

In collaboration  
with PwC



# How to Set Up Effective Climate Governance on Corporate Boards

## Guiding Principles and Questions

INSIGHT REPORT

JANUARY 2019



# Contents

Foreword	3
Executive summary	4
1 Global context	5
2 Climate Governance Principles and Guiding Questions	10
Outlook and conclusion	20
Appendices	21
A1 Legal perspective	21
A2 Investor perspective	22
A3 Design of the principles and consultation process	23
A4 Glossary of terms	25
Contributors	28
Endnotes	29

## Disclaimer

This document is published by the World Economic Forum as a contribution to a project, insight area or interaction. The findings, interpretations and conclusions expressed herein are a result of a collaborative process facilitated and endorsed by the World Economic Forum but whose results do not necessarily represent the views of the World Economic Forum, nor the entirety of its Members, Partners or other stakeholders.

© 2023 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system.

# Foreword



**Dominic Waughray**  
Managing Director, Centre for  
Global Public Goods, Member  
of the Managing Board, World  
Economic Forum



**Jon Williams**  
Partner, Sustainability and  
Climate Change, PwC

Climate change is visibly disrupting business. It is driving unprecedented physical impacts, such as rising sea levels and increased frequency of extreme weather events. At the same time, policy and technology changes that seek to limit warming and reduce the associated physical impacts can also cause disruption to business. As with any form of disruption, climate change is creating and will continue to create risks and opportunities for business in a diverse number of ways.

This disruptive relationship between climate change and business is already receiving increased attention. This has been prompted by the Paris Agreement, the emergence of climate-related legislation, the recommendations of the Financial Stability Board's Task Force on Climate-Related Financial Disclosures (TCFD) and, most recently, the heightened awareness of physical impacts and risks detailed in the Special Report of the Intergovernmental Panel on Climate Change (IPCC) on Global Warming 1.5°C.

In light of this attention, investors, regulators and other stakeholders are challenging companies to

demonstrate an integrated, strategic approach to addressing climate-change risks and opportunities. An important element in ensuring that climate risks and opportunities are appropriately addressed is the important duty that boards of directors have for long-term stewardship of the companies they oversee. However, to govern climate risks and opportunities effectively, boards need to be equipped with the right tools to make the best possible decisions for the long-term resilience of their organizations.

The goal of this work is to propose tools that can be useful for the board of directors to steer climate risks and opportunities: the governance principles are designed to increase directors' climate awareness, embed climate considerations into board structures and processes and improve navigation of the risks and opportunities that climate change poses to business. By providing a compass to enable more effective climate governance, this initiative strives to contribute to the Forum's Compact for responsive and responsible leadership and to sound an urgent call to action for purposeful stewardship from and for the most prominent custodians in corporations: their board of directors.



**The vision and action of Directors, CEOs and senior-level executives is fundamental to addressing the risks posed by climate change and delivering a smooth transition to a low-carbon economy. Materials, such as this new World Economic Forum report, that support Boards and Executives understand how to deliver on the TCFD can help foster a virtuous circle of adoption, where more and better information creates imperatives for others to adopt TCFD and for everyone to up their game in terms of the quality of the disclosures made.**

Mark Carney, Governor, Bank of England; Former Chair, Financial Stability Board

# Executive summary



**As business leaders, we have an important role to play in ensuring transparency around climate-related risks and opportunities, and I encourage a united effort to improve climate governance and disclosure across sectors and regions.**

Bob Moritz, Global Chairman, PwC

The links between climate change and business are becoming increasingly evident and inextricable. Business decisions and actions will slow or accelerate climate change, and climate change will drive risks and opportunities for business. Increasingly, board directors are expected to ensure that climate-related risks and opportunities are appropriately addressed. However, limited practical guidance is available to help board directors understand their role in addressing these risks and opportunities.

On the one hand, good governance should intrinsically include effective climate governance. To this point, climate change is simply another issue that drives financial risk and opportunity, which boards inherently have the duty to address with the same rigour as any other board topic. On the other hand, climate change is a new and complex issue for many boards that entails grappling with scientific, macroeconomic and policy uncertainties across broad time scales and beyond board terms. In this regard, general governance guidance is not necessarily sufficiently detailed or nuanced for effective board governance of climate issues.

This work seeks to provide useful guidance to boards, acknowledging that climate governance is both integral to basic good governance and fraught with complexity. The result is a set of principles and questions to guide the development of good climate governance – designed to help the reader practically assess and debate their organization’s approach to climate governance and frame their thinking about how the latter could be made more robust.

The principles and guidance build on existing corporate governance frameworks, such as the International Corporate Governance Network’s (ICGN) Global Governance Principles, as well as other climate risk and resilience guidelines, such as the recommendations of the Financial Stability Board’s Task Force on Climate-Related Financial Disclosures (TCFD). The drafting process involved extensive consultation with over 50 executive and non-executive board directors, as well as important organizational decision-makers, including chief executives, and financial and risk officers. Input was also gained from experts from professional and not-for profit organizations. This consultation took place through a series of face-to-face and phone

interviews over the course of four months, helping to shape and test the principles and guiding questions.

This report opens with details on the global climate context, addressing changing regulations and increasing expectations of boards in the climate arena. The bulk of the report presents the eight climate governance principles and their associated guidance. The eight principles are not presented in order of priority or in a fixed sequence, but do follow a logical flow and build upon each other. For example, principles 1–4 lay the foundation for Principle 5, and principles 6–8 help facilitate the endurance of attention to climate-change issues in the long term. To make these principles practical and applicable, each principle is accompanied by a set of guiding questions that will help a company identify and fill potential gaps in its current approach to governing climate. The report is also supported by chapters that provide additional technical legal and investor context in the Appendix.

- Principle 1 – Climate accountability on boards
- Principle 2 – Command of the subject
- Principle 3 – Board structure
- Principle 4 – Material risk and opportunity assessment
- Principle 5 – Strategic integration
- Principle 6 – Incentivization
- Principle 7 – Reporting and disclosure
- Principle 8 – Exchange

This initiative sought to make these principles both broadly applicable and practically useful for organizations. However, these principles should not be taken as universally applicable to all companies across sectors and jurisdictions. Moreover, they do not intend to be specifically prescriptive in any way. Rather, the hope is that they will serve as tools to help elevate the strategic climate debate and drive holistic decision-making that includes careful consideration of the links between climate change and business.

1

# Global context

Effective governance and standardized disclosures are essential for managing climate-related financial risks and opportunities.



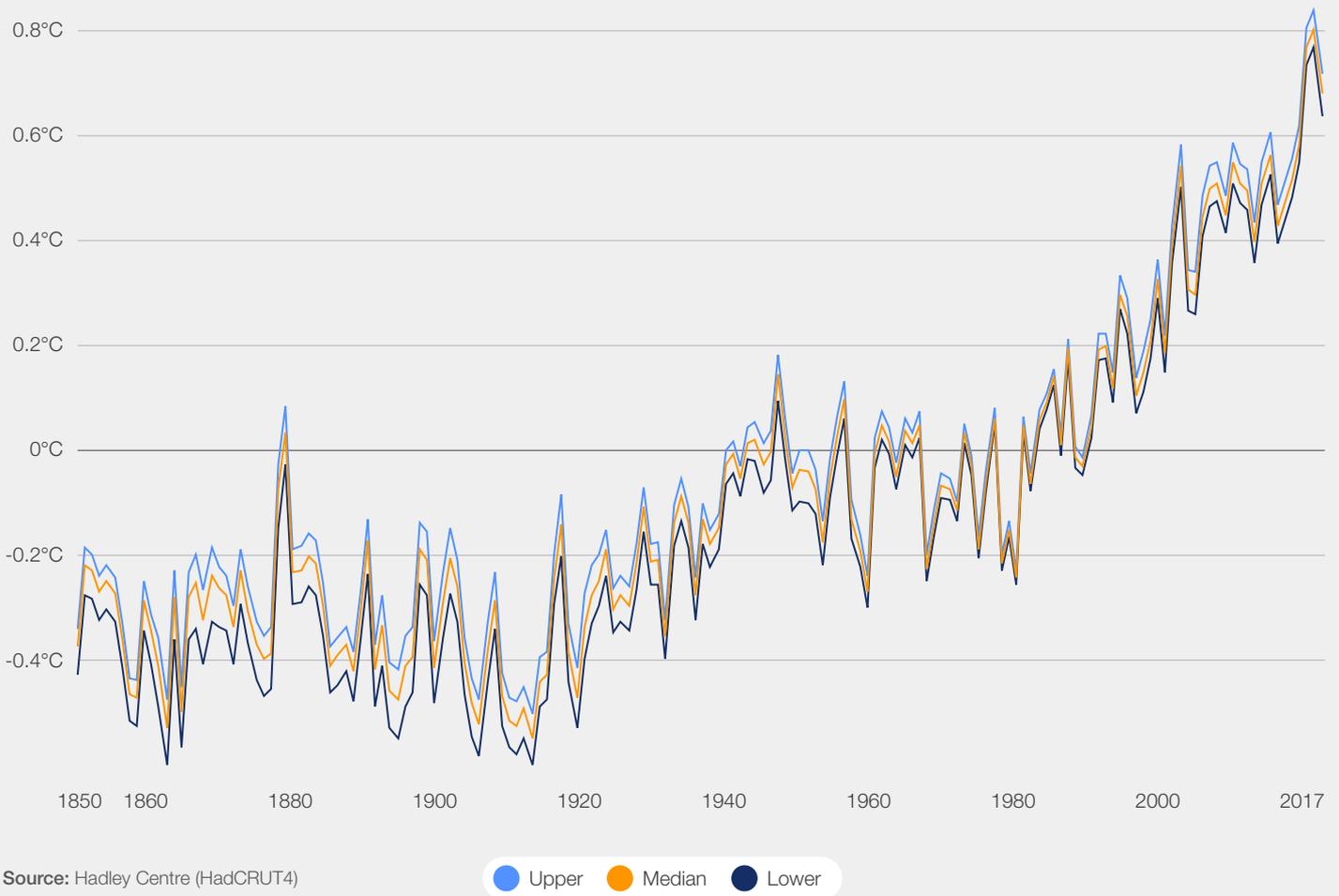
# 1.1 Climate policy, science and economics

Leaders from 184 nations have ratified the Paris Agreement and pledged to take action to keep global temperature rise “well below” 2°C above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C. This agreement is the outcome of more than two decades of diplomacy and serves as a landmark in signalling a global transition to a low-carbon economy.

The agreement came into force on 4 November 2016. To date, it has been ratified by 184 Party

countries<sup>1</sup>. These countries are now in the process of implementing their national climate plans (known as nationally determined contributions or “NDCs”) that they submitted voluntarily under the Paris Agreement. Implementation of these NDCs requires countries to enact policies and legislation to curb emissions. Under the Paris Agreement, countries are also expected to “ratchet up” the ambition of their NDCs over time to stay well below the **2°C warming limit** (current NDCs limit warming to only 2.6°C–3.2°C),<sup>2</sup> see glossary for details.

FIGURE 1 Global temperature anomaly from 1850-1990 average



Despite the Paris ambitions and latest warnings<sup>3</sup> of catastrophes associated with 1.5°C of warming<sup>4</sup>, global temperatures continue to rise, as seen in Figure 1. Without swift economic transformation, chances of keeping warming below 2°C diminish and risks of physical climate-change impacts increase.<sup>5</sup>

Many of these impacts are already being seen, including increased incidents of heatwaves, fires, storms and flooding.<sup>6</sup> In fact, financial losses from extreme weather events in 2017 reached an all-time annual record of \$320 billion.<sup>7</sup>

In light of this scientific and economic evidence, many risk experts and business leaders are beginning to understand the diversity and seriousness of the risks climate change will pose. In fact, over the past five years, corporate leaders have consistently rated climate change and extreme weather as the top macroeconomic risks over the next ten years in terms of both impact and likelihood in the World Economic Forum’s annual Global Risks Report<sup>8</sup> (see Figure 2).

FIGURE 2 | Global Risk Map 2009-2019 (Impact)



Source: World Economic Forum, *Global Risks Report*, 2019

It is estimated that between now and 2100, the [potential financial losses](#) arising from climate change could run from \$4.2 trillion to as much as \$43 trillion<sup>9</sup>, versus a total global stock of manageable assets

worth \$143 trillion. At the same time, climate-change adaptation and mitigation are also predicted to generate [investment opportunities](#) worth up to \$26 trillion between now and 2030.<sup>10</sup>



## 1.2 Disclosure, regulatory and investor trends and the implications for business

Despite the growing recognition that climate change will cause disruption to business as usual, reliable information detailing how companies manage climate-related risks and opportunities has been “hard to find, inconsistent and fragmented”.<sup>11</sup>

In response to this, the Financial Stability Board established the Task Force on Climate-Related Financial Disclosures (TCFD) in 2015 to develop guidance for companies in disclosing clear, comparable and consistent information on the financial risks and opportunities presented by climate change. The final recommendations, released in June 2017, were designed to mainstream consideration of climate risk into business and investment decision-making to facilitate efficient allocation of capital and to enable a smooth transition to a low-carbon economy.

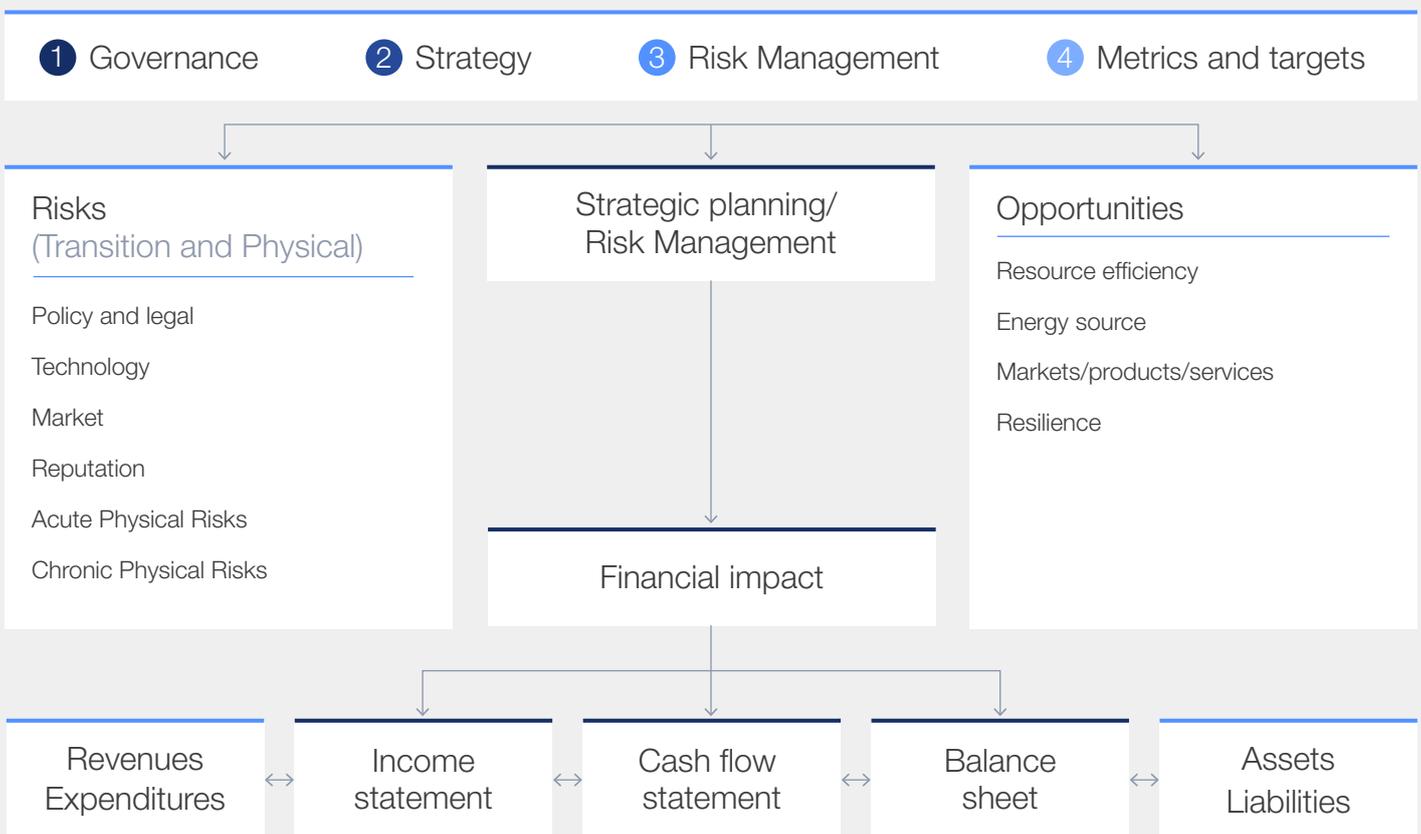
The recommendations categorize the climate risks into: transition risks (risks that arise from the transition to a low-carbon economy such as policy shifts) and physical risks (risks that arise from the physical impacts of a changing climate such as increased extreme weather events).

The TCFD also recognizes the business opportunities associated with the transition to a low-carbon economy and adaptation to the impacts of climate change.

The TCFD emphasizes governance as a foundational building block of effective climate risk and opportunity management. Without effective climate governance structures in place, a company will struggle to make climate-informed strategic decisions, manage climate-related risks and establish and track climate-related metrics and targets in the short, medium or long term.

As of September 2018, the recommendations of the TCFD had received widespread business support from over 500 organizations, including 457 companies with a combined market capitalization of \$7.9 trillion. Within this, there are 287 financial services firms responsible for assets of nearly \$100 trillion, equivalent to more than 50% of the global capital markets.<sup>12</sup> Moreover, according to the 2018 TCFD status report, the World Federation of Exchanges is taking the TCFD recommendations into account in revising its Environmental, Social and Governance (ESG) Guidance & Metrics.<sup>13</sup>

FIGURE 3 Climate-related risks, opportunities and financial impact (according to TCFD)



Source: Task Force on Climate-Related Financial Disclosures (TCFD), 2017

Despite the fact that disclosure against the recommendations of the TCFD remains voluntary, mandatory disclosure of climate risk is emerging as a vital area of regulatory focus. Regulators, listing authorities and public companies in many major jurisdictions, have expressed support for the TCFD recommendations as a useful framework for disclosure and are paying close attention to their uptake.<sup>14</sup> Appendix 1 provides further details on climate-change regulation and disclosure of climate risks.

Investors are also scrutinizing companies' efforts to manage climate-related risks and opportunities. This is driven by a recognition that climate change will have inevitable impacts on investment returns, and that investors need to consider climate change as a new

return variable.<sup>15</sup> The world's largest asset managers are putting particular emphasis on climate-smart governance for their portfolio companies. For instance, BlackRock expects their corporate boards to have "demonstrable fluency in how climate risk affects the business and management's approach to adapting the long-term strategy and mitigating the risk".<sup>16</sup>

State Street Global Advisors issued a Climate Change Risk Oversight Framework for Corporate Directors, setting out its expectations that corporate board members evaluate climate risk and preparedness.<sup>17</sup> Pension funds are also increasingly focusing on effective climate governance. Appendix 2 provides further details on the investor perspective and expectations.

## 1.3 Implications for corporate boards

“ <<long quote>> should be between 100 and 175 characters like this one, and should come directly from the text on the related page, should be between 100 and 175 characters.”

While current disclosure, regulatory and investor trends are driving increased corporate attention to climate change, many boards are struggling to address the related risks and opportunities in a holistic way. The executive and non-executive directors interviewed for this report gave a variety of reason for this, which can be broadly summarized as follows:

- **Competing priorities** – Climate competes with a plethora of other emerging and strategic risks that must be addressed by the board (e.g. industry change, technology and business-model disruption, changing global economic conditions, cybersecurity etc.). Boards have limited time and capacity to equally review and address all of these strategic topics.
- **Complexity of climate change** – Climate change is a complex and inherently systemic issue. The risks are diverse, uncertain and often not yet visible in some markets. Moreover, the extent of the impacts will depend on important external drivers such as the emergence of disruptive technologies and climate regulation, which are particularly difficult to model. This makes climate change an extremely difficult risk and opportunity to manage.
- **Short-term time horizon and focus** – Companies are under constant pressure to deliver short-term results, to meet investor

expectations on a quarterly basis. Climate change poses longer-term risks that extend beyond the considerations of the typical business planning cycle, a phenomenon Bank of England Governor Mark Carney coined as the "Tragedy of the Horizon".<sup>18</sup>

In addition to, and despite these challenges, board directors are faced with a fundamental principle: they have a duty to understand and prudently manage the potential risks and threats of the companies they oversee, no matter what the time horizon. Failure to act on and disclose relevant risks or threats may expose them or their companies to legal action (see Appendix 1 for details).

Yet there remains a dearth of guidance to assist directors in their duty to understand and act on climate change. Aware of this gap, this report offers guiding principles and questions as a foundational framework for organizations seeking to effectively govern climate-related risks and opportunities. The principles are intended to enhance the discussions on climate competence of directors to the extent that climate risk considerations become embedded in normal board processes. This should enable better-informed investment decision-making, more systemic thinking and an integrated approach to crafting and implementing business strategy that is informed by consideration of climate impacts in both the short and long term.

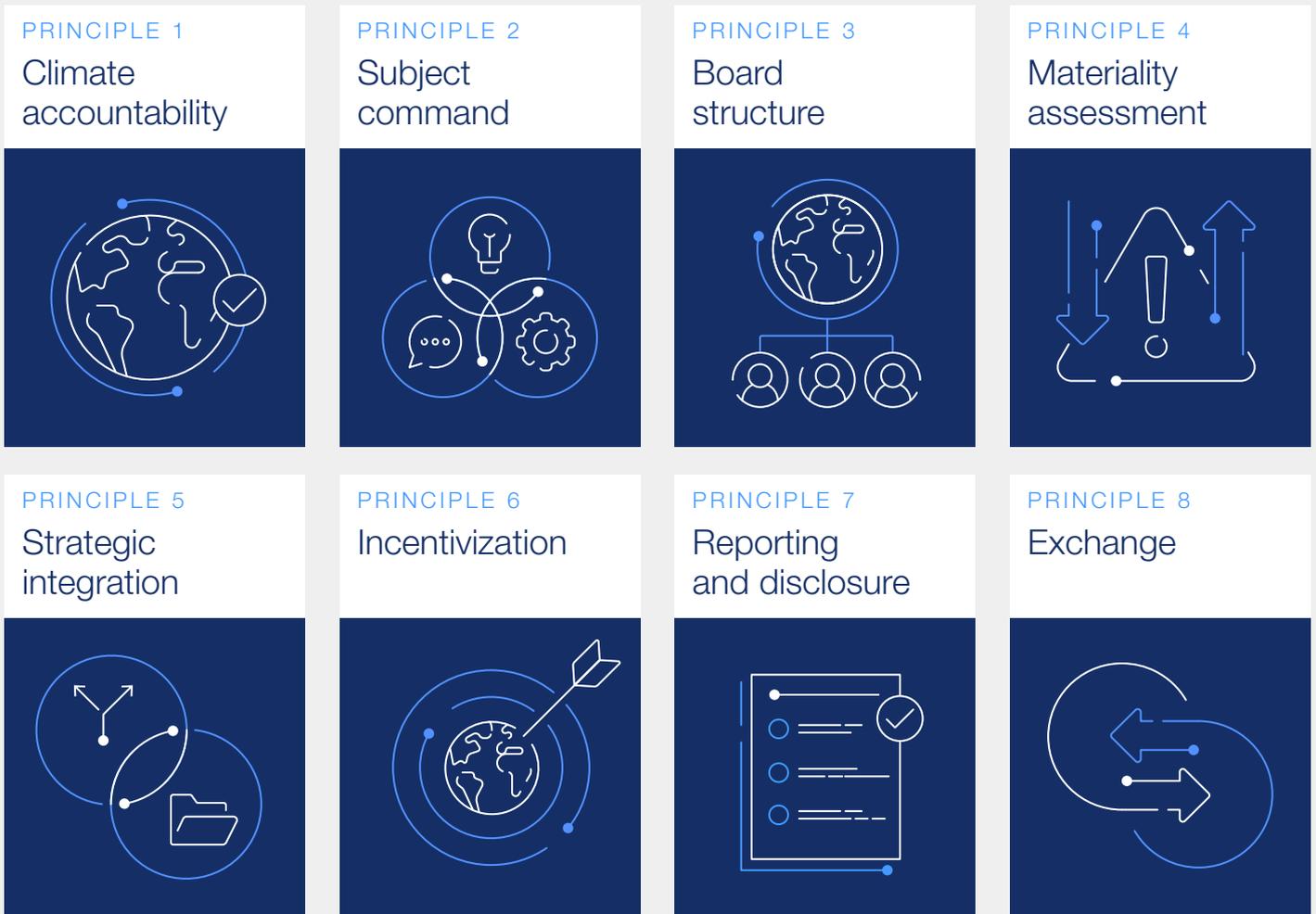
2

# Climate Governance Principles and Guiding Questions

Eight guiding principles for climate governance vary across sectors and there is no universal solution.



FIGURE 4 | Guiding principles for effective climate governance on corporate boards





**PRINCIPLE 1**

## Climate accountability on boards

The board is ultimately accountable to shareholders for the long-term stewardship of the company. Accordingly, the board should be accountable for the company's long-term resilience with respect to potential shifts in the business landscape that may result from climate change. Failure to do so may constitute a breach of directors' duties.

*For details on director duties and trends in climate-change regulation and litigation, see Appendix 1.*

Given that the board is accountable to shareholders for the long-term health of the organization it governs, the board should also be responsible to shareholders for overseeing effective management of climate-related risks and opportunities. As a foreseeable financial issue within mainstream investment and planning horizons, climate change should enliven directors' governance duties in the same way as any other issue presenting financial risks.

The inherent uncertainty associated with how climate change will affect any organization makes it a challenging risk and opportunity for board directors to effectively govern. For example, the Paris Agreement signals a transition to a net zero emissions economy in the second half of the 21st century, whereas current domestic policies signal a much slower transition in most cases. While the information that directors have available is far from perfect, they remain accountable for identifying potential risks and opportunities and using the best available information to make informed decisions that will leave their companies resilient in the face of a variety of different policy and economic outcomes.

## Guiding questions

1. Do your board directors consider the risks and opportunities associated with climate change to be an integral part of their accountability for the long-term stewardship of the organization?
2. To what extent are climate risks and opportunities incorporated into your board's understanding of directors' duties?
3. Do your board directors undertake decisions that are informed by the best available information on climate risks and opportunities (see Principle 4)?
4. Do your directors feel confident in their abilities to explain their decisions as informed by the best available information on climate risks and opportunities?
5. Does the board conduct internal performance reviews? Is accountability for climate risks and opportunities considered during internal evaluations of the board?
6. Are independent performance audits undertaken? If so, do these include climate considerations?



**Climate change is one of the most urgent challenges facing the world today. With a mere twelve years to save the planet, now is the time for corporate directors to step up, be courageous and ensure the long-term resilience of their organisations for the good of society through effective climate governance.**

Katherine Garrett-Cox, Chief Executive Officer, Gulf International Bank UK;  
Member of the Supervisory Board, Deutsche Bank





## PRINCIPLE 2

# Command of the (climate) subject

The board should ensure that its composition is sufficiently diverse in knowledge, skills, experience and background to effectively debate and take decisions informed by an awareness and understanding of climate-related threats and opportunities.

Climate change is a disruptor to business as usual. As with any form of disruption, boards should be composed of directors who collectively have sufficient awareness and understanding of the ways in which climate change may affect the business. Sufficient awareness at the board level will also set the tone for the organization and drive greater awareness for senior management and staff.

Executive and non-executive directors can contribute to good climate governance in different ways. While non-executive directors are not operationally responsible for the business, they may bring specific knowledge to certain subject matter or perspectives in relation to the risks and opportunities of climate change. Executive directors, on the other hand, are operationally accountable and should have greater insight into how climate risks and opportunities are managed within the organization:

### Board composition and agenda

1. To what extent does your board have a robust awareness and understanding of how climate change may affect the company?
2. What steps has your board taken to test that its composition allows for informed and differentiated debate as well as objective decision-making on climate issues?
3. Has an assessment of climate-competence gaps taken place? If so, who is conducting such gap analysis and what recommendations does it contain?

4. Who is responsible for climate change at board level and are these individuals in positions that will allow them to influence board decisions (e.g. committee chairs)?

### Maintaining and enhancing climate competence

Even once a board has a sufficient composition of directors who bring the required skills to address climate at the company, measures should be taken to maintain and enhance the board's command of the subject – to further diversify the perspectives and allow for richer discussions and reviews on climate issues:

5. What steps is your board taking to ensure it remains sufficiently educated about the relevant climate-related risks and opportunities for its business?
6. Has your board considered whether it would benefit from the *advice of external experts*? If so, has the board considered which experts would be most well suited?
7. How can your board plan for succession to ensure that climate awareness does not stop if an important individual or a vocal climate champion leaves the organization or the board? What kind of skills do you incorporate into the desired profile for a new board director?



**It took us much too long – more than 30 years – to bring women on boards, we cannot afford losing another 30 years before climate gets on the board agenda.**

David Crane, former CEO of NRG Energy and B-team Leader



## PRINCIPLE 3

# Board structure

As the stewards for long-term performance and resilience, the board should determine the most effective way to integrate climate considerations into its structure and committees.

To maintain oversight of the company's climate resilience and governance, a board should determine how to most effectively embed climate into its board and committee structures.

Given that board structures vary across jurisdictions (e.g. one-tier vs two-tier boards – see glossary for definition), there are numerous ways to embed climate into these structures. Regardless of the board structure, the approach to embedding climate considerations should enable sufficient attention and scrutiny to climate as a financial risk and opportunity. The selected structure should also allow for effective connection and communication with the relevant members of the executive management.

### Guiding questions

1. Has your board determined how to effectively integrate climate considerations into the board committee structures? Are they integrated into (an) existing committee(s)? Or, are they

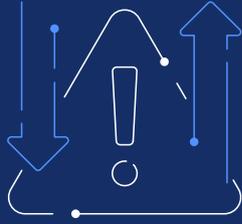
addressed by a dedicated specific climate/sustainability committee?

2. How does your board ensure that climate considerations are given sufficient attention across the board (e.g. being discussed in the audit, risk, nomination or remuneration committees)?
3. How can executive and non-executive directors play *complementary* roles in meeting the board's accountability with regards to climate?
4. Has the way your board embedded climate allow for effective interaction with relevant members of the *executive management* (e.g. if climate is embedded in the risk committee, does this committee ensure that climate is also addressed by the Chief Risk Officer)?
5. Has the board considered appointing a climate expert, or creating an informal or ad-hoc climate advisory committee of internal and external experts?



**As climate change presents an unprecedented challenge to our society and businesses, we need all hands on deck to steer our companies through what needs to be an orderly transition. Committed Boards can play a crucial role to make the 2015 Paris commitments a reality.**

Emma Marcegaglia, Chairman of the Board, Eni



## PRINCIPLE 4

# Material risk and opportunity assessment

The board should ensure that management assesses the short-, medium- and long-term materiality of climate-related risks and opportunities for the company on an ongoing basis. The board should further ensure that the organization's actions and responses to climate are proportionate to the materiality of climate to the company.

### Assessment purpose

Climate change has the potential to drive **material** (see glossary for definition) impacts for any type of company. However, the materiality of these impacts will be unique to each company, depending on a number of factors, including sector, size and jurisdiction of operation. Therefore, the materiality of climate-related risk and opportunities in the short, medium and long term should be assessed at the company and understood by the board. This materiality should then inform the level of action and response to climate change at the company:

1. Is climate considered in *company-wide* assessments of material *risks and opportunities* in the short, medium and long term?
2. How does your board verify that the company has embedded effective materiality assessment processes in relation to climate risks and opportunities?
3. How does your board ensure that the company's response to climate change is aligned to the materiality and proportionality of the issue to the business?

### Assessment process: time horizons and scenario analysis

As climate change is expected to affect the business landscape over a longer term than most typical company budgeting and reporting cycles, it can lead some companies to overlook risks or opportunities that may become material in the medium to long term.

4. Are short-, medium- and long-term time frames considered in materiality assessments at your organization? Are the definitions of these time frames appropriate for your organization specifically (depending on the sector, size, investment time frames etc. of your organization)?
5. How are climate-related materiality assessments conducted? Are they integrated into budget or operating cycle planning?

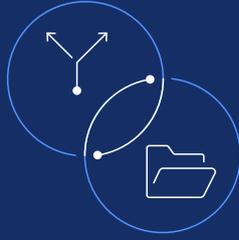
Given the highly uncertain and variable nature of how climate change will affect the business landscape over these time frames (in terms of policy, technology, extreme weather etc.), materiality assessments should contain **scenario analyses** (see glossary for definition) to understand potential major business risks and opportunities under different time horizons and climate outcomes. These materiality assessments and scenarios should be updated sufficiently frequently and on an ongoing basis.<sup>19</sup>

6. Are different climate scenarios being included to inform the assessment of climate change materiality at your organization?
7. How often are climate-related scenario analyses repeated? Does your board feel this frequency is proportionate to the climate risk exposure of the company (i.e. do they take place sufficiently frequently)? Do your investors share the board view?
8. Are climate scenarios conducted in such a way that the results can be used to inform the company's or board's action or response to climate issues?



**A reliable and universal carbon price would substantially advance the climate debates in board and executive rooms.**

Alison Martin, Group Chief Risk Officer, Zurich Insurance Group



## PRINCIPLE 5

# Strategic and organizational integration

The board should ensure that climate systemically informs strategic investment planning and decision-making processes and is embedded into the management of risk and opportunities across the organization.

## Integration into strategic decision-making

Once the board is aware of the extent to which climate change might drive *material risks* and opportunities for its operations, it can begin to integrate climate-change considerations into the organization's strategy.

How a company positions itself on short-term decisions (e.g. investment project decisions) will have long-term and potentially profound implications for the resilience of the organization. When decisions with long-term implications are taken without consideration of how climate might alter the future business landscape, they may be taken with no explicit regard for important risks. Moreover, the long-term resilience of an organization may require fundamental, strategic changes in some organizations' business models, which will take significant time to be implemented.

Given the highly uncertain and variable nature of how climate change will affect the business landscape over different time frames, strategic decision-making should be informed by **scenario analyses** (for further details see the glossary) and the results of these scenarios integrated into strategic planning decisions. Boards should be confident that the strategic decisions they take will not compromise the resilience of the organization under any future climate scenario.

1. Does your corporate strategy include a holistic climate strategy informed by scenario analysis,

i.e. climate risk mitigation and adaptation as well as business continuity and opportunities?

2. Are climate considerations incorporated into the strategic planning, business models, financial planning and other decision-making processes?

## Organizational integration

Climate considerations should be integrated across the organization – particularly, into the firm's "**three lines of defence**"<sup>20</sup> (see glossary) – to help identify and allocate coordinated ownership for climate risks and improve the quality of reporting to the board.

3. Is climate integrated into the "three lines of defence" and the Enterprise Risk Framework (ERM) for the company?

Further, the board should feel confident that the organization is positioned to effectively identify, mitigate, manage and monitor material climate-related risks. Executive directors will have a more involved role to play in organizational integration.

4. How does the board ensure that climate risks and opportunities are identified, mitigated, managed and monitored across the company?
5. Does the board feel confident that sufficient resources (e.g. staff, technology) have been dedicated to the identification, mitigation, management and monitoring of material climate-related risks?



**If investors challenge your climate strategy that suggests it is not deeply enough embedded in your corporate strategy.**

Ann-Kristin Achleitner, Member of the supervisory boards of Engie, Deutsche Börse, Linde and Munich Re



## PRINCIPLE 6

# Incentivization

The board should ensure that executive incentives are aligned to promote the long-term prosperity of the company. The board may want to consider including climate-related targets and indicators in their executive incentive schemes, where appropriate. In markets where it is commonplace to extend variable incentives to non-executive directors, a similar approach can be considered.

## Integration of climate incentives

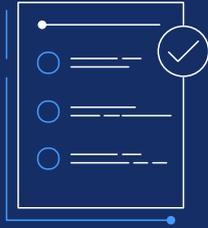
Incentivization should be designed to align the interests of executive directors to the long-term health and resilience of the company. Given that corporate management is typically incentivized on a vast number of topics, the board should consider how incentivization in regards to climate issues could be integrated into the existing incentives. In some cases, companies may be required to reassess current management schemes to ensure that incentives are not offered for inappropriate risks that put the future value of the company in jeopardy.<sup>21</sup>

1. Is the company's management incentivization scheme designed to promote and reward sustainable value creation over time?
2. Are any climate targets and/or goals integrated into management's incentivization model?
3. If so, how do these targets and/or goals relate to other management incentives? Are there any inconsistencies or contradictions in relation to the other incentives?
4. If variable incentives are extended to non-executive directors, do these include incentives related to climate and avoid potential conflicts of interest?

## Assessment of climate incentives

Companies have begun to include climate-related targets and indicators, such as carbon emissions indicators or external ESG (environmental, social, governance) ratings in their management incentive schemes. The appropriateness and applicability of climate-related targets and indicators will vary from company to company, depending on a number of factors, including the *materiality* of climate change to the company (see Principle 4). If implementing incentives tied to targets or indicators, organizations should seek to make them appropriate, proportionate and specific to each organization. The effectiveness of targets and indicators should be carefully considered before implementation and be monitored after implementation to assess suitability.

5. Which climate KPIs (key performance indicators), targets, goals and/or achievements does the board incorporate into the management incentivization models (e.g. related to carbon emissions, science-based targets or inclusion in climate indices)?
6. What are the benefits and limitations of using these KPIs, targets, goals and achievements?
7. How does the board assess the suitability (ex ante) and measure the effectiveness (ex post) of climate-based performance incentives?



## PRINCIPLE 7

# Reporting and disclosure

The board should ensure that material climate-related risks, opportunities and strategic decisions are consistently and transparently disclosed to all stakeholders – particularly to investors and, where required, regulators. Such disclosures should be made in financial filings, such as annual reports and accounts, and be subject to the same disclosure governance as financial reporting.

## Voluntary vs mandatory disclosure

When integrating climate considerations into disclosures, companies should incorporate mandatory requirements and voluntary climate-related reporting frameworks, such as the recommendations of the TCFD. In many jurisdictions, existing company and securities laws already require companies to report on climate change where it is a material financial risk to their business.<sup>22</sup> (see Appendix 1 for details).

1. Does your organization report on the material financial risks and opportunities associated with climate change?
2. Does your organization operate in jurisdictions with *mandatory* climate-related reporting? Is the board aware and informed about *potential* mandatory climate-related reporting requirements?
3. Does the organization report against relevant *voluntary* climate-related reporting frameworks in your jurisdiction (e.g. CDP, TCFD)? If not, has the board considered the potential risks associated with failing to do so (see Appendix 1)?
4. How does your board hold management accountable for implementing the regulatory requirements for climate-relevant disclosure and for maintaining oversight of emerging regulation?
5. How does your board fulfil its duty in relation to the signing or attestation of its climate disclosures in annual reports or financial filings (see Principle 1 and Appendix 1)?

## How and what to disclose?

Some companies express apprehension about disclosing climate-related information. This is driven mainly by concerns that detailed disclosures could reveal commercially sensitive information or make the company vulnerable to future legal action. In fact,

accurate and decision-useful climate disclosures made to investors and other stakeholders should help mitigate risks of failing to disclose relevant information about a company (see Appendix 1).

6. Does the board feel confident that the level of climate-related disclosure is *proportionate* to the materiality of climate-related risks and opportunities at the company and complies with any mandatory reporting requirements?
7. Does the board feel prepared to *explain* its disclosures on climate in response to investor-led challenges?
8. Is the company reporting on areas where progress has been *insufficient* and/or where things have not gone to plan (consistent with national corporate governance codes)?
9. Do disclosures include information about the company's *industry and policy engagement* on climate change?

## Where to disclose

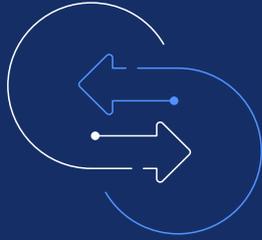
Given that climate risks and opportunities should be integrated into strategic decision-making (see Principle 5), those climate considerations should also be an integral element of disclosure. Some companies treat climate change and sustainability as standalone issues and will often publish a “sustainability report” that stands separate to the annual report or financial filings. However, given that climate change has the potential to create financial impacts throughout an organization, **integrated reporting** (see glossary) can be an effective tool for communicating a clear and concise picture of risk and opportunity.<sup>23</sup> The aim of integrated reporting is to increase the quality of reporting rather than the volume of reporting.

10. Does your organization have integrated reporting in place?
11. If not, are there internal or external expectations to pursue integrated reporting in the future?



**With the right climate risk reporting and disclosure in place, you achieve both board attention, focus and ambition.**

Jim Snabe, Chairman of the Supervisory Board of Siemens AG and Chairman of the Board of A.P. Moller-Maersk Group



## PRINCIPLE 8

# Exchange

The Board should maintain regular exchanges and dialogues with peers, policy-makers, investors and other stakeholders to encourage the sharing of methodologies and to stay informed about the latest climate-relevant risks, regulatory requirements etc.

External exchange includes engagement within industry groups as well as transparent climate-policy engagement. Companies should maintain awareness for the consistency of their messaging across all types of external engagement.

### Guiding questions

1. How does the board ensure that the company develops and encourages climate dialogue and methodology sharing among industry peers, investors, regulators and other stakeholders?
2. How does your board maintain its awareness about good climate-governance practices?
3. Does your company organize stakeholder dialogues on this matter and encourage

the participation and inclusion of all relevant stakeholders (customers, regulators, NGOs, academia etc.)?

4. Is the board kept regularly informed of, does it approve, and does it supervise consistent conduct of the company's industry and public policy engagement?

Finally, working together with investors to understand their concerns and priorities, should help drive progress towards effective climate governance (see also Appendix 2 on investor expectations):

5. How does the board ensure that climate risks and opportunities are being adequately discussed with investors, where legal and governance arrangements allow for such a dialogue?



# Outlook and conclusion

The guiding principles and questions outlined in this report are designed to be widely applicable across organizations, sectors and jurisdictions. However, there is no one-size-fits-all approach to good climate governance, and there are, of course, limitations to this report. For example, interviewees for this project represent a set of leaders who are particularly vocal and engaged regarding climate change and business, as opposed to a cross-section of leaders with divergent perspectives on climate change. Furthermore, the consultation process represents a geographic bias towards European and North American businesses. (See Appendix 3 for details of the consultation process.)

Aware of these limitations, the Forum plans to extend this work, through industry and regional deep-dives, to provide a more encompassing picture. As part of extending this work, the Forum may also seek to elaborate climate-governance case studies on its website and facilitate director training on good climate governance.

Despite these limitations, the authors hope that the guiding principles will spark increased awareness, attention and debate in regards to climate governance in the future. As the world becomes increasingly technology-enabled, boards will experience improved access to the information necessary to permit better climate governance on a technical level. For example, increased speed and capacity for data collection and analysis will allow for more complex and nuanced materiality and scenario analyses and better information with which to make decisions.

Finally, while enjoying these benefits of technological advancements, organizations should not lose sight of the value of human and purposeful leadership. Boards and senior management are responsible for setting the tone at the top, and acting as custodian stewards for profit, people and the planet. A culture of attentive and responsible governance in the face of climate change and other business disruptions is likely to generate trust with employees, investors and other stakeholders, which will make the duty of governing climate risk ultimately more compelling and satisfying.



**I would encourage all companies to discuss with their Boards the genuine role and purpose of our companies in society: do take the time to focus on the ‘why’ and do not jump too fast to the ‘how’ and so shaping our sustainability-agenda.**

Feike Sijbesma, Chief Executive Officer, Royal DSM

FIGURE 5 Climate governance principles and organizational purpose



Source: World Economic Forum, 2019

# Appendices

## A1 Legal perspective

Ellie Mulholland  
Director, Commonwealth Climate and Law Initiative

### Director duty

As a foreseeable financial issue within mainstream investment and planning horizons, climate change now enlivens directors' governance duties in the same way as any other issue presenting financial risks. Shareholder resolutions are increasingly brought – and not just in energy companies – to change investment and disclosures relating to climate risks.

Directors' duties are expressed in statute, regulatory instruments and case law and differ across jurisdictions in the precise expectations of conduct and the discretion accorded to directors. While not all are “fiduciary” duties in the strict legal sense, corporate governance laws generally reflect core fiduciary principles that directors have obligations of *trust and loyalty*, and must act with *care, skill and diligence*.

The existing directors' duties regimes in many jurisdictions, including the UK and US, are conceptually capable of being applied to corporate governance failures in the identification, assessment, oversight and disclosure of climate risks.<sup>24</sup> In the EU, consultation is underway on whether rules that require directors to act in the company's long-term interest need to be clarified to meet the goals of the European Commission's Action Plan on Sustainable Finance.<sup>25</sup> Conduct that will satisfy or contravene directors' duties or disclosure obligations with regards to the impacts of climate change on business and related investment decisions will depend on the unique circumstances of the company and the decision-making context.

Directors who are not prepared for this step change in expectations in the governance of climate-related risks and opportunities may find themselves exposed, particularly directors of companies that operate in sectors which are highly vulnerable to the physical or economic transition risks associated with climate change. Claims may be brought by shareholders, or by creditors, in the case of bankruptcy preceded by stock buybacks or dividends where the valuation of assets is too high, or the valuation of liabilities is too low. However, it is important not to overstate the practical likelihood of litigation. There are procedural, evidentiary and cost-related barriers to claim against directors, particularly in the absence of evidence of bad faith.

### Climate change regulation and disclosure of climate risks

There is an ever-increasing volume of climate-change legislation and policies across the globe. All of the parties to the Paris Agreement have at least one law that explicitly addresses climate change or the transition to a low-carbon economy<sup>26</sup> and there are now over 1,500 laws worldwide covering energy, transport, land use and climate resilience. Many of these laws have the potential to affect the operations of companies across all sectors of the economy, but particularly those that are highly vulnerable to the impacts of climate change: financial services, energy, materials and buildings, agriculture, food and forest products, and transportation.

Mandatory disclosure of climate risk is emerging as a vital area of regulatory focus. France has a law that expressly requires asset managers, pension funds and insurers to disclose climate risks, creating pressure on investee companies and insureds to report.<sup>27</sup> Issuers are required to disclose material risks, which may include climate risks. Regulatory authorities in the US, UK, Canada and Australia have confirmed that existing disclosure laws require disclosure of material climate-related financial risks.<sup>28</sup> This guidance came as early as 2010 in the US,<sup>29</sup> but has received little enforcement attention from the SEC since.

Regulators, listing authorities and public companies in many major jurisdictions have expressed support for the TCFD recommendations as a useful framework for disclosure and are paying close attention to their uptake.<sup>30</sup> In 2018, UK regulators (Prudential Regulation Authority and Financial Conduct Authority) set out proposals for managing climate-change risks and boosting green finance. In 2019, the EU will revise the guidelines on climate-related information for the Non-Financial Reporting Directive<sup>31</sup> and it is likely that further legislative initiatives for mandatory climate disclosures are on the horizon.

### Trends in climate litigation

Courts are increasingly asked to adjudicate on issues relating to climate change. There are now over 1,000 cases worldwide that “raise issues of law or fact regarding the science of climate change and climate change mitigation and adaptation efforts”.<sup>32</sup> Strategic or high-profile “climate litigation”

seeking to hold governments, corporations and private actors accountable for climate-related commitments, to fill perceived gaps in mitigation and adaptation efforts, or to challenge the approval of fossil fuel projects, has been the object of increasing attention. This strategic climate litigation has the potential to act as both a material driver, and consequence, of the low-carbon transition.<sup>33</sup>

Court cases linking climate change and human rights are emerging. Significant cases include the Dutch *Urgenda* decision, which was upheld on appeal in October 2018, and the *People's Climate Case* underway against the EU Parliament and Council. The Commission on Human Rights of the Philippines is holding an inquiry into the human rights impacts of climate change, including the role of 47 of the world's largest fossil fuel and cement companies.

While the majority of cases are against governments, corporations and individuals are defendants in a small but significant number of cases. These claims are often framed as torts or

failure to meet a duty of care, such as: a *failure to mitigate emissions* (which seeks to establish liability for emissions and the associated climate change impacts), a *failure to adapt* (which alleges a failure to adequately manage the physical or economic transition risks associated with climate change or from inaccurate disclosure of related exposures), and *transition-specific regulatory compliance* (which arises from laws and standards introduced to implement the economic transition).<sup>34</sup>

Energy companies have been the initial target for strategic climate litigation against corporations. These cases are often compared to the successful litigation against tobacco companies. Although there are difficulties in establishing legal causation, there have been significant advances in the scientific understanding of the relationship between emissions and climate change, including extreme weather events. As the impacts of climate change continue to grow, it is likely that the volume of such litigation will continue to increase.

## A2 Investor perspective

Veena Ramani  
Program Director of the Capital, Market Systems, Ceres

### How investors define climate governance in their fiduciary duty capacity

Climate change poses a material risk to investor portfolios. The latest investor research has reinforced the idea that climate change may have a material effect on investment returns, and that investors need to consider this issue as a new return variable.<sup>35</sup> A growing number of investors are starting to address this risk through investment decisions and engagement actions.

These decisions and actions have taken a few forms. A growing number of global investors<sup>36</sup> have committed to divest from coal, oil and gas companies in the face of risks, while others are embracing the investment opportunities of climate-change solutions.<sup>37</sup> More investors are engaging with companies in climate-change efforts than ever before. Proposals for sustainability issues, like climate change, accounted for over half of the shareholder proposals submitted during the recent proxy seasons in the US,<sup>38</sup> with some of the largest global investors helping to deliver the first majority resolutions on climate change. As a part of the CA100+ initiative,<sup>39</sup> over 300 global investors collectively representing \$32 trillion in assets are engaging with the largest greenhouse gas-emitting companies in the world on their climate-change systems and performance. Finally, financial

institutions responsible for assets of nearly \$100 trillion, or over 50% of the value of global capital markets, have publically supported the TCFD and are engaging with the companies they lend to or invest in to implement the recommendations.

As investors assess how well companies are positioned in the face of climate change, they are increasingly paying attention to the climate governance systems of the companies in question as a predictor of performance. A company that puts smart governance systems in place to proactively identify, assess and manage climate risks is likely to prove resilient in the face of climate-change impacts. Investors are paying particularly close attention to the role of the *board* as a part of this interest in climate change and sustainability overall. A 2017 survey by CFA Institute<sup>40</sup> revealed that financial analysts believe board accountability is the most important sustainability issue in their investment analysis and decision-making.

So, what do investors expect from their corporate investees and their boards in particular?

First, investors increasingly ask companies to put formal mandates in place for climate-change oversight, for instance, through charter incorporation. Having such systems in place would allow for material sustainability issues such as climate change to be discussed systematically and in depth.<sup>41</sup>

Second, investors expect boards to demonstrate a solid competence on climate change. Much of the focus has been on recruiting directors who demonstrate the right expertise on this issue, but

there has also been a call for increasing the fluency of the overall board in this area.<sup>42</sup>

Third, investors also ask boards to integrate climate-change considerations into their decision-making. The growing investor focus on two-degree scenario planning is intended to feed into board deliberations on the impact of climate change on business strategy and risk. Boards are likely to also drive performance

by linking climate-change goals with executive pay.

Finally, investors demand that companies provide more transparency on the role of the board in climate-change oversight and decision-making. This transparency can be demonstrated both through public reporting, for instance, using the TCFD framework, but also through board engagement with major shareholders.

## A3 Design of the principles and consultation process

The guiding principles outlined in this report were designed by the World Economic Forum, in close consultation with over 50 individual experts – in particular with corporate directors, chief executives and chairs, and chief risk, legal and financial officers as well as sustainability, climate and corporate governance experts. While this consultation process captured a wide variety of expert perspectives, the authors would like to acknowledge that most interviewees were from a set of sectors (including financial services, energy and industrials) that have a driving role to play in the transition to a global low-carbon economy. The authors would also like to acknowledge that the consultation focus on European and North American business does represent a geographic bias and further consultation across a greater diversity of geographies is an important next step.

The primary purpose of these principles is to equip directors of listed companies with a first set of guiding principles to facilitate their oversight of management of relevant climate issues. Nevertheless, these principles should be also useful to the executive management and the underlying functions listed in the paragraph above. Therefore, the principles and accompanying questions may

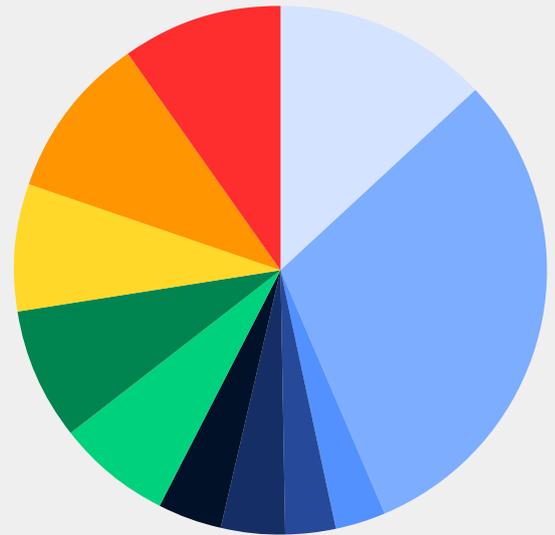
be used as guidance for boards to reflect on the strategic climate governance and management within their organizations.

The principles have been designed bearing in mind that climate governance will be relevant to different types of companies in different ways. An individual company's approach to governing climate will vary depending on a number of factors such as company type and size, industry affiliation and jurisdiction or geography. Different companies will also be at different stages along the journey of integrating climate considerations into governance, meaning that each principle and guiding question will be more or less applicable to each individual organization.

The proposed eight principles were not presented in order of priority or in a fixed sequence, but should follow a logical flow. For example, principles 1–4 shall lay the foundation for principle 5 and principles 6–8 help facilitate the endurance of attention to climate change issues longer term. To make these principles practical and applicable, each principle was accompanied by a set of guiding questions that may help a company identify and fill potential gaps in its current approach to governing climate.

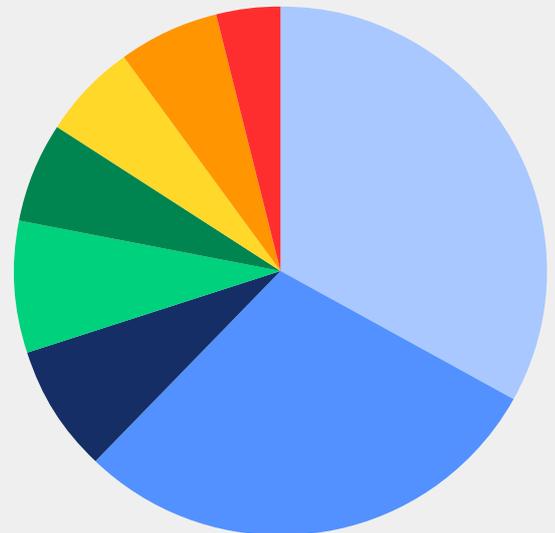
### Contributors by role/function

- Finance/audit 10%
- Chief sustainability officer 10%
- Chairman 8%
- Chief executive officer 8%
- Law 7%
- Chief financial officer 4%
- Chief investment officer 4%
- Academic 3%
- Chief risk officer 3%
- Board member (independent) 31%
- Policy and Gov. affairs 13%



### Contributors by industry/sector

- Agriculture, food and consumer goods 4%
- Academic 6%
- Legal 6%
- Other 6%
- Engineering, transport and shipping 8%
- Chemicals, materials and construction 8%
- Financial services 29%
- Energy/oil and gas 33%



Source: World Economic Forum, 2019

## A4 Glossary of terms

**One-tier vs two-tier board structure:** A one-tier board is comprised of both executive and non-executive directors. It is associated with greater interaction among board members, greater exposure of non-executive directors to direct information about the company, lighter administrative burdens and faster decision-making processes. However, as the single board is tasked with both managing and supervising the company, it is more difficult for these types of boards to guarantee the independence of non-executive directors. Moreover, this structure allows for chairperson and CEO duality, which is generally not recommended by corporate governance practice.

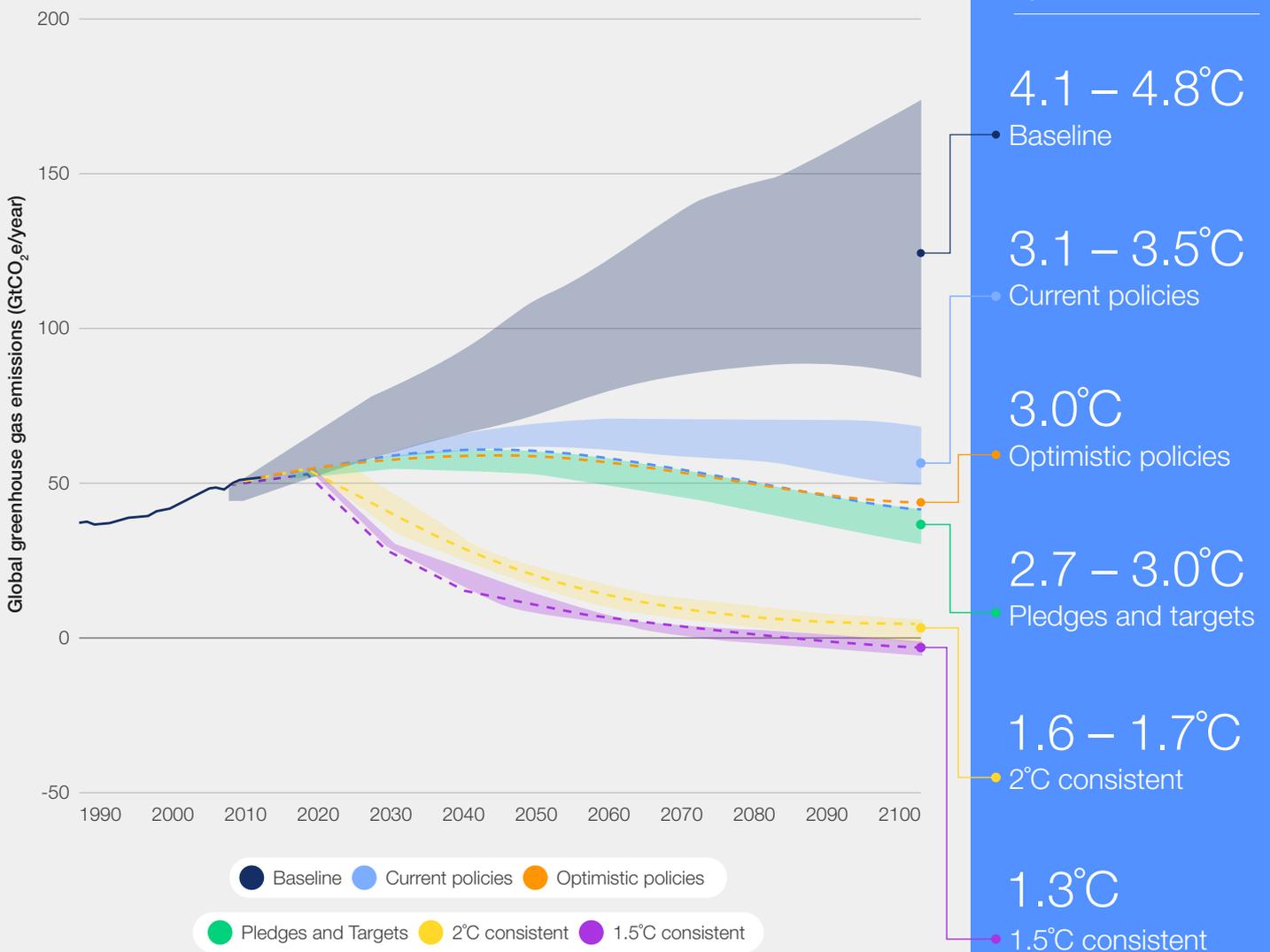
Conversely, on a two-tier board there is a clear separation between management and supervision or oversight. Executive and non-executive directors serve on separate boards (i.e. the supervisory

board is composed exclusively of non-executive directors while the management board is composed exclusively of executive directors). This clear distinction allows for greater independence of non-executive directors and mandates the separation of chairperson and CEO roles. However, disadvantages of this structure include delayed or limited flow of information to non-executive directors, increased administrative budget and delayed decision-making processes.

**2°C warming limit:** Such limit has been widely considered the threshold beyond which there will be severe, widespread and irreversible damage. Yet the latest broad scientific analysis from the Intergovernmental Panel on Climate Change (IPCC) concludes that the risks associated with 1.5°C are likely to be far more severe than 2°C of global warming.<sup>43</sup> (Figure 7).

FIGURE 7 2100 warming projections

### Emissions and expected warming based on pledges and current policies



Source: Intergovernmental Panel on Climate Change (IPCC), 2018

**Integrated reporting:** The International Integrated Reporting Council (IIRC) defines integrated reporting as “concise communication about how an organization’s strategy, governance, performance and prospects, in the context of its external environment, lead to the creation of value over the short, medium and long term”.<sup>44</sup> It communicates the full range of factors that affect the ability of an organization to create value over time, ensuring more efficient and financial sustainable allocation of capital.<sup>45</sup> The more that integrated thinking is embedded into an organization’s operations, the better it will be able to identify potential risks and opportunities: for example, those related to technological or climate changes. Integrated reporting brings greater cohesion and efficiency to the reporting process, improving internal processes and, as a result, decision-making. This benefits stakeholders who are affected by an organization’s ability to create value, as well as the ability of the organization to respond to their needs.

**Materiality assessment:** A materiality assessment enables a company to understand and identify the most important issues for itself and its various stakeholders. Such assessment of criticality shall inform the firm’s strategy and approach to risk and opportunity management, while helping the company to identify potential trends that could affect the ability to create value in the long term. It is essential for the organization to prioritize the areas of interest, and to focus time and resources on the most material topics. Assessing climate-related risks and opportunities should not be different from any other material issue an organization faces. Given that climate change will affect different businesses in different ways across a range of time scales, it is important for organizations to identify any material ways in which climate change may affect the business across short-, medium- and long-term time frames.

**Scenario analysis:** Climate-scenario analysis is a tool used to understand the potential climate-related risks and opportunities a company faces, and the implications these may have on their business in the future. It enables organizations to consider their strategic resilience and management response options to a range of future states.<sup>46</sup> Climate-scenario analysis is important for organizations to undertake, particularly given the extent of uncertainty around the severity and timing of the most significant climate change impacts. It is essential to prompt longer-term strategic thinking so that businesses can adequately incorporate the potential effects of climate change into their strategic planning processes.<sup>47</sup> This provides multiple benefits: improving the organization’s

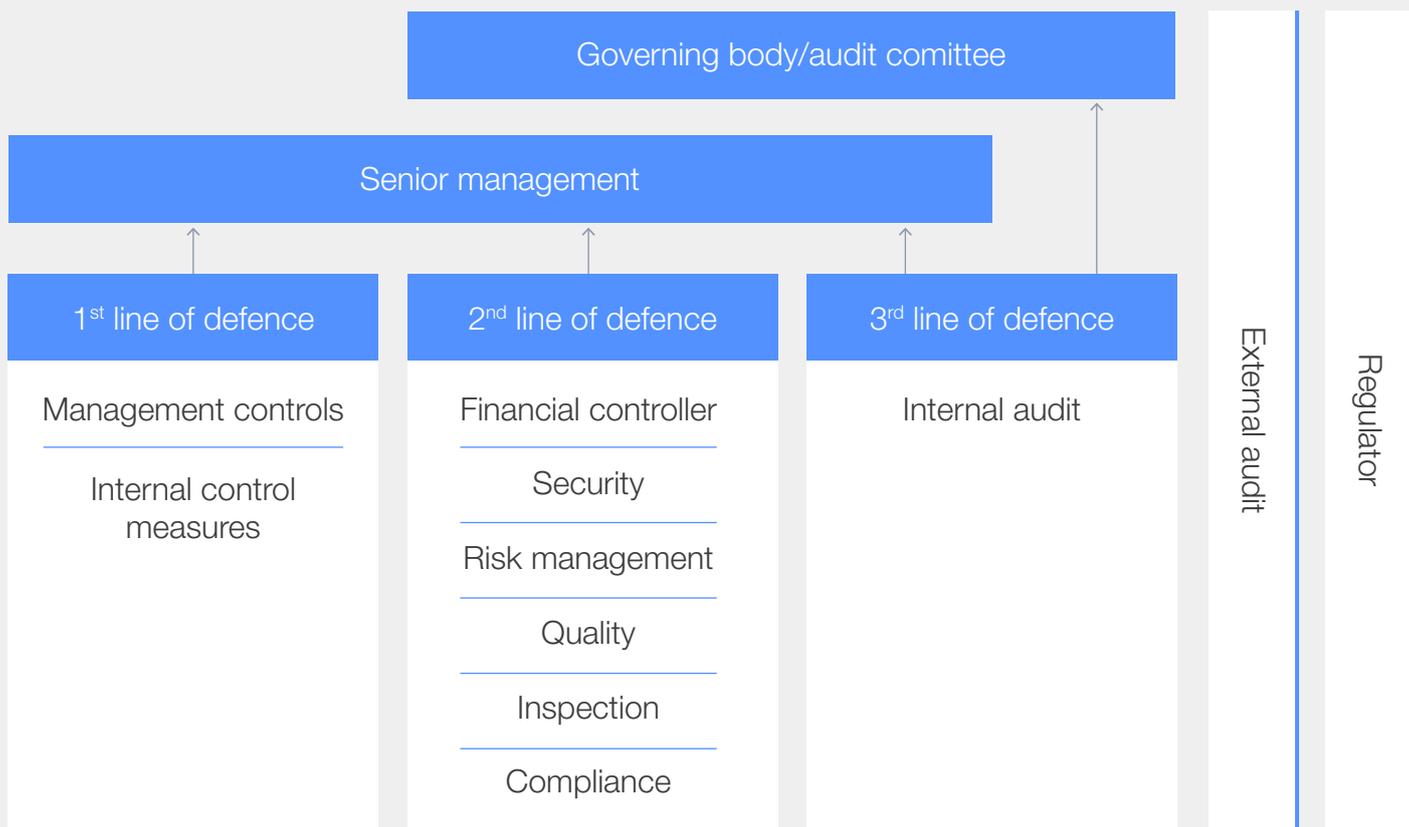
understanding of climate-related risks and opportunities, as well as informing stakeholders about how the organization is responding to these changes. However, it is important for organizations to understand that, while these scenario analyses can be used as tools to consider different potential future outcomes, they are not forecasts or predictions – and are as strong as their assumptions.

Given the policy signals associated with the Paris Agreement, the TCFD recommends “organizations use, as a minimum, a 2°C scenario and consider using other scenarios most relevant to the organization’s circumstances (...)”.<sup>48</sup> The selection of other scenarios should be informed by which scenarios might present the greatest challenges to the organization. If conducting scenario analyses related to NDCs, organizations should bear in mind that these have been designed with a ratchet mechanism such that emission reductions become more ambitious over time. However, in reality, progress towards, and changes to, these NDCs will obviously depend on the national political contexts.

**Three lines of defence:** as outlined by the chartered Institute of Internal Auditors (IIA)<sup>49</sup>: The board provides direction to senior management by setting the organization’s risk appetite. It also seeks to identify the principal risks facing the organization. Thereafter, the board assures itself on an ongoing basis that senior management is responding appropriately to these risks. The board delegates primary ownership and responsibility for operating risk management and control to the CEO and senior management. It is management’s task to provide leadership and direction to the employees in respect of risk management, and to control the organization’s overall risk-taking activities in relation to the agreed level of risk appetite. To ensure the effectiveness of an organization’s risk-management framework, the board and senior management need to be able to rely on adequate line functions – including monitoring and assurance functions – within the organization. The IIA endorses the three lines of defence model as a way of explaining the relationship between these functions and as a guide to how responsibilities should be divided:

1. The first line of defence – functions that own and manage risk
2. The second line of defence – functions that oversee or specialize in risk management, compliance
3. The third line of defence – functions that provide independent assurance, above all internal audit

FIGURE 8 | Three lines of defence model



Source: Chartered Institute of Internal Auditors, 2015

# Contributors

## Project team

**Dominik Breiting**

Project Lead, Climate Governance and Finance,  
Global Leadership Fellow, World Economic Forum

**Emily Farnworth**

Head, Climate Change Initiatives,  
World Economic Forum

**Marisa Donnelly**

Manager, PwC

**Jonathan Grant**

Director, PwC

**Devina Shah**

Associate, PwC

**Jon Williams**

Partner, PwC

The views expressed in this report are those of the authors below and do not necessarily represent the views of the World Economic Forum or its members and partners, nor those of PwC and the numerous contributors.

The authors would like to sincerely thank each individual contributor for their valuable comments, insights and guidance in the creation of this report.

A special thanks goes also to our project adviser PwC – particularly to the Sustainability and Climate Change practice as well as the Corporate Governance team; and to our Forum colleagues Pedro Gomez, Head of Oil and Gas Industry, and Caterina Cilfone, Project Specialist, Climate Initiatives, who provided valuable support throughout the preparation of this report.

For any questions or clarifications regarding this report, please don't hesitate to contact Pim Valdre ([Pim.Valdre@weforum.org](mailto:Pim.Valdre@weforum.org)).

# Endnotes

1. U.S. Global Change Research Program, Fourth National Climate Assessment, Volume II 2018: <https://nca2018.globalchange.gov/chapter/1/> (link as of Dec 4)
2. The Intergovernmental Panel on Climate Change, Special Report: Global Warming of 1.5 °C, 2018: <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/> (link as of Dec 4)
3. United Nations Framework Convention on Climate Change, 2018, The Paris Agreement Status of Ratification: <https://unfccc.int/process/the-paris-agreement/status-of-ratification> (accessed 29/11/18). (link as of Dec 4)
4. Climate Action Tracker, 2018, Temperatures: <https://climateactiontracker.org/global/temperatures/> (accessed 29/11/18). (link as of Dec 4)
5. PwC, 2018, The Low Carbon Economy Index 2018: <https://www.pwc.co.uk/lowcarboneyconomy> (accessed 29/11/18). (link as of Dec 4)
6. World Resources Institute, 2018, Extreme Weather: What's Climate Change Got to Do With It? <https://www.wri.org/blog/2017/09/extreme-weather-whats-climate-change-got-to-do-it> (accessed 29/11/18). (link as of Dec 4)
7. Munich RE, 2018, 2017 Year in Figures: <https://www.munichre.com/topics-online/en/2018/01/2017-year-in-figures> (accessed 29/11/18). (link as of Dec 4)
8. World Economic Forum, Global Risk Report 2019
9. Economist Intelligence Unit, 2018, The Cost of Inaction: Recognising the Value at Risk from Climate Change: [https://www.eiuperspectives.economist.com/sites/default/files/The%20cost%20of%20inaction\\_0.pdf](https://www.eiuperspectives.economist.com/sites/default/files/The%20cost%20of%20inaction_0.pdf) (link as of Dec 4)
10. New Climate Economy, 2018, Unlocking the Inclusive Growth Story of the 21st Century: Accelerating Climate Action in Urgent Times: [https://newclimateeconomy.report/2018/wp-content/uploads/sites/6/2018/09/NCE\\_2018Report\\_FINAL.pdf](https://newclimateeconomy.report/2018/wp-content/uploads/sites/6/2018/09/NCE_2018Report_FINAL.pdf) (link as of Dec 4)
11. Bank of England, 2018, A Transition in Thinking and Action speech by Mark Carney: <https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/a-transition-in-thinking-and-action-speech-by-mark-carney.pdf> (accessed 29/11/18). (link as of Dec 4)
12. Task Force on Climate-Related Financial Disclosures, 2018, Press Release Status Report: [https://www.fsb-tcfd.org/wp-content/uploads/2018/09/Press-Release-TCFD-2018-Status-Report\\_092518\\_FINAL.pdf](https://www.fsb-tcfd.org/wp-content/uploads/2018/09/Press-Release-TCFD-2018-Status-Report_092518_FINAL.pdf) (accessed 29/11/18). (link as of Dec 4)
13. Task Force on Climate-Related Financial Disclosures, 2018, 2018 Status Report: <https://www.fsb-tcfd.org/wp-content/uploads/2018/08/FINAL-2018-TCFD-Status-Report-092518.pdf> (accessed 29/11/18). (link as of 4/12/18)
14. TCFD, TCFD Supporters as of the One Planet Summit September 2018: <https://www.fsb-tcfd.org/tcfd-supporters/> (accessed 29/11/18). (link as of 4/12/18)
15. Mercer, 2015, Investing in a Time of Climate Change: <https://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf> (accessed 29/11/18). (link as of 4/12/18)
16. BlackRock, 2018, BlackRock Investment Stewardship Engagement Priorities for 2018: <https://www.blackrock.com/corporate/literature/publication/blk-stewardship-2018-priorities-final.pdf> (accessed 29/11/18). (link as of Dec 4)
17. State Street Global Advisors, 2016, Climate Change Risk Oversight Framework for Directors: [https://www.ssga.com/investment-topics/environmental-social-governance/2018/06/climate-change-risk-oversight\\_jun%202018.pdf](https://www.ssga.com/investment-topics/environmental-social-governance/2018/06/climate-change-risk-oversight_jun%202018.pdf) (accessed 29/11/18). (link as of Dec 4)
18. BIS Central Bankers' Speeches, 2015, Mark Carney: Breaking the Tragedy of the Horizon – Climate Change and Financial Stability: <https://www.bis.org/review/r151009a.pdf> (accessed 29/11/18). (link as of Dec 4)
19. Task Force on Climate-Related Financial Disclosures, 2017, Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities: <https://www.fsb-tcfd.org/publications/final-technical-supplement/> (accessed 29/11/18). (link as of Dec 4)
20. The International Institute of Internal Auditors, 2013, IIA Position Paper: The Three Lines of Defense in Effective Risk Management and Control: <https://global.theiia.org/standards-guidance/Public%20Documents/PP%20The%20Three%20Lines%20of%20Defense%20in%20Effective%20Risk%20Management%20and%20Control.pdf> (accessed 29/11/18). (link as of Dec 4)
21. Hermes Investment, 2017, US Corporate Governance Principles: <https://www.hermes-investment.com/ukw/wp-content/uploads/sites/80/2017/10/US-CG-Principles-Oct-2017.pdf> (accessed 29/11/18). (link as of Dec 4)
22. Baker McKenzie, 2017, Recommendations of the Task Force on Climate-related Financial Disclosures: Country Reviews: [https://f.datasrv.com/fr1/717/47909/TCFD\\_Baker\\_McKenzie\\_PRI\\_full\\_report\\_2017.pdf](https://f.datasrv.com/fr1/717/47909/TCFD_Baker_McKenzie_PRI_full_report_2017.pdf) (accessed 29/11/18). (link as of Dec 4)
23. Integrated Reporting, 2016, Value of Board Level Insights: Purpose Beyond Profit: <http://integratedreporting.org/resource/creating-value-cfo-leadership-in-ir/> (accessed 29/11/18). (link as of Dec 4)
24. CCLI, 2018, Directors' Liability and Climate Risk: National Legal Papers for Australia, Canada, South Africa and the United Kingdom: <https://ccli.ouce.ox.ac.uk/publications/> (accessed 29/11/18). (link as of Dec 4)

25. European Commission, 2018, EU Action Plan on Sustainable Finance: [https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth\\_en](https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth_en) (accessed 29/11/18). (link as of Dec 4)
26. Grantham Research Institute on Climate Change and the Environment and Sabin Center for Climate Change Law, 2018, Climate Change Laws of the World database: <http://www.lse.ac.uk/GranthamInstitute/legislation/> (accessed 29/11/18). (link as of Dec 4)
27. Article 173 of the French Energy Transition for Green Growth Law.
28. UK Financial Conduct Authority, 2018, DP18/8 Climate Change and Green Finance: <https://www.fca.org.uk/publication/discussion/dp18-08.pdf> (accessed 29/11/18); Bank of England, 2018, Enhancing Banks' and Insurers' Approaches to Managing the Financial Risks from Climate Change: <https://www.bankofengland.co.uk/prudential-regulation/publication/2018/enhancing-banks-and-insurers-approaches-to-managing-the-financial-risks-from-climate-change> (accessed 29/11/18); Ontario Securities Commission, 2018, CSA Staff Notice 51-354: Report on Climate Change-Related Disclosure Project: [http://www.osc.gov.on.ca/en/SecuritiesLaw\\_csa\\_20180405\\_51-354\\_disclosure-project.htm#N](http://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20180405_51-354_disclosure-project.htm#N) (accessed 29/11/18); Australian Securities and Investment Commission, 2018, Report 593: Climate Risk Disclosure by Australia's Listed Companies: <https://download.asic.gov.au/media/4871341/rep593-published-20-september-2018.pdf> (accessed 29/11/18). (link as of Dec 4)
29. SEC, 2010, Commission Guidance Regarding Disclosure Related to Climate Change: <https://www.sec.gov/rules/interp/2010/33-9106.pdf> (accessed 29/11/18). (link as of Dec 4)
30. TCFD, 2018, TCFD supporters: <https://www.fsb-tcfd.org/tcfd-supporters/> (accessed 29/11/18). (link as of Dec 4)
31. European Commission, 2018, EU Action Plan on Sustainable Finance, Action 9: [https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth\\_en](https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth_en) (accessed 29/11/18). (link as of Dec 4)
32. UNEP, 2017, Status of Climate Change Litigation: <http://wedocs.unep.org/bitstream/handle/20.500.11822/20767/climate-change-litigation.pdf?sequence=1&isAllowed=y> (accessed 29/11/18). (link as of Dec 4)
33. The Two Degrees Investing Initiative (2Di) and MinterEllison, The Carbon Boomerang: Litigation as a Driver and Consequence of the Energy Transition, September 2017, [http://et-risk.eu/carbon\\_boomerang/](http://et-risk.eu/carbon_boomerang/) (accessed 29/11/18). (link as of Dec 4)
34. *ibid.*
35. Mercer, 2015, Climate Change Report 2015: <https://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf> (accessed 29/11/18). (link as of Dec 4)
36. The Guardian, 2018, Fossil Fuel Divestment Funds Rise to \$6tn: <https://www.theguardian.com/environment/2018/sep/10/fossil-fuel-divestment-funds-rise-to-6tn> (accessed 29/11/18). (link as of Dec 4)
37. Ceres, 2018, Clean Trillion in Sight: <https://www.ceres.org/CleanTrillionInSight> (accessed 29/11/18). (link as of Dec 4)
38. Pionline, 2018, Environmental Social Issues Big in Proxy Season: <https://www.pionline.com/article/20180709/PRINT/180709889/environmental-social-issues-big-in-proxy-season> (accessed 29/11/18). (link as of Dec 4)
39. Climate Action 100, 2018: <http://www.climateaction100.org/> (accessed 29/11/18). (link as of Dec 4)
40. CFA Institute, 2017, ESG Survey 2017: <https://www.cfainstitute.org/en/research/survey-reports/esg-survey-2017> (accessed 29/11/18). (link as of Dec 4)
41. Ceres, 2018, How Corporate Boards Engage Sustainability Performance: <https://www.ceres.org/resources/reports/view-top-how-corporate-boards-engage-sustainability-performance> (accessed 29/11/18). (link as of Dec 4)
42. Ceres, 2018, Lead from the Top: <https://www.ceres.org/resources/reports/lead-from-the-top> (accessed 29/11/18). (link as of Dec 4)
43. Intergovernmental Panel on Climate Change, 2018, Report: <http://www.ipcc.ch/report/sr15/> (accessed 29/11/18). (link as of Dec 4)
44. Integrated Reporting, 2015, The International IR Framework: <http://integratedreporting.org/wp-content/uploads/2015/03/13-12-08-THE-INTERNATIONAL-IR-FRAMEWORK-2-1.pdf> (accessed 29/11/18). ((link as of Dec 4)
45. Integrated Reporting, 2018, The IIRC: <http://integratedreporting.org/the-iirc-2/> (accessed 29/11/18). (link as of Dec 4)
46. TCFD, 2017, Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities: <https://www.fsb-tcfd.org/publications/final-technical-supplement/> (accessed 29/11/18). (link as of Dec 4)
47. PwC, 2018, Getting Started with Climate Scenario Analysis: <https://www.pwc.co.uk/sustainability-climate-change/assets/pdf/getting-started-with-climate-scenario-analysis.pdf> (accessed 29/11/18). (link as of Dec 4)
48. TCFD, 2017, Technical Supplement: The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities: <https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-TCFD-Technical-Supplement-062917.pdf> (accessed 29/11/18). (link as of Dec 4)
49. Chartered Institute of Internal Auditors, 2018, Governance of Three Lines of Defence: <https://www.iaa.org.uk/resources/audit-committees/governance-of-risk-three-lines-of-defence/> (accessed 29/11/18). (link as of Dec 4)



---

COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

---

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

---

**World Economic Forum**  
91–93 route de la Capite  
CH-1223 Cologny/Geneva  
Switzerland

Tel.: +41 (0) 22 869 1212  
Fax: +41 (0) 22 786 2744  
contact@weforum.org  
www.weforum.org