

D Scenario Analysis and Climate-Related Issues

Some organizations are affected by risks associated with climate change today. However, for many organizations, the most significant effects of climate change are likely to emerge over the medium to longer term and their timing and magnitude are uncertain. This uncertainty presents challenges for individual organizations in understanding the potential effects of climate change on their businesses, strategies, and financial performance. To appropriately incorporate the potential effects in their planning processes, organizations need to consider how their climate-related risks and opportunities may evolve and the potential implications under different conditions. One way to do this is through scenario analysis.

Scenario analysis is a well-established method for developing strategic plans that are more flexible or robust to a range of plausible future states. The use of scenario analysis for assessing the potential business implications of climate-related risks and opportunities, however, is relatively recent. While several organizations use scenario analysis to assess the potential impact of climate change on their businesses, only a subset have disclosed their assessment of forward-looking implications publicly, either in sustainability reports or financial filings.⁴²

The disclosure of organizations' forward-looking assessments of climate-related issues is important for investors and other stakeholders in understanding how vulnerable individual organizations are to transition and physical risks and how such vulnerabilities are or would be addressed. As a result, the Task Force believes that organizations should use scenario analysis to assess potential business, strategic, and financial implications of climate-related risks and opportunities and disclose those, as appropriate, in their annual financial filings.

Scenario analysis is an important and useful tool for understanding the strategic implications of climate-related risks and opportunities.

This section provides additional information on using scenario analysis as a tool to assess potential implications of climate-related risks and opportunities. In addition, a technical supplement, [The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities](#), on the Task Force's website provides further information on the types of climate-related scenarios, the application of scenario analysis, and the key challenges in implementing scenario analysis.

1. Overview of Scenario Analysis

Scenario analysis is a process for identifying and assessing the potential implications of a range of plausible future states under conditions of uncertainty. Scenarios are hypothetical constructs and not designed to deliver precise outcomes or forecasts. Instead, scenarios provide a way for organizations to consider how the future might look if certain trends continue or certain conditions are met. In the case of climate change, for example, scenarios allow an organization to explore and develop an understanding of how various combinations of climate-related risks, both transition and physical risks, may affect its businesses, strategies, and financial performance over time.

Scenario analysis can be qualitative, relying on descriptive, written narratives, or quantitative, relying on numerical data and models, or some combination of both. Qualitative scenario analysis

⁴² Some organizations in the energy sector and some large investors have made public disclosures describing the results of their climate-related scenario analysis, including discussing how the transition might affect their current portfolios. In some instances, this information was published in financial filings.

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explores relationships and trends for which little or no numerical data is available, while quantitative scenario analysis can be used to assess measurable trends and relationships using models and other analytical techniques.⁴³ Both rely on scenarios that are internally consistent, logical, and based on explicit assumptions and constraints that result in plausible future development paths.

As summarized in [Figure 7](#), there are several reasons why scenario analysis is a useful tool for organizations in assessing the potential implications of climate-related risks and opportunities.

Figure 7

Reasons to Consider Using Scenario Analysis for Climate Change

- 1 Scenario analysis can help organizations consider issues, like climate change, that have the following characteristics:
 - Possible outcomes that are highly uncertain (e.g., the **physical** response of the climate and ecosystems to higher levels of GHG emissions in the atmosphere)
 - Outcomes that will play out over the medium to longer term (e.g., timing, distribution, and mechanisms of the **transition** to a lower-carbon economy)
 - Potential disruptive effects that, due to uncertainty and complexity, are substantial
- 2 Scenario analysis can enhance organizations' strategic conversations about the future by considering, in a more structured manner, what may unfold that is different from business-as-usual. Importantly, it broadens decision makers' thinking across a range of plausible scenarios, including scenarios where climate-related impacts can be significant.
- 3 Scenario analysis can help organizations frame and assess the potential range of plausible business, strategic, and financial impacts from climate change and the associated management actions that may need to be considered in strategic and financial plans. This may lead to more robust strategies under a wider range of uncertain future conditions.
- 4 Scenario analysis can help organizations identify indicators to monitor the external environment and better recognize when the environment is moving toward a different scenario state (or to a different stage along a scenario path). This allows organizations the opportunity to reassess and adjust their strategies and financial plans accordingly.⁴⁴
- 5 Scenario analysis can assist investors in understanding the robustness of organizations' strategies and financial plans and in comparing risks and opportunities across organizations.

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2. Exposure to Climate-Related Risks

The effects of climate change on specific sectors, industries, and individual organizations are highly variable. It is important, therefore, that all organizations consider applying a basic level of scenario analysis in their strategic planning and risk management processes. Organizations more significantly affected by transition risk (e.g., fossil fuel-based industries, energy-intensive manufacturers, and transportation activities) and/or physical risk (e.g., agriculture, transportation

⁴³ For example, see Mark D. A. Rounsevell, Marc J. Metzger, *Developing qualitative scenario storylines for environmental change assessment*, WIREs Climate Change 2010, 1: 606-619. doi: 10.1002/wcc.63, 2010 and Oliver Fricko, et. al., *Energy sector water use implications of a 2° C climate policy*, Environmental Research Letters, 11: 1-10, 2016.

⁴⁴ J.N. Maack, *Scenario analysis: a tool for task managers*, Social Analysis: selected tools and techniques, Social Development Papers, Number 36, the World Bank, June 2001, Washington, DC.

and building infrastructure, insurance, and tourism) should consider a more in-depth application of scenario analysis.

a. Exposure to Transition Risks

Transition risk scenarios are particularly relevant for resource-intensive organizations with high GHG emissions within their value chains, where policy actions, technology, or market changes aimed at emissions reductions, energy efficiency, subsidies or taxes, or other constraints or incentives may have a particularly direct effect.

A key type of transition risk scenario is a so-called 2°C scenario, which lays out a pathway and an emissions trajectory consistent with holding the increase in the global average temperature to 2°C above pre-industrial levels. In December 2015, nearly 200 governments agreed to strengthen the global response to the threat of climate change by “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels,” referred to as the Paris Agreement.⁴⁵ As a result, a 2°C scenario provides a common reference point that is generally aligned with the objectives of the Paris Agreement and will support investors’ evaluation of the potential magnitude and timing of transition-related implications for individual organizations; across different organizations within a sector; and across different sectors.

b. Exposure to Physical Risks

A wide range of organizations are exposed to climate-related physical risks. Physical climate-related scenarios are particularly relevant for organizations exposed to acute or chronic climate change, such as those with:

- long-lived, fixed assets;
- locations or operations in climate-sensitive regions (e.g., coastal and flood zones);
- reliance on availability of water; and
- value chains exposed to the above.

Physical risk scenarios generally identify extreme weather threats of moderate or higher risk before 2030 and a larger number and range of physical threats between 2030 and 2050. Although most climate models deliver scenario results for physical impacts beyond 2050, organizations typically focus on the consequences of physical risk scenarios over shorter time frames that reflect the lifetimes of their respective assets or liabilities, which vary across sectors and organizations.

3. Recommended Approach to Scenario Analysis

The Task Force believes that all organizations exposed to climate-related risks should consider (1) using scenario analysis to help inform their strategic and financial planning processes and (2) disclosing how resilient their strategies are to a range of plausible climate-related scenarios. The Task Force recognizes that, for many organizations, scenario analysis is or would be a largely qualitative exercise. However, organizations with more significant exposure to transition risk and/or physical risk should undertake more rigorous qualitative and, if relevant, quantitative scenario analysis with respect to key drivers and trends that affect their operations.

A critical aspect of scenario analysis is the selection of a set of scenarios (not just one) that covers a reasonable variety of future outcomes, both favorable and unfavorable. In this regard, the Task Force recommends organizations use a 2°C or lower scenario in addition to two or three other

⁴⁵ United Nations Framework Convention on Climate Change. “[The Paris Agreement](#),” December 2015.

scenarios most relevant to their circumstances, such as scenarios related to Nationally Determined Contributions (NDCs), physical climate-related scenarios, or other challenging scenarios.⁴⁶ In jurisdictions where NDCs are a commonly accepted guide for an energy and/or emissions pathway, NDCs may constitute particularly useful scenarios to include in an organization's suite of scenarios for conducting climate-related scenario analysis.

For an organization in the initial stages of implementing scenario analysis or with limited exposure to climate-related issues, the Task Force recommends disclosing how resilient, qualitatively or directionally, the organization's strategy and financial plans may be to a range of relevant climate change scenarios. This information helps investors, lenders, insurance underwriters, and other stakeholders understand the robustness of an organization's forward-looking strategy and financial plans across a range of possible future states.

Organizations with more significant exposure to climate-related issues should consider disclosing key assumptions and pathways related to the scenarios they use to allow users to understand the analytical process and its limitations. In particular, it is important to understand the critical parameters and assumptions that materially affect the conclusions drawn. As a result, the Task Force believes that organizations with significant climate-related exposures should *strive* to disclose the elements described in [Figure 8](#).

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Figure 8

Disclosure Considerations for Non-Financial Organizations

Organizations with more significant exposure to climate-related issues should consider disclosing key aspects of their scenario analysis, such as the ones described below.

- 1 The scenarios used, including the 2°C or lower scenario⁴⁷
- 2 Critical input parameters, assumptions, and analytical choices for the scenarios used, including such factors as:
 - Assumptions about possible technology responses and timing (e.g., evolution of products/services, the technology used to produce them, and costs to implement)
 - Assumptions made around potential differences in input parameters across regions, countries, asset locations, and/or markets
 - Approximate sensitivities to key assumptions
- 3 Time frames used for scenarios, including short-, medium-, and long-term milestones (e.g., how organizations consider timing of potential future implications under the scenarios used)
- 4 Information about the resiliency of the organization's strategy, including strategic performance implications under the various scenarios considered, potential qualitative or directional implications for the organization's value chain, capital allocation decisions, research and development focus, and potential material financial implications for the organization's operating results and/or financial position

⁴⁶ The Task Force's technical supplement, [The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities](#) provides more information on scenario inputs, analytical assumptions and choices, and assessment and presentation of potential impacts.

⁴⁷ The objective of the Paris Agreement is to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. The IEA is developing a 1.5°C scenario that organizations may find useful.

4. Applying Scenario Analysis

While the Task Force recognizes the complexities of scenario analysis and the potential resources needed to conduct it, organizations are encouraged to use scenario analysis to assess climate-related risks and opportunities. For organizations just beginning to use scenario analysis, a qualitative approach that progresses and deepens over time may be appropriate.⁴⁸ Greater rigor and sophistication in the use of data and quantitative models and analysis may be warranted for organizations with more extensive experience in conducting scenario analysis. Organizations may decide to use existing external scenarios and models (e.g., those provided by third-party vendors) or develop their own, in-house modeling capabilities. The choice of approach will depend on an organization's needs, resources, and capabilities.

In conducting scenario analysis, organizations should *strive* to achieve:

- transparency around parameters, assumptions, analytical approaches, and time frames;
- comparability of results across different scenarios and analytical approaches;
- adequate documentation for the methodology, assumptions, data sources, and analytics;
- consistency of methodology year over year;
- sound governance over scenario analysis conduct, validation, approval, and application; and
- effective disclosure of scenario analysis that will inform and promote a constructive dialogue between investors and organizations on the range of potential impacts and resilience of the organization's strategy under various plausible climate-related scenarios.

In applying scenario analysis, organizations should consider general implications for their strategies, capital allocation, and costs and revenues, both at an enterprise-wide level and at the level of specific regions and markets where specific implications of climate change for the organization are likely to arise. Financial-sector organizations should consider using scenario analysis to evaluate the potential impact of climate-related scenarios on individual assets or investments, investments or assets in a particular sector or region, or underwriting activities.

The Task Force's supplemental guidance recognizes that organizations will be at different levels of experience in using scenario analysis. However, it is important for organizations to use scenario analysis and develop the necessary organizational skills and capabilities to assess climate-related risks and opportunities, with the expectation that organizations will evolve and deepen their use of scenario analysis over time. The objective is to assist investors and other stakeholders in better understanding:

- the degree of robustness of the organization's strategy and financial plans under different plausible future states of the world;
- how the organization may be positioning itself to take advantage of opportunities and plans to mitigate or adapt to climate-related risks; and
- how the organization is challenging itself to think strategically about longer-term climate-related risks and opportunities.

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⁴⁸ Organizations considering undertaking scenario analysis may wish to conduct various sensitivity analyses around key climate factors as a precursor to scenario analysis, recognizing that sensitivity analysis and scenario analysis are different, but complementary, processes.

5. Challenges and Benefits of Conducting Scenario Analysis

Scenario analysis is a well-established method for developing strategic plans that are more flexible and robust to a range of plausible future states. As previously discussed (Figure 7, p. 26) it is particularly useful for assessing issues with possible outcomes that are highly uncertain, that play out over the medium to longer term, and that are potentially disruptive. Scenario analysis can help to better frame strategic issues, assess the range of potential management actions that may be needed, engage more productively in strategic conversations, and identify indicators to monitor the external environment. Importantly, climate-related scenario analysis can provide the foundation for more effective engagement with investors on an organization's strategic and business resiliency.

Conducting climate-related scenario analysis, however, is not without challenges. First, most scenarios have been developed for global and macro assessments of potential climate-related impacts that can inform policy makers. These climate-related scenarios do not always provide the ideal level of transparency, range of data outputs, and functionality of tools that would facilitate their use in a business or investment context.

Second, the availability and granularity of data can be a challenge for organizations attempting to assess various energy and technology pathways or carbon constraints in different jurisdictions and geographic locations.

Third, the use of climate-related scenario analysis to assess potential business implications is still at an early stage. Although a handful of the largest organizations and investors are using climate-related scenario analysis as part of their strategic planning and risk management processes, many organizations are just beginning to explore its use. Sharing experiences and approaches to climate-related scenario analysis across organizations, therefore, is critical to advancing the use of climate-related scenario analysis. Organizations may be able to play an important role in this regard by facilitating information and experience exchanges among themselves; collectively developing tools, data sets, and methodologies; and working to set standards. Organizations across many different sectors will inevitably need to learn by doing. Some may seek guidance from other industry participants and experts on how to apply climate-related scenarios to make forward-looking analyses of climate-related risks and opportunities.

Addressing these challenges and advancing the use of climate-related scenario analysis will require further work. These challenges, however, are not insurmountable and can be addressed. Organizations should undertake scenario analysis in the near term to capture the important benefits for assessing climate-related risks and opportunities and improve their capabilities as tools and data progress over time.

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