and controls are required to present information to investors that is accurate. This includes processes and controls over: <ul style="list-style-type: none"> <li>• Data and inputs;</li> <li>• Model and calculation methodologies;</li> <li>• Identifications of metric limitations, assumptions, and judgements; and</li> <li>• Wider disclosures and reporting processes including review processes and validation.</li> </ul> </li> </ul>



## Practical application guidance

As previously noted, the below tables show suggested actions and approaches that firms may wish to consider. They are not exhaustive, and firms should consider the best approach for their business.

### Risk management – Practical application guidance

	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
<p><b>Processes for identifying and assessing climate-related risks</b></p>	<ul style="list-style-type: none"> <li>Existing risk functions are responsible for analysing climate-related risks.</li> <li>Materiality thresholds are in place with respect to climate risks, with a clear escalation policy to senior management and Board levels.</li> <li>Updates on climate-related regulations are regularly monitored and escalated where necessary.</li> <li>A high-level approach to investee company engagement is established, with trigger points for engagement actions.</li> <li>Processes for assessing risks are established for each fund, and/or investment strategy.</li> </ul>	<ul style="list-style-type: none"> <li>A dedicated individual is responsible for climate-related issues across functions. They have regular access to the Board to raise climate-related issues.</li> <li>A detailed and regularly updated materiality policy is established on a fund and strategy basis.</li> <li>Changes in the regulatory landscape are regularly considered by sector Subject Matter Experts ('SME's), with updates provided to the Board.</li> <li>A detailed engagement plan is in place for various levels of climate-related risks.</li> <li>Processes for assessing risk are documented in detail for each fund, and/or investment strategy.</li> </ul>	<ul style="list-style-type: none"> <li>An ESG function, reporting to a designated member of the management team (e.g., Head of ESG or equivalent) with relevant climate change capability, is established, with direct presence on the Board/ Executive Committee and appropriate committees (e.g., audit, risk).</li> </ul>
<p><b>Processes and approach for mitigating climate-related risks</b></p>	<ul style="list-style-type: none"> <li>Climate risk responses where these are identified as material are clearly documented, including thresholds for risks that can be managed, transferred, accepted, or avoided. This includes response plans for portfolio companies such as where and how to engage, and in determining sector avoidance/exclusions policies.</li> <li>Identified risks and mitigants are disclosed in risk registers, financial statements etc.</li> <li>Pre-determined risk responses are presented at a fund, and/or investment strategy level.</li> </ul>		<ul style="list-style-type: none"> <li>A climate risk response framework is in place, with risks then being considered on a risk-by-risk basis to enable a tailored result to each situation.</li> <li>Identified risks and mitigants are disclosed in detail in risk registers, financial statements etc.</li> <li>Detailed pre-determined risk responses are presented on at a fund, and/or investment strategy level. For example, reducing exposures to certain sectors in response to an increase in the climate-related risks of a fund.</li> </ul>

**Detail of how  
climate change  
is incorporated  
into overall risk  
management**

**Band 1**

Climate risk is considered by the wider risk function in isolation, with links to other business risks (e.g., market, operations) made in material circumstances.

**Band 2 (in addition to Band 1)**

Existing risks categories of business risks (e.g., credit, market, technology) include a climate component, which is overlaid on existing calculations.

**Band 3 (in addition to Bands 1 and 2)**

Climate change considerations are fully integrated across the business in terms of risk management.

All risk types impacted by climate risk are considered and these form part of regular risk reporting. For example, the impact of climate change on market risks.



## Case studies<sup>5</sup>

### Case study 1: USA, US\$470bn AUM

A leading United States-based PE firm with approximately US\$470bn AUM and approximately 20 funds to date documents a comprehensive risk management process in their annual climate change report. The PE firm's overall climate programme is guided by the TCFD framework, and the Sustainability and Accounting Standards Board (SASB) specific issue topics are used to identify and assess climate-related risks. In the pre-investment phase, all potential portfolio companies are screened against an 'issues list' which refers to activities, operations, or industries (e.g., carbon-intensive industries) that raise significant ESG-related or reputational risks. If a portfolio company is involved, directly or indirectly, in an activity on the issues list then the investment teams work together with the public affairs team to determine the outcome which can include not proceeding with the investment. As a further step for climate risk exposure specifically, the PE firm has developed screening guidance using sub-sector classifications and company specific questions. This approach gives the PE firm a baseline view of the climate exposure and whether further screening or assessment in the later stages of the due diligence process are required.

In the post-investment phase, the PE firm conducts continuous monitoring of climate-related issues material to the portfolio company. The risk management process is enhanced with dedicated resources towards climate-related data collection and monitoring which also serves the annual climate reporting disclosure. For portfolio companies, the PE firm launched a Climate Education Series providing them with advice from trusted experts and tested resources to understand and manage climate risk. There were several sessions some of which discussed emerging disclosures (including the TCFD) and the components of climate risk assessments and how to perform them. The PE firm recognises employee training and education on climate-related matters to be an important part of risk management. Currently, the PE firm makes various climate-related tools and resources available to employees including how climate change is included in the investment decision-making process. Going forward, the PE firm intends to roll-out more training and guidance to investment teams on climate change topics such as materiality, regulatory trends, industry-specific risks.

### Case study 2: Europe, US\$20bn AUM

An asset management firm with approximately US\$20bn PE business maintains a climate risk tool, developed by a third-party adviser, which assesses potential climate risks associated with an investment by evaluating industry sub-sector, low-carbon economic transition and physical risk-related issues. It draws on various data sources, which are regularly reviewed and updated. This tool is embedded in the investment screening process and recorded in each investment proposal. Moreover, this rating enables the Investment Committee to consider proceeding with a proposal and/or request further action is taken to ensure risks are managed or mitigated effectively either pre- or post-investment or decide not to proceed altogether.

### Case study 3: USA, US\$130bn AUM

A PE firm with US\$130bn AUM have recognised that the impacts from physical risks of climate change, together with growing investor pressure for action and regulatory shifts, are all driving the need to decarbonise. The company supports the Paris Agreement and is a signatory to the PRI and the TCFD. The PE firm understands that climate change poses a significant risk to the long-term resilience of portfolio companies and therefore intends to embed a physical climate risk assessment within due diligence and asset management activities. Furthermore, understanding that portfolio companies face regulatory risk for emission reductions, the PE firm has a structured approach to work with the companies to establish baseline emission profiles and support with monitoring of performance over time. If a portfolio company meets a pre-defined criteria for emissions reduction, then there is an in-house platform, owned by the PE firm, that enables portfolio companies to execute decarbonisation programs. The platform consults specialty consultants and engineers to design and execute operational interventions.

# Metrics and Targets

## Background and purpose

Metrics and targets are used to assess and manage relevant climate-related risks and opportunities and to enable PE firms to measure, monitor and report the climate-related impacts on their business. They are intended to enhance transparency and improve decision making, whilst helping GPs to manage the changing expectations of LPs.

Metrics and their associated targets should serve as indicators of performance across TCFD pillars and provide decision-useful information for LPs and other stakeholders.

The primary purposes of the Metrics and Targets pillar is to reflect the estimated potential impact of climate risks and opportunities for a business, to provide a degree of comparability between firms, and to understand trends and improvements over time towards a long-term goal. For PE firms, this equates to 3 use cases for PE management and investors:

### **The core risks and opportunities are estimated with respect to the portfolio in the short- and medium-term**

As the primary purpose of a PE firm is to unlock and generate value for investors, understanding the value that is at risk from climate change during an asset hold is an important component to be monitored.

The drivers of metrics will largely be the result of the short- and medium-term scenario analysis (as described in the Strategy section), which estimates the quantitative risks and opportunities for a portfolio company.

### **The alignment of the portfolio to a long-term decarbonisation goal is monitored**

As noted previously, governments and regulatory bodies are beginning to require firms to present and disclose transition plans to a low-carbon economy (e.g., net-zero targets). Notably, the ISSB (which, as previously noted, will replace the TCFD) has explicit requirements around the disclosure of emission reduction targets and the use of carbon offsets. The FCA ESG Sourcebook specifically encourages firms operating in a country with a commitment to a net-zero economy (such as the UK) to assess that commitment in developing and disclosing its transition plan. Where a firm has not considered the commitment in developing and disclosing its transition plan, the FCA encourages a firm to explain why not.

Due to the length of PE hold periods, some of the future risks may not crystallise and impact investor return. However, metrics are available to compare the level of 'greenness' of PE portfolios and this will be considered by capital providers who want to align their investment strategy with climate outcomes, and to monitor PE firms' contributions towards a net-zero goal.

### **The decarbonisation of the PE firm as a corporate entity is estimated, and transition plans can be monitored**

The TCFD guidelines indicate that all firms should understand and disclose the carbon emissions which are produced directly and indirectly by the business as a corporate entity (i.e., Scope 1 and 2 emissions), in addition to Scope 3 emissions (which includes financed emissions).

Much of the impact for PE firms will be in respect to Scope 3 emissions and the iCI's 'Greenhouse Gas Accounting and Reporting for the Private Equity Sector' methodologies can provide further guidance of how PE firms can begin thinking about quantifying value chain emissions. This may influence the development of meaningful and impactful targets towards ambitions to decarbonise portfolios.

## The TCFD Guidance

The TCFD Guidance recommends asset managers consider the following:

- 1. What do risks and opportunities look like in the short and medium-term?**
- 2. How might the firm align a portfolio over the long-term?**
- 3. How might the firm itself decarbonise, including financed emissions from assets?**



As such, the metrics and targets pillar of the TCFD guidance for asset managers' disclosures is aligned to the above outcomes as follows:

#### Short- and medium-term risk and opportunity assessment

PE firms should present climate metrics which are used to measure and manage climate-related risks and opportunities. This should include forward looking metrics that are consistent with business or strategic planning time horizons. Furthermore, PE firms should use metrics which can be used to assess climate-related risks and opportunities for each product or investment strategy, and those that are used for investment decisions and monitoring;

#### Long-term portfolio alignment

PE firms should describe the extent to which their assets under management and products and investment strategies, where relevant, are aligned with a well below 2°C scenario, using whichever approach or metrics best suit their organisational context or capabilities.

#### PE firm decarbonisation

Firms should provide their Scope 1, 2 and 3 GHG emissions, calculated in line with the GHG protocol methodology. GHG emission and associated metrics should be provided for historical (and current) periods to allow for trend analysis. More information on GHG accounting, and practical steps to take can be found in iCI's 'Greenhouse Gas Accounting and Reporting for the Private Equity Sector' [report](#)<sup>30</sup>.

Whilst disclosing GHG emissions for portfolios is useful and, as a simple metric, provides a degree of comparability with other businesses, using an absolute metric is not always the most appropriate where portfolios are changing and growing. In response to this, the TCFD guidance advises that asset managers disclose a WACI for each fund, in addition to other carbon footprinting metrics that may be more relevant to portfolios of businesses (and the FCA's rules require this as a "core" metric for in-scope firms in their product level reports). WACI is one of the most common metrics used in the industry where

carbon emissions are considered per unit of revenue, thereby presenting a relative metric that excludes some of the noise caused by changing portfolios.

Other decarbonisation targets recommended by the TCFD (and required by the FCA in the UK), include total carbon emissions, and a total carbon footprint.

#### Targets

The TCFD recommends that PE firms set targets against which changes in values can be monitored. Depending on the metric being targeted, PE firms should disclose:

- Whether the target is an absolute measure (e.g., GHG emissions), or an intensity-based measure (e.g., WACI);
- The timeframes over which the target applies;
- A base year from which progress is to be measured; and
- Key performance indicators used to assess progress against targets.

Firms should also disclose details of how targets have been formulated. This includes the scope of the target, level of aggregation, methodologies, and areas of judgements and assumptions.

Further detail on the recommended disclosures for asset managers by the TCFD is available on the TCFD Knowledge Hub as previously referenced.

The TCFD guidance on disclosures relating to the metrics and targets pillar is as follows:

TCFD Guidance – Metrics & Targets Pillar <sup>31</sup>	
TCFD Recommended disclosure	TCFD Guidance
<b>Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process</b>	Organisations should provide the key metrics used to measure and manage climate-related risks and opportunities, as well as metrics consistent with the cross-industry, climate-related metric categories. Organisations should consider including metrics on climate-related risks associated with water, energy, land use, and waste management where relevant and applicable.
	Where climate-related issues are material, organisations should consider describing whether and how related performance metrics are incorporated into remuneration policies.
	Where relevant, organisations should provide their internal carbon prices as well as climate-related opportunity metrics such as revenue from products and services designed for a low-carbon economy.
	Metrics should be provided for historical periods to allow for trend analysis. Where appropriate, organisations should consider providing forward-looking metrics for the cross-industry, climate-related metric categories consistent with their business or strategic planning time horizons. In addition, where not apparent, organisations should provide a description of the methodologies used to calculate or estimate climate-related metrics.
	Asset managers should describe metrics used to assess climate-related risks and opportunities in each product or investment strategy. Where relevant, asset managers should also describe how these metrics have changed over time. Where appropriate, asset managers should provide metrics considered in investment decisions and monitoring.
	Asset managers should describe the extent to which their assets under management and products and investment strategies, where relevant, are aligned with a well below 2°C scenario, using whichever approach or metrics best suit their organisational context or capabilities. Asset managers should also indicate which asset classes are included.
<b>Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks</b>	Organisations should provide their Scope 1 and Scope 2 GHG emissions independent of a materiality assessment, and, if appropriate, Scope 3 GHG emissions and the related risks. All organisations should consider disclosing Scope 3 GHG emissions.
	GHG emissions should be calculated in line with the GHG Protocol methodology to allow for aggregation and comparability across organisations and jurisdictions. As appropriate, organisations should consider providing related, generally accepted industry specific GHG efficiency ratios.
	GHG emissions and associated metrics should be provided for historical periods to allow for trend analysis. In addition, where not apparent, organisations should provide a description of the methodologies used to calculate or estimate the metrics.
	Asset managers should disclose GHG emissions for their assets under management and the weighted average carbon intensity (WACI) for each product or investment strategy, where data and methodologies allow. These emissions should be calculated in line with the Global GHG Accounting and Reporting Standard for the Financial Industry developed by the Partnership for Carbon Accounting Financials (PCAF Standard) or a comparable methodology. In addition to WACI, asset managers should consider providing other carbon footprinting metrics they believe are useful for decision-making.



TCFD Guidance – Metrics & Targets Pillar<sup>31</sup>

## TCFD Recommended disclosure

**Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets**

## TCFD Guidance

Organisations should describe their key climate-related targets such as those related to GHG emissions, water usage, energy usage, etc., in line with the cross-industry, climate-related metric categories on p. 79 of the TCFD Guidance, where relevant, and in line with anticipated regulatory requirements or market constraints or other goals. Other goals may include efficiency or financial goals, financial loss tolerances, avoided GHG emissions through the entire product life cycle, or net revenue goals for products and services designed for a low-carbon economy.

In describing their targets, organisations should consider including the following:

- whether the target is absolute, or intensity based,
- time frames over which the target applies,
- base year from which progress is measured, and
- key performance indicators used to assess progress against targets.

Organisations disclosing medium-term or long-term targets should also disclose associated interim targets in aggregate or by business line, where available. Where not apparent, organisations should provide a description of the methodologies used to calculate targets and measures.

## Current good practices and relevant guidance

Climate-related metrics and targets should be aligned to the use cases of scenario analysis as previously described. This should be structured in a way that it is of tangible use for both PE firms and investors rather than simply to disclose details to comply with regulatory requirements.

As previously noted, the core use cases of scenario analysis are to identify and quantitatively estimate the risks and opportunities on a portfolio company/fund during the hold period; to understand the impact climate change might have after the hold period (e.g., in a way that could impact sale price), and to progressively align portfolios to a lower carbon economy in future periods. Whilst the TCFD does not prescribe metrics to be used by PE firms for all use cases (although certain metrics are recommended), the below should be considered to present valuable disclosures.

### Hold period and post-hold period – CVAR

The TCFD recognises CVAR as a useful forward-looking financial metric for climate-related risks. Value-at-Risk ('VAR') is a common metric for measuring financial risks and estimates the risk of loss for investment. CVAR quantifies, over a given time horizon, the potential financial loss on a portfolio of assets due to climate change and aims to assess the potential sensitivity of investment to climate-related risks and opportunities.

In the UK, the FCA requires that in-scope asset managers as far as reasonably practicable calculate and quantitatively estimate CVAR

annually on a fund level basis from June 2023 (for firms with over £50bn AUM) or June 2024 (for firms with between £5bn and £50bn AUM) so that investors can understand the extent to which the fund they are invested in is exposed to climate-related risks and opportunities. It is therefore likely that this will become a common and useful metric going forward across financial institutions.

**There is currently no prescribed methodology for calculating CVAR and therefore there is scope for different approaches and interpretations, however, the broad construct is as follows:**

- **For a given period, PE firms calculate the present value of a baseline set of cash flows and financial results for individual portfolio companies. The baseline may be for an assumed level of climate change (e.g., 4°C BAU) or where climate change is not considered at all.**
- **A counterfactual set of cashflows is then recalculated under different climate stresses/scenarios (e.g., a 2°C scenario, 1.5°C scenario etc.), with the difference in the present value representing the value at risk. In some cases, firms may also overlay a probability weighting or confidence intervals in the CVAR value.**

CVAR can be calculated as a £ value at risk, or a % exposure, but provides GPs and LPs with a forward-looking understanding of how exposed a portfolio/fund may be to different climate change, and the degree of resilience under each scenario.

Using the scenario analysis approaches as described in the 'Strategy' pillar section of this report, CVAR can be calculated for both hold period and post hold period time frames, the result being a tangible assessment of risk that may inform strategy. For example, a CVAR bound to a 7-year hold period may be relatively low, indicating that climate risks and opportunities materialising in that time are unlikely to cause a material impact on the portfolio company. However, a CVAR based on a 7-year period following the hold period (i.e., over 14 years) may be considerably higher, reflecting that the subsequent buyer of the portfolio company will inherit an increased degree of uncertainty on how the portfolio company may be impacted by climate risks/opportunities. This level of uncertainty and exposure may contribute to the determination of the sale price of the asset.

Whilst CVAR can also be calculated over a longer term (which would be more appropriate for long-term investors such as life insurance companies which tend to have longer term liabilities than PE firms), this is not likely to be as useful for PE firms as a targeted pre- and post-hold period, as the risks arising in the long-term future may not have a financial bearing for the PE firm.

### CVAR disclosure considerations – Annual versus 3 year rolling average

Presenting a CVAR metric to investors may be a useful tool in assessing trends in the climate risks and opportunities in a portfolio or fund. However, because of regularly changing components of a fund, there may be instances where an annual change in the value of CVAR needs to be caveated, explained or disclosed differently.

For example, a PE firm that is actively engaged in improving the climate position of its portfolio companies may acquire a business, alter its operating model in a way that reduces the CVAR, dispose of the business, and acquire a new portfolio company with a higher CVAR, thereby increasing the CVAR for the fund. In this example, the PE firm is enabling positive climate outcomes, but in doing so may present an increasing CVAR over time, which may be misinterpreted by investors as a negative signal. For these instances (which are also reflected in other simpler metrics such as carbon emissions and intensity metrics), firms should consider additional disclosures to clarify the approach taken for the benefit of investors.



As noted above, presenting an annual CVAR is a regulatory requirement in some jurisdictions such as the UK, where it is required, as far as reasonably practicable, in TCFD-aligned product (fund) reports. In this case, PE firms should look to disclose further detail on the drivers of increased CVAR to provide transparency for investors. For jurisdictions that do not require the disclosure of CVAR (annually or at all) however, PE firms may wish to present a 3-year rolling average CVAR. In doing so, PE firms can smooth some of the volatility year on year which will be because of a changing composition of the underlying portfolio constituents.

### Long-term portfolio alignment – Implied Temperature Rise and Carbon metrics

The additional use of scenario analysis is to understand how a PE firm's current portfolio aligns to long-term decarbonisation targets and goals (such as net-zero). This is based on the aggregate of each individual portfolio company's modelled adaptation into a less carbon intensive environment. Decarbonisation of individual firms will be driven by firm specific actions (e.g. to make use of climate-related opportunities), and by developments in technology over time.

As previously noted, LPs and investors are increasingly aligning their investment strategies to their beliefs, and this includes consideration on whether their capital is contributing to a low-carbon economy. As such, the ability for PE firms to disclose and quantify the alignment of their investment strategies to more 'green' solutions could result in an increased pool of capital for GPs.

### Implied Temperature Rise ('ITR')

One of the metrics described by the TCFD is a portfolio or fund ITR. The ITR is a forward-looking metric that translates the output of long-term scenario analysis into an estimated change in temperature, expressed as a numeric degree rating.

**For example, a portfolio company producing renewable energy will be more aligned to a lower temperature rise (e.g., a 2°C) than a portfolio company extracting coal that may be aligned to a higher temperature rise. Simplified variations of the metric can be used, for example taking only current GHG emissions of a portfolio company/fund and extrapolating this to a long-term target, which can serve as a pragmatic solution for PE firms not wishing to conduct detailed scenario analysis.**

The metric is a simple to understand tool that directly helps investors to assess how well aligned a portfolio is to global targets and serves as a useful tool in adhering to the TCFD's recommended disclosure of how a portfolio compares with a 2°C temperature pathway. It is also an intuitive metric in aligning targets and

monitoring progress. For example, a PE firm may target to reduce a certain fund from having an ITR of 3.7°C in 2022, to 2.5°C by 2030 etc., representing a shift in portfolio company composition, or an improvement in the carbon intensity of each portfolio company making up the fund.

Currently, there is no consensus amongst the market, nor regulators, on a specific calculation methodology for ITR. A number of bodies (e.g., 2° Investing Initiative, Arabesque, Carbon Delta, CDP, MSCI, SBTi, and Trucost) continue to develop guidance for what is currently a nascent metric which is partly limited by the assumptions and judgments required. However, a high-level approach (e.g., based on sector exposures) may be appropriate as a short-term solution as methodologies converge.

### SBTi-accredited portfolio composition

Calculating an ITR can be complex and can often include a number of assumptions and judgements. Firms that do not have the capabilities (or regulatory requirement) to develop/disclose an ITR metric may wish to consider a simpler alternative that does not require modelling, whilst still providing a forwarding looking view.

One solution is to monitor and disclose the number/percentage of portfolio companies that have SBTi accredited transition plans in place, or are planning on aligning to an SBTi target, versus those portfolio companies that do not. Presenting this provides investors with a simple metric to understand the extent to which the existing portfolio of companies is adapting to climate change over time.

Further detail on SBTi target considerations is included later in this section, and in Appendix 8.

### Weighted Average Carbon Intensity ('WACI')

**WACI is a carbon emissions metric calculated as follows:**

$$\sum_n^i \left[ \frac{\text{Current value of investment}_i}{\text{Current portfolio value}} \times \frac{\text{issuer's Scope 1 and Scope 2 GHG emissions}_i}{\text{issuer's £M revenue}_i} \right]$$

WACI provides a point in time value of carbon exposure of a certain fund or portfolio. This is performed by calculating the Scope 1 and 2 GHG emissions of an asset generated per unit of revenue, and weighting this based on the holding of the fund. The metric (as recommended by the TCFD) is useful in that it quantifies the extent to which a fund is exposed to carbon intensive sectors. For example, per unit of revenue, an oil and gas major will generate more GHG emissions than 'greener' industries, and therefore the carbon intensity is higher.

The primary drawback of the metric is that it is static, using only current levels of emissions. Therefore, whilst investors can track the trend in WACI over time, the metric ignores the underlying portfolio company's transition and adaptation plans. For example, newly developing 'green' companies may produce high initial carbon emissions which are necessary to reach a lower carbon intensity steady state.

Nevertheless, WACI is a useful instrument for asset managers to disclose, and due to its simplicity, a metric that is easily comparable with other funds.

### Absolute carbon metrics

The TCFD guidance recommends that firms in all sectors disclose their Scope 1, 2 and 3 GHG emissions. GHG emissions should be calculated in line with the GHG Protocol methodology. This is aligned to the methodology developed by the Partnership for Carbon Accounting Financials ('PCAF') which at its core apportions GHG emissions based on the value of investment holding in an underlying corporate.

An absolute comparison of carbon emissions can be useful for investors in that it is simple and comparable throughout all industries and is easy to set targets against. However, as previously described, it can be distorted by changing portfolios (e.g., not allowing a consistent year-on-year comparison), but also is a point in time calculation that does not account for future development/ expectation.

Firms are increasingly disclosing GHG emissions and therefore aggregating emissions to a fund level is becoming easier. However, using proxy data for emissions data, (based on size of businesses and sectors), can also represent a pragmatic solution for estimating emissions where data gaps exist.

### Other metrics recommended by the TCFD

In addition to the above metrics, the TCFD provides guidance on additional KPIs for consideration which may be useful for asset managers and PE firms, including:

- Carbon price assumptions, both external and internal;
- The percentage of assets (as a proportion of all portfolio companies<sup>32</sup>) and/or activities vulnerable to physical climate risks;
- The percentage of assets and/or activities vulnerable to climate-related transition risks;
- The percentage of assets and/or activities aligned toward climate-related opportunities;
- The percentage of executive remuneration impacted by climate considerations; and
- The level of expenditures or capital investment driven by climate considerations.

These metrics provide a simple output that can be easily understood by investors and serve as a pragmatic solution for identifying funds or investment strategies which are more or less exposed to climate-related risks, with a forward-looking perspective. Moreover, the use of these

metrics may be helpful in situations in which insufficient climate data is available to perform CVAR or ITR analysis.

### Other metrics and targets for PE firms, private credit providers and VC

As previously noted, PE firms often have a significant influence in encouraging a certain behaviour in portfolio companies and as such, PE firms may wish to set metrics and targets linked to positive climate behaviours. Examples include:

- Proportion of portfolio companies (as previously described and in footnote to this page) calculating Scope 1, 2 and 3 emissions;
- Proportion of portfolio companies that have carried out an energy assessment/audit for Scope 1 and 2 emissions;
- Proportion of portfolio companies with action plans for reducing their Scope 1 and 2 emissions; and/or
- Number of engagement meetings with portfolio companies on climate risk with details of number or percentage of advanced interventions.

**Private credit and VC providers may also wish to consider additional metrics to reflect the nuances of their business. For example:**

- **Climate-driven impacts on reserving and capital;**
- **Changes in credit quality of loans related to climate-related considerations (e.g. spread of stressed PD/LGDs under different climate scenarios);**
- **Number of loans, or equity arrangements, which include a climate-related term or mechanism (e.g. a sustainability ratchet) or have been provided primarily for the use of climate-related opportunities.**



### Metrics to be considered during the due diligence phase

In addition to the hold period, post-hold period and long-term portfolio terms, PE firms may also want to assess the climate metrics of target businesses during the due diligence phase. PE firms are unlikely to have access to the level of data required to assess climate risks to the same level of detail that they would for their portfolio companies, particularly for forward-looking metrics, but firms should be in a position to understand the business with respect to the metrics presented previously in this section (e.g. GHG emissions, WACI).

In doing so, PE firms will be able to influence investment decisions by assessing the below:

- A qualitative (or quantitative) level of exposure to climate risks and opportunities;
- An understanding of how an acquisition may impact the overall climate exposure of a fund or portfolio;
- Climate risks or opportunities that may impact the bid price, forecast cashflows, future working capital commitments, or net debt considerations; and/or
- Whether a potential target satisfies any climate floors/hurdles for investment, e.g. firms with a WACI of above a certain percentage are not considered for acquisition.

### Target setting

The TCFD is not prescriptive in how PE firms should set climate-related targets. Targets can be simply applied to the metrics presented above. SBTi and Net-Zero Asset Managers Initiative (NZAM) recommend that firms set short-term targets, to break down their long-term targets. These short- and long-term targets help investors to track progress and make management accountable by progressing from climate intent to climate action. As LPs increasingly monitor the goals set by their GPs, how ambitious these targets are and how they compare with the targets of other GPs may influence capital allocations.

In line with the latest climate science, SBTi recommends PE firms to consider 2050 or earlier as their timeline for long-term (net-zero) targets and a minimum of 5 years to a maximum of 15 years as timeline for setting up short- or mid-term targets. Furthermore, existing guidance from the SBTi<sup>33</sup>, Net-Zero Investment Framework<sup>34</sup> and PRI Target Setting Protocol<sup>35</sup> recommend setting medium-term targets (<10 years) for Scope 1 and 2 emission reductions, with the market expectation that Scope 3 emissions reductions targets will be phased in over time as data availability improves.

### Other guidance on metrics and targets

**The guidance presented in this section is primarily aligned to the requirements of the TCFD, tailored for the use cases and climate responses identified in the strategic pillar. However, further external support is available which builds on this guidance that may be useful for private market firms to consider as a practical guide. This includes:**

- **SBTi – A guidance document which provides methodologies for setting science-based targets for the private market industry.**
- **ISSB – The exposure draft currently in circulation and due for finalisation by the ISSB.**
- **ESRS (‘European Sustainability Reporting Standards’) – All TCFD disclosure requirements are included in ESRS E1, which also imposes additional requirements and classification differences on firms in the European market.**

**Further detail on this guidance is provided in Appendix 8.**

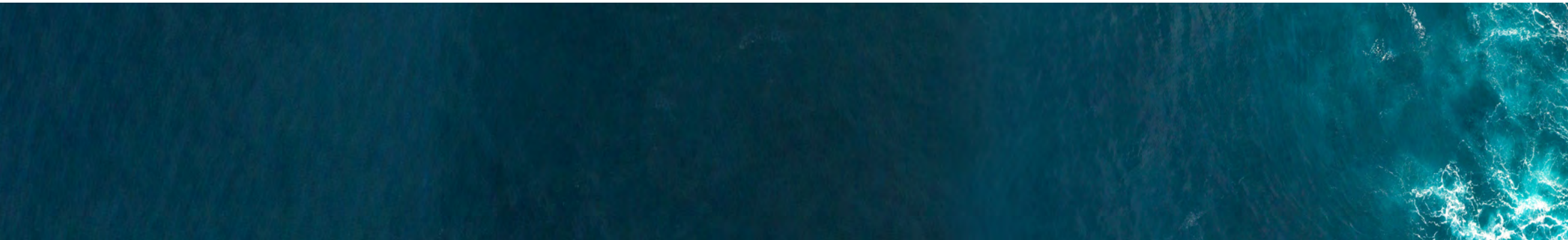
## Practical application guidance

As previously noted, the below tables show suggested actions and approaches that firms may wish to consider. They are not exhaustive, and firms should consider the best approach for their business.

### Metrics and Targets – Practical application guidance

	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Static / Historical metrics	<ul style="list-style-type: none"> <li>Metrics monitored are compliant with TCFD recommendations; namely absolute emissions and an intensity metric such as WACI.</li> <li>Metrics are monitored at a portfolio and fund level.</li> </ul>	<ul style="list-style-type: none"> <li>A transition risk and opportunity heatmap by sector and geography is produced.</li> <li>A physical risk and opportunity heatmap by sector and geography is produced.</li> </ul>	N/A
Simple metrics and other KPIs	<ul style="list-style-type: none"> <li>Other simple metrics are disclosed, such as:               <ul style="list-style-type: none"> <li>Portfolio % exposed to carbon-related assets by sector.</li> <li>Portfolio % which is vulnerable to physical risks.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Metrics monitored are compliant with TCFD recommendations; namely absolute emissions and an intensity metric such as WACI.</li> <li>Metrics are monitored at a portfolio and fund level.</li> </ul>	N/A
Engagement metrics	<ul style="list-style-type: none"> <li>Number of engagements with portfolio companies to assist/intervene on climate-related considerations.</li> </ul>	<ul style="list-style-type: none"> <li>Outcomes of engagement is disclosed, e.g., % of portfolio covered by emission reduction targets.</li> </ul>	





	Band 1	Band 2 (in addition to Band 1)	Band 3 (in addition to Bands 1 and 2)
Forward-looking metrics	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>High-level forward-looking metrics (such as CVAR and ITR) are considered with assistance in modelling from consultants.</li> <li>Qualitative forward-looking analysis is performed.</li> </ul>	<ul style="list-style-type: none"> <li>CVAR metric aligned to the timeframes of the use cases is produced using scenario analysis (i.e., multiple CVARs). CVAR results are used to influence investment strategy and can be disclosed in annual and more regular reporting.</li> <li>ITR (or equivalent) is produced and disclosed with public commitments made with commentary for deviations against plans.</li> </ul>
Targets	<ul style="list-style-type: none"> <li>Medium-long term targets are aligned with stakeholder expectations (e.g., goals for net-zero) and ratcheted up over time.</li> <li>Progress against targets are disclosed to investors.</li> </ul>	<ul style="list-style-type: none"> <li>Interim targets are set, disclosed, and monitored against.</li> <li>Target levels of engagement (number or percentage) are set and monitored against.</li> </ul>	<ul style="list-style-type: none"> <li>Portfolio decarbonisation target set (e.g., SBT PE guide Portfolio Coverage Approach)</li> <li>CVAR targets are monitored and disclosed. CVAR targets consider portfolio alignment strategies.</li> <li>ITR targets/commitments are aligned with 2°C or better scenarios with ambitious reductions at short-term and long-term phases.</li> </ul>

## Case studies<sup>5</sup>

### Case study 1: UK, US\$420bn AUM

This PE firm based in the UK, with approximately US\$420bn AUM, has used a variety of metrics and tools to manage the potential impact of climate risks and opportunities, as well as monitor year-on-year progress towards their goals.

They have chosen to include the following metrics:

- Climate Value at Risk (CVAR);
- Absolute operational carbon emissions;
- Weighted average carbon intensity (WACI);
- Investment in green assets; and
- Portfolio warming potential (PwP)

For each of these five metrics, they have also identified which asset/liability classes it applies to (not all metrics apply to all classes), whether it is a physical or transition risk, or both, the scope of its measurement, measurement methodology and external data provider, if applicable.

The PE firm found it difficult to calculate their WACI – as it covers only a subset of asset classes, and within that subset, had limited data and proxy data to rely on. Many asset managers may encounter similar difficulties. As more data becomes available, these metrics will become more useful and comparable.

In disclosing their investment in green assets, the PE firm included transition assets, which are not currently taxonomized, and therefore not comparable across the business or with other market players. Again, as more information becomes available in the sector, or regulated by governing and regulatory bodies, we anticipate the PE firm's approach and suite of assets included in the disclosure to shift. In addition to this, because there is currently no standardisation for this definition across the industry, it is challenging to compare the methodology of this firm with others.

### Case study 2: USA, US\$40bn AUM

A PE firm based in the United States with over US\$40bn AUM has conducted a carbon footprinting exercise of all portfolio companies across Scope 1, 2 and 3 emissions, consistent with the GHG Protocol. The PE firm supports its portfolio companies with this exercise, with the aim to encourage the use of climate-related data as a strategic tool to identify climate risks and opportunities. The PE firm also normalises emissions by number of employees to compare portfolio companies and funds.

The company has set a target for the carbon footprint of the portfolio, which was approved by the SBTi, and aligned to their guidance for PE firms. The targets will cover 100% of the firm's investment and lending activities, where they have 25% or more ownership or at least one Board seat. This target also requires portfolio companies to set science-based targets by 2040 at the latest, with the long-term goal that the portfolio itself will be net-zero by 2050.

### Case study 3: France, \$US17bn AUM

A French-based PE firm with over US\$17bn AUM has ensured portfolio companies are setting science-based emissions reduction targets aligned with the 1.5°C scenario of the Paris Agreement, to tackle its Scope 2, category 15 financed emissions. This firm also assists their portfolio companies in calculating their carbon emissions, which enables consistent support along the climate journey for the firm and their portfolio companies.



#### Case study 4: USA, US\$120bn AUM

A global alternative PE firm with approximately \$120bn AUM has a dedicated climate investing platform, that follows a third-party methodology, including Carbon Yield, to measure the emissions tons avoided per dollar invested, and the Impact Multiple of Money (IMM), which in addition to measuring the ESG impact will also estimate terminal value through the lifetime of the investment and social return.

Among other impact measurement metrics, both Carbon Yield and IMM were initially only used to support activities within the climate fund. However, a broader ESG suite of decision-making tools including climate impact assessment tools has now been rolled out across the firm's wider capital allocation decision making process. The PE firm has outsourced the design, implementation, and performance measurement of its ESG strategy to a third-party who are responsible for:

- coordination and integration of ESG performance management across the firm's funds and platforms;
- advisory on ESG diligence and screening; and
- supporting cross-portfolio collaboration and supporting portfolio companies to improve their ESG performance.





# Appendices

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# Appendix 1: Scope of work

## Scope of Work

### Objective

Support the iCI and BVCA in summarising good practice guidance around TCFD-style reporting for private equity as an asset class for iCI and BVCA members. The deliverable will be a 20-30 page KPMG-branded Word guidance document, that will also include BVCA and iCI logos (as provided by BVCA and iCI) in a manner to be decided by KPMG in discussion with the Steering Group, covering:

### Background to TCFD

- A brief background on the TCFD recommendations and the UK's roadmap for mandatory TCFD-aligned disclosures
- A general overview of climate-related physical and transition risks, and climate-related scenario analysis
- A description of reference scenarios commonly used in modelling of climate-related risks and opportunities (IPCC, IEA, NGFS etc.)

### Overview of good practice for TCFD-style reporting in the PE context for each of the four pillars (governance, strategy, risk management, and metrics and targets)

- Description of good practice
- Enablers for good practice

- Outline of key considerations for PE firms
- Annotated, illustrative case-studies, constructed using general information from the public domain

As an input to this work, KPMG will provide support to iCI and BVCA in providing additional content suggestions for, and digitising a questionnaire developed by iCI, using the MS Forms programme. This will be circulated by iCI and BVCA to their memberships, with results to be analysed by KPMG and taken into consideration in drafting the deliverable. Where respondents have indicated a preference to take part in an interview, KPMG will be provided with their, Name, Organisation and e-Mail Address in order to arrange the interviews.

In addition, KPMG will deliver one training workshop/webinar for iCI and BVCA members, in a format and at a time agreed in discussion with the Steering Group, sharing key insights generated through the project

### Audience

- iCI and BVCA members. Memberships are composed of private equity general partners, limited partners, venture capital organisations, other private market participants
- The guidance document will be published on the BVCA website, for general access, and the

BVCA will be free to use the guidance in whole or in part for any reasonable purposes relating to its typical activities as a trade association

- iCI will disseminate the guidance to its members and will be free to publish it publicly and to use the guidance in whole or in part for any reasonable activity relating to its typical activities.

### Approach and phases of work

#### Phase 1: Consider existing guidance:

- Collate and consider existing sources of guidance for PE organisations (sources below)
- Leverage existing KPMG expertise across UK, US, Europe and APAC
- Identify and agree iCI and BVCA members to be interviewed

#### Phase 2: Draft Guidance

- Assess and identify gaps in the existing guidance, as compared to the detailed recommendations set out by the TCFD, and areas that lack clarity
- Develop draft guidance which provides a succinct but comprehensive view of good practice in responding to TCFD recommendations for PE

#### Phase 3: Test and iterate:

- Schedule interviews with selected members
- Hold member interviews
- Share draft guidance with stakeholders (iCI and BVCA Steering Group members, selected iCI members, BVCA members – to be agreed at project Kick Off, TCFD, etc)
- Refine the guidance based on feedback

#### Phase 4: Finalise and socialise:

- Package the guidance document in an accessible format, assumed to be PDF, this to be agreed at project Kick Off
- Share guidance document with members, following a communications plan, to be agreed at project Kick Off
- Host webinar(s) to 'launch' the guidance and deliver key messages

# Appendix 2: Types of climate risk

Climate-related risks, as described by the TCFD<sup>36</sup>, can be divided into two categories: physical risk and transition risk.

## Physical risk

Physical risks of climate change represent the outcomes of the planet warming, giving rise to a change in the physical ecosystem. Physical risks can be disaggregated into:

- **Acute physical risk** – An extreme weather event such as a flash flood, hurricane, or wildfire; and
- **Chronic physical risk** – The long-term variability of weather patterns, causes changes to the climate such as rising sea levels, and increasing mean temperatures over a longer time frame.

## Transition risks

Transition risks are those arising as a result of transitioning to a lower carbon economy. The TCFD categorises these as follows;

- **Policy and legal** – Changes from governments, policy makers and markets in respect to climate change initiatives. This includes: carbon pricing and reporting obligations; mandates on and regulation of existing products and services; and exposure to litigation;
- **Technological** – Changes and developments in technology for reducing carbon emissions. Risks for businesses include; the requirement to substitute existing products and services with lower emissions options (i.e. product/service

redundancy); and unsuccessful investment in new technologies;

- **Market** – Changes in the market as a result of the transition, including changes in customer behaviour, uncertainty in market signals, and changes in the cost of raw materials, and
- **Reputational** – The risk of negative reputational considerations as a result of the transition, including, shifts in customer preferences and expectations, increased stakeholder concern/negative feedback, and the stigmatisation of sectors.

In addition to the above risks, the transition to a lower carbon economy presents a number of climate opportunities for businesses. Whilst these tend to be sector specific, examples include:

- **Resource efficiency** – Using more efficient modes of transport / production / distribution / buildings / water usage;
- **Energy sources** – Use of lower emissions sources of energy, new technologies, and participation in the carbon markets;
- **Products and services** – Development and expansion of lower emissions goods and services, new products, and climate adaptation/insurance risk solutions;

- **Markets** – Access to new markets, use of public sector incentives, and access to new assets and locations; and
- **Resilience** – Participation in renewable energy programmes and adoption of energy efficient measures, and resource substitution/diversification.



# Appendix 3: Other relevant regulatory regimes

## Glasgow Financial Alliance for Net-Zero (GFANZ) –

GFANZ was launched in April 2021 by Mark Carney, UN Special Envoy for Climate Action and Finance, and the COP26 Presidency, in partnership with the UN-backed Race to Zero campaign launched by UN High-Level Climate Champions, Nigel Topping and Gonzalo Muñoz, to unite net-zero financial sector-specific alliances from across the globe into one industry-wide alliance. Bringing together existing and new net-zero finance initiatives into one sector-wide coalition, GFANZ provides a forum for leading financial institutions to accelerate the transition to a net-zero global economy<sup>37</sup>.

## International Sustainability Standards Board (ISSB) –

The ISSB published its first draft standards in H1 2022 – and is collecting comments and feedback. The standards will be IFRS style sustainability disclosures which aim to help provide investors and other stakeholders with information about sustainability-related risks and opportunities to assist in decision making, in a consistent manner across borders.

**SASB Standards** – SASB Standards guide the disclosure of financially material sustainability information by companies to their investors. Available for 77 industries, the Standards identify the subset of environmental, social, and governance (ESG) issues most relevant to financial performance in each industry<sup>38</sup>.

**Securities and Exchange Commission (SEC)** – In May 2022, the SEC proposed amendments to rules and reporting forms to promote consistent, comparable, and reliable information for investors concerning funds and advisors' incorporation of environmental, social and governance factors. The

proposed amendments seek to categorise certain types of ESG strategies broadly and require funds and advisors to provide more specific disclosures in fund prospectuses, annual reports and advisor brochures based on ESG strategies they pursue<sup>39</sup>.

## Non-Financial Reporting Directive ('NFRD') (EU):

- Disclosure of information related to: Environmental protection; Social responsibility and treatment of employees; Respect for human rights; Anti-corruption and bribery; and Diversity on company Boards.
- Disclosure of mandatory taxonomy alignment KPIs identifying proportion of turnover, CapEx and OpEx relating to activities in line with EU Taxonomy Regulation (see below).

## Sustainable Finance Disclosure Regulation ('SFDR') (EU):

- Pre-contractual and periodic disclosures on how ESG factors are integrated at both an entity level and product level, including sustainability risks, the consideration of adverse sustainability impacts in investment processes and the provision of sustainability-related information with respect to financial products. Content of disclosure depends on 'Article 6'/'Article 8'/'Article 9' categorisation. Standard disclosures have applied from January 2022, and Principle Adverse Indicator disclosures will apply from June 2023.

## Taxonomy Regulation (EU):

- Aims to define environmentally sustainable activities, using detailed technical criteria and by reference to six environmental objectives.

Currently applies in respect of climate change mitigation and climate change adaptation objectives; will apply from January 2023 in respect of other environmental objectives. Article 8 and Article 9 funds under SFDR must report their levels of Taxonomy alignment.

New requirements under Alternative Investment Fund Managers Directive ('AIFMD') and Markets in Financial Instruments Directive ('MiFID') (EU):

- Note: AIFMD/MiFID rules apply to EU regulated PE firms.
- Changes have recently been implemented to integrate sustainability risks and sustainability factors into the AIFMD and MiFID regimes, including in relation to organisational requirements, conflicts of interest and due diligence. MiFID firms now need to assess their clients' sustainability preferences and take these into account.

## Forthcoming regulations that may be relevant to PE firms in the future include:

### Corporate Sustainability Reporting Directive ('CSRD') (EU):

- From 2023, the CSRD will supersede the NFRD and will mandate additional disclosures on double materiality, the process to select material topics for stakeholders and forward-looking information including ESG targets and progress. A wider range of companies will be captured by disclosure requirements.
- All reported data must be independently audited and assured.

### Sustainability Disclosure Requirements ('SDR')

## (UK):

- Concepts developed by the UK regulation may become applicable to EU regulations in due course and developments in requirements should therefore be considered.
- The requirements cover additional disclosures for asset managers, asset owners and products. Disclosures will build on the TCFD and also incorporate the new ISSB sustainability standards.
- Are likely to require double materiality disclosures outlining how sustainability issues impact companies and how companies' activities impact sustainable development and product level labelling based on meeting minimum criteria and organisational arrangements around sustainable investment activities.

### UK Green Taxonomy (UK):

- Similarly to the SDR, the UK Green Taxonomy is a UK regulation that is currently under development. However, concepts of the taxonomy may be extended into the European market in due course.
- Will likely, if/when enacted, require disclosure around environmental impacts of products against UK Green Taxonomy and how sustainability is incorporated into investment strategy. Legislation covering the first two environmental objectives is expected at the end of 2022, based on indicative timelines, with legislation covering the four remaining objectives expected in 2023 (although this timing may change according to political developments). The UK taxonomy will probably have a similar structure to the EU taxonomy, although there may be differences in how alignment is evidenced.

### Taskforce for Nature-Related Financial Disclosures ('TNFD') (Global):

- The TNFD is expected to publish its first draft framework in H1 2022 based on its indicative timelines. This will be similar in structure to the TCFD framework, and will be designed to work in tandem with the TCFD. The report is expected to provide guidance about how companies should understand and disclose nature-related risks

and opportunities and how these affect their governance, risk management frameworks, strategic decision making and metrics/ targets.

### EU Social Taxonomy (EU):

- The European Commission is developing a Social Taxonomy under its mandate to consider expanding the existing Taxonomy Regulation to consider risks outside of climate risk. An outline structure has been proposed which broadly follows the structure of the environmental taxonomy, with refinements made to accommodate social objectives. Initiatives such as the UN Sustainable Development Goals (SDGs), UN guiding principles and the Organisation for Economic Co-operation and Development (OECD) environmental and social guidelines will feed into the framework. Once complete, companies are likely to be expected to report against the social taxonomy under SFDR and other regulations as they currently do for the environmental taxonomy.

### EU Corporate Due Diligence Directive (EU):

- The EU has adopted a directive which will require companies to design and implement appropriate due diligence procedures to mitigate against human rights abuses, environmental and social degradation and non-Paris agreement climate scenario-aligned practices across the value chain

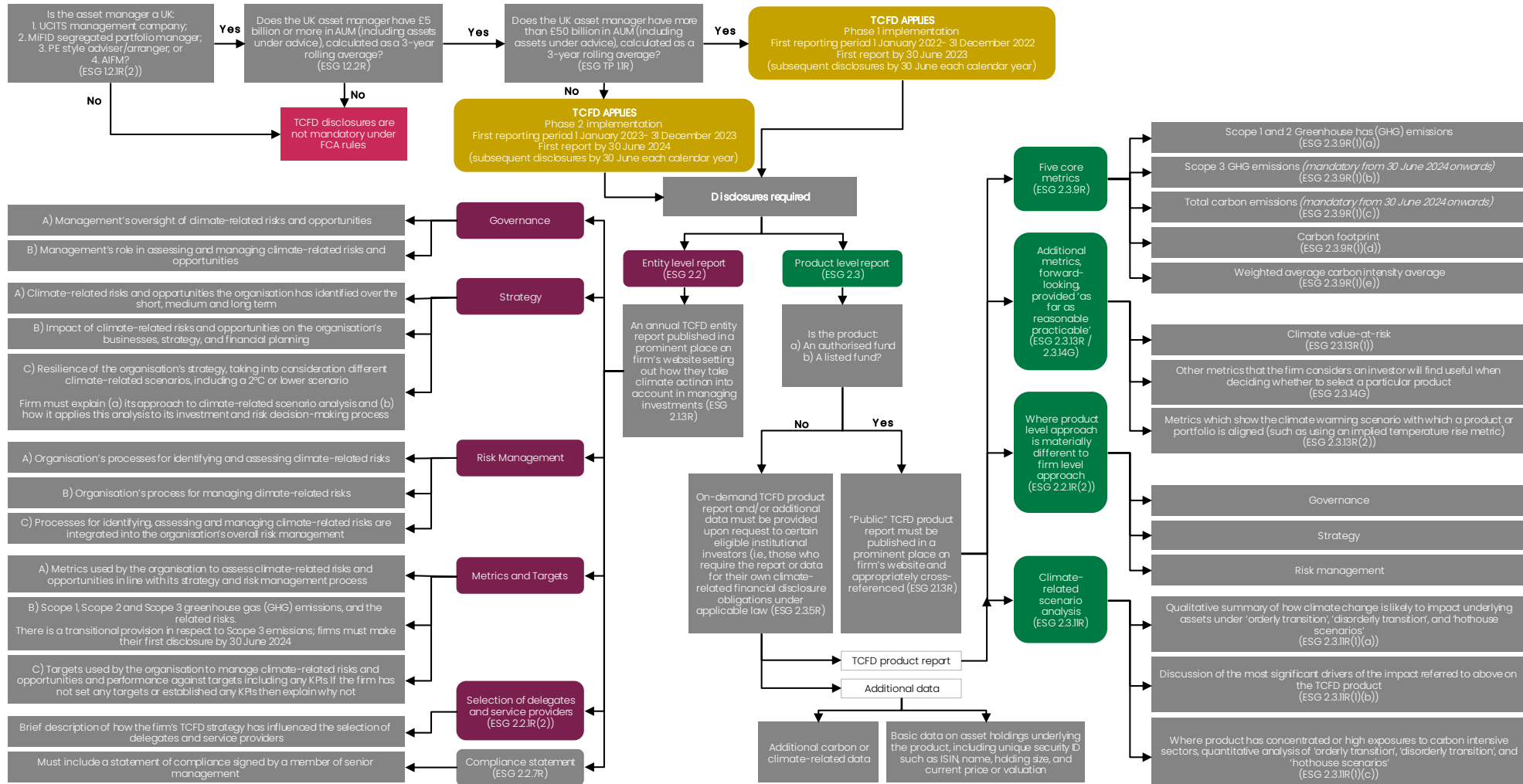
(including outside the EU). Directors will have a duty to ensure that due diligence is carried out appropriately. Victims will be able to take legal action for damages that could have been avoided with appropriate due diligence measures. Once approved by the European Parliament and Council, Member States will have two years to transpose the directive into national law.

### Net-Zero Asset Managers Initiative (NZAM):

- The Net-Zero Asset Managers Initiative is a group of international asset managers committed to supporting the goal of net-zero greenhouse gas emissions by 2050 or sooner, in line with global efforts to limit warming to 1.5°C; and to supporting investing aligned with net-zero emissions by 2050 or sooner.
- It is an initiative designed to mobilise action by the asset management industry that shows leading practice in driving the transition to net-zero and delivers the ambitious action and investment strategies that will be necessary to achieve the goal of net-zero emissions. It also provides a forum to share best practice and overcome barriers to aligning investments to that net-zero goal.



# Appendix 4: FCA PS21/24 Decision flowchart



Source of Flowchart: [Invest Europe](#)

# Appendix 5: Climate scenarios

The range of possible climate scenarios that could be realised is infinite, and the timing and magnitude of climate impacts is uncertain. However, guidance has been provided by a number of climate bodies to provide structure to scenario selection. Most commonly, the process for scenario development uses guidance from the IPCC, which takes potential macroeconomic and political states of the world and augments them with carbon constraints to achieve a long-term temperature pathway.

## IPCC Shared Socioeconomic Pathways ('SSPs')

The IPCC sets out five potential economic states of the world that may be realised during the 21st century, and these form the building blocks on which different 'scenarios' can be considered. The five different states are as follows;

- SSP1 – a world of sustainability-focused growth and equality;
- SSP2 – a 'middle of the road' world where trends broadly follow their historical patterns;
- SSP3 – a fragmented world of 'resurgent nationalism';
- SSP4 – a world of ever-increasing inequality; and
- SSP5 – a world of rapid and unconstrained growth in economic output and energy use.

The SSP inputs are used to model how underlying correlations between socioeconomic changes (such as population and income growth) impacts country and sector productivity, fossil fuel use etc. These relationships drive the resultant impact on key variables such as carbon prices, fuel prices, fuel demand, steel prices and sector level price and quantity, to allow models to sensitise revenues and costs at a more granular level.

For each of these scenarios, the IPCC sets out 153 inputs for production split between primary inputs (labour, capital, land, resources) and intermediary inputs (commodities) at various intervals until 2100 and for different regions.

## Representative Concentration Pathways ('RCPs')

The IPCC sets out RCPs which are pathways for limiting global warming to specific radiative forcing levels and essentially act as a carbon budget with respect to emissions as previously described. A higher RCP corresponds to more global warming and is measured in Watts per meter squared, e.g., RCP 2.6 means limiting global radiative forcing to 2.6 W/m<sup>2</sup>.





Combining SSPs with RCPs creates a plausible 'scenario' against which to perform modelling. An illustration of viable SSP/RCP combinations is presented in the table below.

Change in long-term (2081 – 2100) global temperatures through most likely SSP–RCP combinations (undertaken in the latest IPCC report using CMIP6)					
SSP	RCP 1.9 (W/m <sup>2</sup> )	RCP 2.6 (W/m <sup>2</sup> )	RCP 4.5 (W/m <sup>2</sup> )	RCP 7.0 (W/m <sup>2</sup> )	RCP 8.5 (W/m <sup>2</sup> )
<b>SSP1:</b> Sustainability – Low challenges to mitigation and adaptation World shifts to more sustainable path; Increased investments in education & health; Global cooperation	~0.6°C (relative: 1995 – 2014) ~1.4°C (relative: 1850 – 1990)	~0.9°C (relative: 1995 – 2014) ~1.8°C (relative: 1850 – 1990)	More likely than not to exceed 2°C* (relative: 1995 – 2014)	Incompatible combination	Incompatible combination
<b>SSP2:</b> Middle of the Road – Medium Challenges to Mitigation and Adaptation Social, economic, and technological trends do not shift; Slow progress from institutions on SDGs; Moderate population growth; Less intense resource and energy consumption	Most likely below 2°C but above 1.5°C* (relative: 1850 – 1990)	Likely to not exceed 2°C* (relative: 1850 – 1990)	~1.8°C (relative to 1995 – 2014) ~2.7°C (relative: 1850 – 1990)	Incompatible combination	Incompatible combination
<b>SSP3:</b> Regional Rivalry – A Rocky Road – High Challenges to Mitigation and Adaptation Focus on domestic policies and needs; Investments in education and technology decline; Higher inequality; Population growth remains high	Incompatible combination	Incompatible combination	More likely than not to exceed 2°C* (relative: 1850–1990)	~2.8°C (relative: 1995 – 2014) ~3.6 °C (relative: 1850 – 1990)	Likely to exceed 3°C* (relative: 1995 – 2014)
<b>SSP4:</b> Inequality – A Road Divided (Low Challenges to Mitigation, High challenges to Adaptation) High inequality; Degradation of social cohesion; Large investment in technology; Diverse energy sector; Environmental policies focused in middle & high income areas	SSP4–RCP scenarios have been considered as 'tier 2' scenarios and thus not included in the IPCC's report				
<b>SSP5:</b> Fossil-fuelled Development – Taking the Highway (High challenges to mitigation, low challenges to adaptation) Economic strength is prioritised; Strong investments in health, education & technology; Population peaks at 2100 and declines; Local environmental issues are managed	Incompatible combination	Incompatible combination	Likely to exceed 2°C* (relative: 1995 – 2014)	Likely to exceed 3°C* (relative: 1995 – 2014)	~3.5°C (relative: 1995–2014) ~4.4°C (relative: 1850 – 1990)

Source: IPCC

As noted previously, the TCFD does not prescribe the range of scenarios that should be analysed, however PE firms may wish to assess scenarios which are more diverse (e.g. more extreme outcomes) and yet still plausible. This would provide a greater range of outcomes and show the degree of which portfolio companies are resilient to different outcomes.

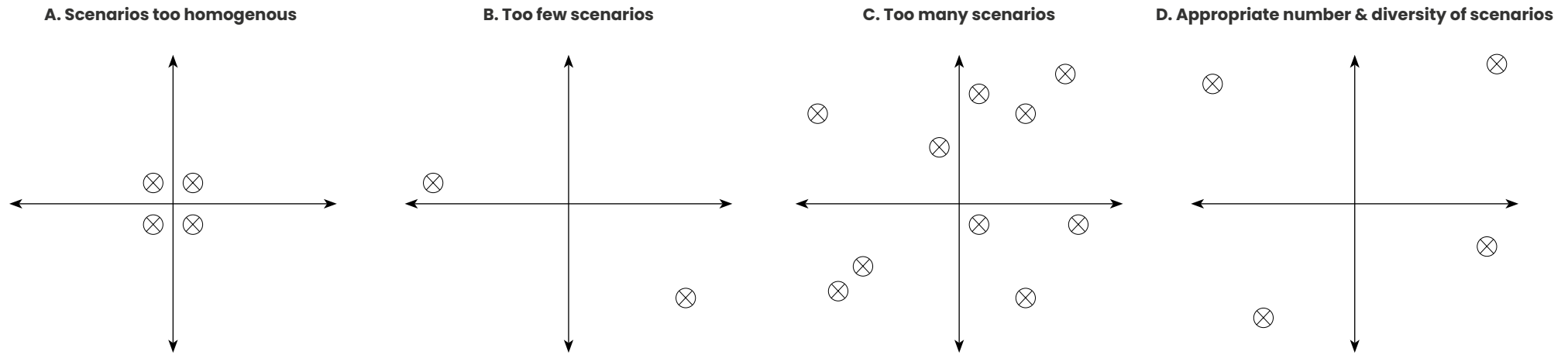


Illustration of the variations in number and type of scenarios. The vertical and horizontal axis represent different drivers used to construct the scenarios

Source: IPCC



# Appendix 6: Climate model methodologies

**Micro-models commonly used for climate modelling are Computable General Equilibrium models. Climate specialists use a variety of CGE models, but almost all standard CGE models share a number of key characteristics:**

- All economic agents (be they households, firms, the financial sector, governments) have 'perfect knowledge', meaning that agents are aware of every opportunity open to them and how to combine those opportunities to maximise with profits (firms), or utility (households).
- Each agent acts in an economically rational way to maximise their profit/utility, and this results in a global equilibrium where demand is equal to supply, which is in turn equal to the global 'potential supply' (e.g., a situation in which the global amount of economic resources is fully utilised and there are no further potential gains from exchange).
- This can represent a challenge in that the model assumes economic rationality of agents, which is not necessarily reflective of reality. A mitigant response to this is to model sectors (in addition to specific portfolio companies) to smooth out counterparties that may, over the course of the timeframe modelled, take non-economically rational decisions. A sector-based approach, whilst less resource intensive,

is more limited in its ability to disaggregate risks and opportunities. Firms with funds or portfolios that are sector specific or more homogenous, with few outliers, may choose this option for ease. Firms with funds or portfolios that range in sector, size, geographies and challenges, may opt for a more detailed analysis, which provides granularity, flexibility, greater transparency, and can also be aggregated up and analysed at the firm level as required.

- Many firms may also opt for a combination of the two. Performing some counterparty modelling for more specific portfolio companies or highly diverse funds, and sector-based modelling for more homogenous groups.
- For climate change modelling, transition risk (i.e., the change in global activity that is required to achieve a given temperature pathway), is achieved by constraining global output to an upper bound of CO2 emissions. This is generally achieved using a carbon price (most often as an explicit tax on CO2 emissions). As a result, agents are assumed to optimise their profit/utility under a carbon constraint by substituting carbon intensive activities for low-carbon alternatives. The outcome of this is that agents that are more capable of substituting their activities towards a 'greener' input mix face lower total costs and can generate relatively

higher returns, which can then be reinvested to businesses, and therefore grow. Conversely, those Agents less well placed to adjust to the effects of more stringent climate policy (e.g., coal mining) are more constrained by a CO2 cap, must pass on higher policy costs, face falling demand and generate less profits, and so begin to shrink.

- CGE models are generally deterministic, meaning that running the model multiple times with the same set of assumptions will generate the same outcome each time.
- One of the key features of most CGE models used for climate analysis is that, given the assumption of perfect markets and frictionless trade, money tends to be treated in the abstract with financial asset markets, labour market adjustment, business cycles, inflation and monetary policy largely absent. The omission of a richer treatment of factors typically covered by more traditional macroeconomic forecasting and simulation models may be significant for PE firms who require stressed costs of capital as an input into their valuation models (e.g., DCF).

**Macro-econometric models represent a different approach to climate modelling. Leading tools include the National Institute Global Econometric Model ('NiGEM') and E3ME (developed by Cambridge Econometrics). The key characteristics of macro-models are as follows;**

- The primary difference between macro-econometric models and CGE models is that macro-econometric models impose fewer theory-derived behavioural restrictions on different Agents across the economy and generally dispense with the full employment assumptions.
- Instead, macro-econometric models tend to use long time series of outturn data to estimate historical statistical relationships between variables, imposing some broad theoretical structure (such as the notion of an "equilibrium" or "potential" output that acts as an anchor for economic activity in the medium-term).
- The fact they are estimated from outturn data means they better lend themselves to be given "stochastic" features, allowing for the possibility that the model can be run multiple times to construct ranges or alternative scenarios by drawing across the range of the historical statistical data distribution.
- Macro-econometric models can also be readily adapted to factor in the role of "uncertainty"

(e.g. a lack of perfect foresight and knowledge) for agents. This could lead to added realism over CGE models; for instance if Agents are not able to maximise outcomes in the same smooth, seamless way as in CGE models, the possibility of slow adjustment to shocks or changing policy configurations can be captured.

- The inclusion of uncertainty (i.e., that agents know that there are 'unknown unknowns') means that agents will plan for unknown events occurring, and the lack of perfect markets mean that buyers and sellers may not be aware of each other, and therefore prices do not automatically move to market-clearing rates.
- The result of this is that in macro-econometric models, potential output and actual output can deviate for extended periods, broadening the range of potential effects that can be modelled to reflect an assessment of climate transition analysis, with a combination of separate demand and supply effects potentially in operation simultaneously.
- Furthermore, macro-econometric models tend to provide a richer rendering of the financial system, monetary policy, asset markets and interest rates, with these mechanisms typically being key to the functioning ("closure") of the models. Thus their ability to model a richer set of

macro-financial variables such as interest rates and inflation etc. is beneficial for firms reliant on components such as rates and credit spreads to make financial and valuation decisions.

- However, since macro-econometric models tend to be based on statistical relationships estimated on historical data, a potential weakness is that they are not as well suited to significant structural changes in policy. This issue becomes quite stark in the context of climate policy, where the scale of change is largely unprecedented in outturn data. This general shortcoming of macro-econometric models over more microeconomic theory-consistent models (like CGE) is known as the Lucas Critique.

Whilst there are advantages to both modelling approaches, there is no absolute advantage of one over the other. CGE models can be used to a more granular degree and can be tailored to specific portfolio companies, whereas the 'real world' assumptions and climate stressed economic variables (e.g., interest rates) of macro-models represent some of the key strengths as an alternative approach, particularly with respect to valuations for PE firms.

In response to this, some leading industry climate modellers have developed a hybrid approach using both CGE and macro-models

(with integrated and consistent assumptions) and, whilst still nascent, may represent a more complete solution.

For physical risk, the majority of providers use overlays to the core model to factor in the realisation of acute (e.g., floods, rainstorms) and chronic (e.g., rising sea levels, drought) risks. Information tends to be provided by external providers who specialise in climate science and meteorological weather modelling and is integrated with the transition risk model component.

Physical risk modelling is commonly performed using 'damage curves' (i.e., that a certain risk event results in a given level of damage to physical assets) using replacement values of assets, whilst also considering business interruption arising from repair costs/time etc.



# Appendix 7: Tools and enablers for applying climate scenario analysis

There are several climate analytics tools that firms could draw from to support their climate scenario analysis.

## Climate Financial Risk Forum (CFRF) Climate Narrative Tool<sup>40</sup>

Established in 2019, the CFRF brings together senior financial sector representatives to share their experiences in managing climate-related risks and opportunities. The Forum has developed an online climate scenario analysis narrative tool, to support smaller firms in their journey to climate disclosure. The tool itself is free to access and leverages pre-existing data sets from the NGFS. It sets out pre-selected inputs of business activity models, products and risks of firm, and develops qualitative narratives over several scenarios. It also links to the data sets behind these qualitative narratives, and graphs relevant quantitative data.

## Network for Greening the Financial System (NGFS) Scenarios<sup>41</sup>

The NGFS scenarios explore a range of transition and physical risks and are defined as follows:

- Orderly transition risk scenarios assume that effective policy changes are introduced in a timely manner, limiting physical and transition risks.

- Net-Zero 2050 limits global warming to 1.5°C through stringent climate policies and innovation, reaching global Net-Zero CO2 emissions around 2050. Some jurisdictions such as the US, EU and Japan reach Net-Zero for all GHGs.
- Below 2°C gradually increases the stringency of climate policies, giving a 67% chance of limiting global warming to below 2°C.
- Disorderly transition risk scenarios assume that the introduction of effective policy change is delayed or divergent, leading to elevated transition risks and limited physical risks.
- Divergent Net-Zero reaches Net-Zero globally around 2050 but with higher costs in the short-term because of divergent policies being adopted across sectors leading to inefficiencies and a quicker phase out of oil use.
- Delayed transition assumes annual emissions do not decrease until 2030. Strong policies are needed to limit warming to below 2°C by 2050. CO2 removal is limited.
- Hot house world scenarios assume that some climate policies are implemented in some jurisdictions, but globally efforts are insufficient

to halt significant global warming, leading to high physical risk.

- Nationally Determined Contributions (NDCs) includes all pledged policies even if not yet implemented.
- Current Policies assumes that only currently implemented policies are preserved, leading to high physical risk.

The NGFS scenarios are generated by three Integrated Assessment Models: GCAM, MESSAGEix-GLOBIOM and REMIND-MAGPIE (covering mainly transition risks and using global databases), as well as Climate Impact Explorer developed by Climate Analytics (an online database covering certain physical risk hazards, drawing on country-specific data). The macroeconomic outputs are generated by NiGEM.

The NGFS scenarios are further detailed in the [NGFS scenario portal](#). For full details on the data used to create the graphs and charts shown in the reports see [here](#).

The [NGFS Scenario Explorer](#), hosted by International Institute for Applied Systems Analysis (IIASA), is an open-source web-based interface for transition scenarios, providing intuitive visualisations and displays of timeseries data across several formats.

It allows a user to select regions, industries and scenarios to test their own hypothesis, and dive deeper into the technical side of scenario analysis.

The [Climate Impact Explorer](#), hosted by Climate Analytics, is another open-source tool that individuals can use to visualise the broad range of physical and transition climate impacts and how they will change over time. It is built on NGFS scenarios, but has also included scenarios from Climate Action Tracker, and the RCPs used by the IPCC. It explores a broad range of indicators, like air temperature, economic damages, agriculture yields, and others, and can be selected alongside a country and a scenario. One is then able to cross reference two scenarios in the model and view the range of projected outcomes (inclusive of outliers) between the two pathways.

# Appendix 8: Metrics and Targets – other guidance materials

## SBTi guidance for PE on setting science-based targets

SBTi has provided methodologies for setting science-based targets for the private market industry<sup>42</sup> which align to the approaches of this guidance document and may be considered as a useful tool;

- **Sectoral Decarbonisation Approach** – Setting targets on an individual sector basis for portfolio companies to align their emissions reductions targets to a 2°C or 1.5°C pathway. This methodology is best suited to PE direct investments where the level of influence is higher.
- **SBT Portfolio Coverage Approach** – An engagement approach described as a ‘target of targets’, where a PE firm sets a five year target for a selected metric (e.g. GHG emissions or other metric) for portfolio companies to have set their own SBT, so that 100% of portfolio companies have set a target by 2040. This methodology is best suited to PE direct investments where the level of influence is higher.
- **Temperature Rating Approach** – The Temperature Rating Approach rates all portfolio companies with a temperature score (based on their GHG footprints and any existing GHG targets, for the PE firm to set a target to reduce their aggregated temperature to a minimum 2°C scenario for the portfolio company’s own Scope 1-3 emissions by 2040. Note that this

may be a useful tool for both direct PE firms and credit providers, as the underlying rating is independent of the funding mechanism.

## ISSB Exposure Draft detail on metrics and targets disclosures

In addition to the TCFD disclosure recommendations presented in the previous sub-section, PE firms should be aware of the forthcoming requirements that will become applicable once the ISSB standards come into force. Currently, the ISSB Exposure Draft<sup>43</sup> is prescriptive in the disclosures required from firms, including:

- Disclosure of the metrics used to manage and monitor sustainability-related risks and opportunities;
- Metrics definitions and methodologies (e.g. whether metrics are absolute or relative (intensity) based), including commentary on whether the metric has been validated (and by whom), and what the assumptions and limitations of the metrics are;
- Disclosure of targets (with interim or milestones), including the period over which the target applies and the base period from when progress is measured;
- Explanations of performance against targets with analysis of trends or significant changes in performance, with details of any revisions to targets with explanations for the revisions; and

- Explanations for any changes in metric calculation methodologies, with details of the reasons for changes, and with restated comparatives unless it is impracticable to do so.

## ESRS E1 – Additional guidance on the Metrics and Targets pillar in addition to the TCFD requirements

The below list provides an overview of the differences between ESRS E1<sup>44</sup> and the TCFD disclosure requirements with respect to metrics and targets;

- Energy consumption and mix and energy intensity per revenue required;
- More details on GHG emissions (share of Scope 1 emissions under ETS, Scope 2 emissions in market-based and location-based, calculation and presentation requirements on scope 3, distinction between removals, offsets and avoided emissions);
- More details on potential financial effects and opportunities (stranded assets, assets at physical risks, ETS liabilities, business activities at risks, market size for low-carbon solutions);
- Revenue, Capital Expenditure, Operating Expenditure deriving from the EU Taxonomy regulation;
- Specific target on GHG emission reduction and remuneration tied to this target;

- Distinction of three levels of targets: general climate-related targets, GHG emission reduction targets, and net-zero targets and other neutrality claims;
- Target values aligned with 2030 and 2050 and preferably set over five years rolling periods;
- Targets presented by decarbonisation levers;
- Use of carbon offsets excluded from GHG emission reduction targets (only included in net-zero targets under specific conditions); and
- Pathways to net-zero presentation.



# Appendix 9: Asset Manager: TCFD case studies per pillar

On the release of the TCFD, asset management was identified as one of the four financial service arms to disclose on the reporting guidance. The below appendix presents a number of examples of market leading asset managers who have embedded the pillars of the TCFD into their practices, based on their publicly available disclosed data and information.

Pillar	Summary objective	Examples	Key takeaways for PE
Governance	The asset managers governance of climate-related risks and opportunities	<p><b>Case study: Denmark, US\$18.4bn AUM</b></p> <p>A small Danish asset manager has a comprehensive governance process to oversight and embedment of climate risks and opportunities across the organisation through which the Board is informed. Accountability and oversight responsibilities are anchored in Group Policies which are applied across the organisation and across client mandates and mutual funds. A Sustainability Steering Committee is responsible for implementing the above-mentioned policies, which are anchored in more specific procedures applied to portfolio managers. The Sustainability Steering Committee meets regularly and sets the direction of the in-house ESG initiatives and principles. Represented on this committee are senior members of the executive management team, ESG specialists, portfolio managers, and Head of Legal.</p> <p>Management is responsible for identifying and monitoring climate-related risks and opportunities, and for reporting them back to the Board. Management's role is to ensure adequate resources and expertise, including staff, training, and budget, are available to assess, implement and monitor risk and opportunity measures. The asset manager has implemented a solution from a third-party specialist that enables effective climate risk assessments using decisive data and actionable intelligence on climate change risk and its impact on portfolio investments.</p>	<p>Structure of the governance system that is inclusive of a climate change mandate</p> <p>Frequency of meetings regarding climate change and what level of the organisation is chairing these meetings</p> <p>Climate change is an item on the company Board agenda</p>
		<p><b>Case study: Global, US\$9tr AUM</b></p> <p>A large global asset manager has structured a thorough governance process that is embedded across the organisation. At Board level, there is oversight of long-term climate-related strategies. The risk committee oversees climate risk on behalf of the Board, and a Global executive committee oversees investment stewardship and sustainability strategy of which climate-related risk is embedded.</p> <p>Sustainability specialist teams focus on:</p> <ul style="list-style-type: none"> <li>Investment stewardship: which focuses on engagement with client portfolio companies on climate-related governance matters and casting of proxy votes</li> <li>Sustainable investing: drive high-quality climate-related integration across investment teams</li> <li>Corporate sustainability: develops climate-related disclosures, collects and reports GHG emissions data.</li> </ul> <p>There are also broader functional climate-related responsibilities spanning investment divisions, risk and quantitative analytics, in-house climate software to help inform investment decisions, and broader enterprise services.</p>	

Pillar	Summary objective	Examples	Key takeaways for PE
<b>Strategy</b>	Potential and realised impacts of climate risks and opportunities on the asset managers portfolio companies, strategy and financial planning in forward looking planning both strategic and financial	<p><b>Case study: UK, US\$700bn AUM</b></p> <p>To help analysts and fund managers better understand the climate-related risks and opportunities within investment portfolios, this large asset manager has developed an internal toolkit, which focuses on assessment. They have also developed an in-house dashboard, which measures the speed and scale of climate action driving decarbonisation.</p> <p>This firm applies several tiers in their toolkit:</p> <ol style="list-style-type: none"> <li>1. Macro-economic climate analysis: leverages their dashboard to visualise the gap between the IEA's Current Policies and 2 Degree Scenario, through an implied temperature rating.</li> <li>2. Bottom-up investment climate analysis:             <ol style="list-style-type: none"> <li>a. A bespoke sustainability tool to measure portfolio sustainability across the assets under management. This tool provides investment teams with an estimated value for the potential sector or environmental impact of a company, which can be aggregated up to the portfolio level and compared to the fund's own benchmark.</li> <li>b. Carbon Value at Risk measures the impact of higher carbon prices on companies' earnings, modelling the impacts of higher supply chain and operating costs, assuming higher prices and consequently lower demand in each sector</li> <li>c. Hosts a customisable qualitative framework where analysis and fund managers can weight the most material environmental indicators to assess the sustainability of a company's business model</li> <li>d. Assess total portfolio holdings under external methodologies, communicating the portfolio's exposure to climate-related risks</li> <li>e. Scenario analysis to assess a portfolios to both physical and transition risks and understand the locality and severity of these risks</li> </ol> </li> <li>3. Strategic climate alignment: another bespoke tool has been developed to enable investment teams to interrogate their portfolios financed emissions and implied temperature scores in accordance with the groups SBTi targets.</li> </ol> <p>Within scenario analysis, this firm chose to use multiple climate scenarios and a third-party model to ensure transparency and interpretability. They used a CVAR model, based on IPCC RCPs to assess physical risk, and three NGFS scenarios to assess transition risk.</p> <p>To measure the exposure of holding to climate risk over time, this firm is using third-party VaR modelling, augmented by the Bank of England's early/late action and 'No additional action' scenarios.</p> <p>To leverage these results and inform future actions, this firm has committed to engaging and encouraging portfolio companies to reduce their emissions. Specifically, they are developing an ambitious engagement programme, targeting portfolio companies with high levels of carbon emissions, that have not set commitments to decarbonise, and that represent a significant allocation of client capital.</p> <p>For temperature alignment, this firm compared the temperature alignment of their AUM under two well-established external methodologies: Morgan Stanley's Warming Potential and SBTi's Temperature Rating. Morgan Stanley's model assesses the implied decarbonisation pathway of economic sectors under different temperature outcomes and uses the current carbon intensity of a company to arrive at a value for warming potential. The SBTi Temperature Rating methodology considers the current level of ambition of companies based on disclosed GHG emissions targets, translating these into a temperature score. These temperature alignment scores are then being used to direct further assessment and engagement activities across the firm.</p>	<p>Description of transition plans with scenario alignment</p> <p>Description scenario analysis methods and outcomes</p> <p>Explanation of the changes to strategy and financial planning because of identified climate-related risks and opportunities</p>

Pillar	Summary objective	Examples	Key takeaways for PE
<b>Strategy</b>	Potential and realised impacts of climate risks and opportunities on the asset managers portfolio companies, strategy and financial planning in forward looking planning both strategic and financial	<p>This firm has also committed to tracking and holding portfolio companies to account – engaging with them to reduce their own carbon emission, rather than disposing of the assets that do not immediate serve their climate goals. The firm has determined an escalation timeline, currently prioritising portfolio companies for engagement and developing engagement plans and tools. In the following 1-2 years, this firm will gradually increase their engagement, communication and concerns if goals are not met. After 2-3 years of strategic engagement, the firm will review investments that have still not met climate goals and decide whether or not to divest.</p> <p><b>Case study: Global, US\$9tr AUM</b></p> <p>A global asset manager has a progressive climate strategy and conducts in-house scenario analysis using asset-level data. The asset manager acknowledges market and regulatory shifts and customer demand for net-zero. As such, the asset manager has an adapted business strategy to consider climate risks and opportunities alongside long-term financial returns and all other matters that are material to its clients. The company has also committed to support investors prepare portfolios for a net-zero future. In summary the strategy has addressed climate-related risks and opportunities through:</p> <ul style="list-style-type: none"> <li>• Offering more sustainable investment products</li> <li>• Proxy voting on climate issues</li> <li>• Considering material climate issues in active investment decisions</li> <li>• Developing and implementing an in-house climate analytics solution with the capability to quantitatively estimate physical and transitional risks to support the investment process.</li> </ul> <p>This asset manager’s scenario analysis approach may be broken into two steps i.e., the identification of key climate-related risks and a selection of transition and physical climate scenarios to provide a range of potential future outcomes. Two scenarios per risk type were selected.</p> <p>The climate projections are converted into forecasts of sector and economic impact. The sector impacts are mapped onto the geolocations of individual companies and assets. Finally, this is translated into financial risks and temperature metrics at the portfolio level using the in-house climate risk quantification solution. This helps investors understand their exposure to climate-related risk and opportunities which enables them to make informed decisions on their investments.</p>	<p>Description of transition plans with scenario alignment</p> <p>Description scenario analysis methods and outcomes</p> <p>Explanation of the changes to strategy and financial planning because of identified climate-related risks and opportunities</p>



Pillar	Summary objective	Examples	Key takeaways for PE
<b>Risk Management</b>	The processes used by the asset manager to identify, assess and manage climate risks	<p><b>Case study: UK, US\$6bn AUM</b></p> <p>A medium-sized pension trust in the UK publicly discloses on the TCFD. Their risk management approach is clear and effective comprising the identification, assessment, monitoring and control of risk. Risks relating to climate are identified through research and impacts relating to climate change are discussed at the investment sub-group and then raised at the Trustee Board level. All risks are prioritised based on the overall threat posed which helps to generate a view of the climate-related risk posed alongside other risks faced by the Trust. The risks identification process is continuous given the fluidity of emerging risk types. The risk prioritisation process is by size, scope and materiality of the potential risk event which includes rating the risk for likelihood and impact. Where relevant, scenario analysis and calculated metrics are used to inform likelihood and impact ratings</p> <hr/> <p><b>Case study: Canada, US\$420bn AUM</b></p> <p>A large Canadian pension fund is making considerable efforts to integrate climate risk and opportunities into their investment decision-making process. The pension fund has a broad climate change programme with six workstreams of which risk management is incorporated in all and are summarised as follows:</p> <ul style="list-style-type: none"> <li>• Top-down approach factoring climate risk into the investment strategy and total portfolio design</li> <li>• Identify, assess and monitor climate risk to ensure resilience of the pension fund</li> <li>• Bottom-up approach on Active Equities and Real Assets with an enhanced climate risk review process to identify and manage key climate change issues on the most material individual assets across sectors and geographies</li> <li>• Knowledge building and raising awareness on climate risk through learning programs that enable global investment professionals to make more informed investment decisions</li> </ul>	<p>Description of the process used to identify, assess and manage climate-related risks</p> <p>Risk types considered in the organisation's climate-related risk assessments</p> <p>Detailing the risks identified especially those deemed to have a substantive impact on the organisation</p>

Pillar	Summary objective	Examples	Key takeaways for PE
<b>Metrics &amp; Targets</b>	<p>The metrics and targets used to assess and manage relevant climate-related risks and opportunities</p>	<p><b>Case study: Global, US\$9tr AUM</b></p> <p>In order to achieve net-zero, a large global asset manager notes the importance of understanding their baseline emissions today. The asset manager uses four main categories of metrics:</p> <ul style="list-style-type: none"> <li>• Business indicators with metrics on sustainable investing and investment stewardship inclusive of engagement</li> <li>• Corporate GHG emissions which covers Scope 1, 2 and relevant categories of scope 3</li> <li>• Firm level climate metrics for AUM include absolute emissions and the carbon footprints of investments the asset manager makes in corporate securities and real estate on behalf of its clients</li> <li>• Product level sustainability characteristics of investment products offered to clients at the fund level include WACI and ITR. The asset manager makes this publicly available for exchange-traded funds and mutual funds on product websites however this is dependent on the reliability of the data</li> </ul> <p>Backward-looking exposure metrics include absolute emissions of AUM which are calculated at the firm level and emissions intensity which includes a firm level carbon footprint of the AUM and a fund level WACI. The ITR is the only one forward-looking metric used and is calculated at the fund level. The asset manager notes a few challenges with the fund level metrics:</p> <ul style="list-style-type: none"> <li>• WACI: incomplete data/ asset class coverage and market movements can create noise</li> <li>• ITR: complicated metric that requires several assumptions and the methodologies vary</li> </ul> <hr/> <p><b>Case study: UK, US\$700bn AUM</b></p> <p>A large asset manager measures progress against their climate change strategy using several metrics and targets which ensures effective management to the climate-related risks and opportunities facing their business.</p> <p>As an asset manager, the greatest exposure to climate risks is in scope 3 investments category as such the accurate measurement and monitoring of financed emissions is most critical. As such, the asset manager reviews investee GHG emissions using absolute and intensity metrics and tracks the implied temperature scores.</p> <p>The asset management firm have implemented a temperature rating methodology, as per CDP-WWF model, to assess the forward-looking climate ambition of their investment portfolios which is aligned with the SBTi of which they have publicly committed to. The model calculates the implied temperature pathway of the portfolio based on the level of ambition by corporate GHG emissions reduction targets set by the firm's investee companies.</p>	<p>Disclosure of metrics and targets with methodological approach.</p> <p>Performance against a pre-determined baseline</p> <p>Substantiation of the selected target quantum and timeframe</p>

# Appendix 10: Venture Capital Case Study

## Venture Capital: South Africa, US\$100bn company net worth

A South African based VC with a portfolio of software-led businesses such as Payments and Fintech, and Edtech has recently published their first TCFD report and a goal to limit global warming to 1.5°C. This VC's objective is to grow 'value-creating' businesses that deliver digital products and services that contribute impactfully to the social and economic development of local communities and enable a wider systemic transition to low-carbon business models and circular economy.

From a governance perspective, this VC Board retains oversight of the sustainability agenda for the group which is inclusive of the climate action strategy and plan. The review and approval of business and financial plans, including sustainability targets and resource allocations are steered by relevant Board committees. The Board is supported by multiple committees, including the risk committee, the social, ethics and sustainability committee and the governance committee, to retain oversight on the progress made on the implementation of the sustainability strategy, inclusive of climate-related risks and opportunities, for the group and across the portfolio. The risk committee and the SES committee meet at least twice a year and every Board meeting includes sustainability as a standard agenda item, ensuring

the Board is informed on ESG and climate-related risks frequently, to steer on actions where needed.

Strategically, the VC aims to build a low-carbon digital portfolio which entails acquiring and building companies in sectors that enable a systemic transition to a circular economy. The VC leads in the digitisation of traditional businesses which enables a transition to a low-carbon economy. Although several of the businesses operate in high-growth markets that are particularly vulnerable to climate change, their asset-light business model also enables low physical risks to operations as digital solutions are material efficient and reduce the need for physical infrastructure and mobility. The VC actively engages their portfolio companies to develop a climate action roadmap premised on 'real world' criteria adapted to their operating contexts. Currently, the VC is undergoing group-wide alignment to a pathway that will contribute to limiting global warming to 1.5°C which includes encouraging portfolio companies to commit themselves to a net-zero pathway. To achieve this outcome, they are in the process of setting multiyear GHG reduction targets that will drive the ambition, which will be published in the next TCFD report. They are also driving their portfolio companies to set their own science-based targets, which is the main pillar of the group-wide climate transition plan.

For a VC starting out on their climate journey, a great deal of time has been invested in identifying and articulating the risks and opportunities faced by the organisation. The responsibility for the identification and assessment of climate-related risks lies with the global head of sustainability who provides regular updates on progress to the executive management team and the Board. The management of the risk lies with each portfolio company with support and oversight provided at the corporate level. In summary, the VC's business model allows for businesses in climate prone regions to thrive and that are also ready to capture opportunities of the transition to a low-carbon future. At this stage, detailed quantitative and qualitative climate risk assessments have been completed for the identified transitional and physical risks which is inclusive of the impact and likelihood rating and the time horizon. Quantitative methods include carbon pricing scenario analysis to 2050 using OECD and IEA models and for physical risk exposures using the RCPs for low, medium and high mitigation scenarios. The data inputs were blended with internal company datasets and complemented with third-party data to fill data gaps. Pursuing climate-related opportunities is at the core of the VC's capital allocation decision model, which is governed by their Responsible Investment guidelines. Their TCFD report discloses their material opportunities identified from both a transition and response

to impacts from physical climate change. A similar approach to the qualitative climate risk assessment is taken on the assessment of climate opportunities.

The VC discloses Scope 1 and 2 emissions for corporate level and for majority-owned portfolio companies. Scope 3 emissions (categories 1 – 7) are also disclosed at the corporate level. All investees have committed themselves to being carbon-neutral since FY21 which is recognised by the VC as an important first step to develop a thorough practice of carbon measurement and accounting that underpins setting of net-zero targets across the group. Submission of a corporate SBT to the SBTi is aligned to the company's aspiration to net-zero but also to show leadership to the portfolio companies when engaging them to do the same.



# Appendix 11: Per pillar considerations per asset class

	Governance	Strategy	Risk Management	Metrics and Targets
Private Credit	<ul style="list-style-type: none"> <li>• Predominantly aligned to PE firms with direct investments.</li> <li>• For firms without designated ESG teams, climate-related responsibilities should be close to the core of the business – this may be credit modelling.</li> </ul>	<ul style="list-style-type: none"> <li>• Time frames to align to credit periods and potential periods for sequential loans.</li> <li>• Levels of engagement to leverage relationships with direct PE investors and sponsors where possible.</li> <li>• Climate considerations may be incorporated into product structuring, such as sustainability ratchets and loans for sustainability purposes / projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Climate considerations may to be brought into credit processes and controls.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional metrics and targets on the proportion of credit risk driven by climate change.</li> <li>• Spread of credit ratings because of climate change (under different scenarios)</li> <li>• Number of loans or equity arrangements which include a sustainability mechanism</li> <li>• Predominantly aligned to PE firms with direct investments.</li> </ul>
Venture Capital	<ul style="list-style-type: none"> <li>• Predominantly aligned to PE firms with direct investments.</li> </ul>	<ul style="list-style-type: none"> <li>• Setting pre-determined guiderails for funding ventures in higher emitting sectors.</li> </ul>	<ul style="list-style-type: none"> <li>• Predominantly aligned to PE firms with direct investments.</li> </ul>	<ul style="list-style-type: none"> <li>• As per private credit items above</li> <li>• Develop metrics to assess portfolio companies against during the due diligence process to set expectations and maintain consistency between investments from the start</li> </ul>
Fund of funds or Secondaries	<ul style="list-style-type: none"> <li>• Predominantly aligned to PE firms with direct investments, with increased focus on those charged with the selection and monitoring of GPs.</li> </ul>	<ul style="list-style-type: none"> <li>• Analysis to be performed on GPs including their approach to climate considerations and selection of sectors.</li> <li>• Influence GPs where possible to encourage climate action.</li> </ul>	<ul style="list-style-type: none"> <li>• Climate considerations need to be considered in the processes and controls for the selection and monitoring of GPs</li> </ul>	<ul style="list-style-type: none"> <li>• ITR on a GP level basis may be considered.</li> </ul>

# Appendix 12: Research methodology

As an initial stage of this report and research, a survey was designed by iCI, with input and edits from KPMG UK. The survey was created in Microsoft Forms and distributed via email to iCI and BVCA members. The survey had 55 respondents.

The survey included 28 questions, which can broadly be categorised into:

- Firm information (geography, AUM, asset classes, GP/LP),
- Current state of TCFD engagement (does your firm report in line with TCFD, are you in scope for FCA?)
- Governance (assigning responsibility for climate-related financial risks at the Board and Management levels)
- Strategy (using scenario analysis to understand the potential impacts of climate risks and opportunities)
- Risk Management (factoring climate risk into usual risk assessment processes)
- Metrics and Targets (setting Scope 1, 2, and 3 targets)
- Suggestions for use for this guidance (top challenges facing PE firms)



# Appendix 13: Key contacts in connection with this guide



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