

# Very few companies make good use of scenarios to anticipate their climate-constrained future

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## HIGHLIGHTS

- **Scenario analysis is a very useful tool to develop an understanding of how climate-related risks and opportunities might affect a business** – both risks and opportunities linked to the transition to a low-carbon economy and risks related to the physical impacts of climate change.
- The analysis of a sample of answers to 2017 CDP questionnaire shows that **only 5% of companies indicate using scenario analysis** to evaluate their climate-related risks and opportunities.
- Half of these companies are **based in Europe**.
- The use of climate-related scenario analysis is much more common among **oil and gas companies and energy utilities** than in other sectors of activity.
- Among companies that disclose carrying out a scenario analysis of their **transition risks**:
  - about 40% indicate using **tailored scenarios, in general internally designed and modelled**;
  - only half explicitly mention using a **2°C or more ambitious scenario**.
- Among companies that disclose carrying out a scenario analysis of their **physical risks**:
  - about 25% indicate using **external scenarios and tools, in most cases those put together by the IPCC**.
- There seems to be confusions in the **way climate-related scenarios are understood and used**, and a need for guidance on this topic has been identified.

## Introduction

Climate change induces disruptions of our ecosystems, and the transition to a low-carbon economy significantly affects the political, economic and social landscapes. **Businesses have to adapt to those changes, which entails risks and opportunities**. Some changes are already visible today, but the deepest changes are expected to materialize over the mid to long term, and there is a lot of uncertainty around their timing and magnitude. In this context, **the use of forward-looking scenarios is particularly useful to evaluate the resilience of a business to a range of future states**. Scenarios are indeed hypothetical constructs meant to highlight central elements of a possible future and to draw attention to the key factors that will drive future developments. Applied to climate-related issues, they can be used to develop an understanding of **how the risks and opportunities of climate change might impact the business over time**.<sup>1</sup> For this reason, the Task-Force on Climate-related financial disclosures (TCFD) set up by the Financial Stability Board (FSB) recommends the use of scenarios to assess potential business implications of climate-related risks and opportunities, and the disclosure of these analyses to investors and other stakeholders. The aim of this Climate Brief is to **give an overview of the degree of implementation of the TCFD recommendation** on the use of scenario analysis to evaluate climate-related risks and opportunities (see the box below for the taxonomy of climate-related risks). The analysis is based on the 2017 answers of a sample of 2,003 companies to CDP Climate Change questionnaire, which is the most comprehensive database available on the strategy of companies concerning climate-related issues.<sup>2</sup>

The TCFD divides climate-related risks into two major categories: risks related to the transition to a lower-carbon economy – **transition risks** – and risks related to the physical impacts of climate change – **physical risks**.

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<sup>1</sup> These definitions are derived from the Technical Supplement of the TCFD on the Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities.

<sup>2</sup> Our analysis of the answers to CDP questionnaire made very clear that the term "climate-related scenario analysis" bears different meanings for companies. This Climate Brief does not take into account companies that use scenario analysis to align their strategy to a given climate objective. The methodology used to identify companies that give information indicating that they carry out scenario analysis to evaluate climate-related risks and opportunities as recommended by the TCFD is explained in the Technical Supplement to this Climate Brief. With a view to simplification, those companies are referred to as "companies disclosing their use of climate-related scenario analysis" in this Climate Brief.

## A small fraction of companies disclose carrying out a scenario analysis of their climate-related risks and opportunities

About a **hundred companies** disclose using climate-related scenario analysis in their answer to CDP questionnaire (see Figure 1). They represent approximately **5% of the sample**.

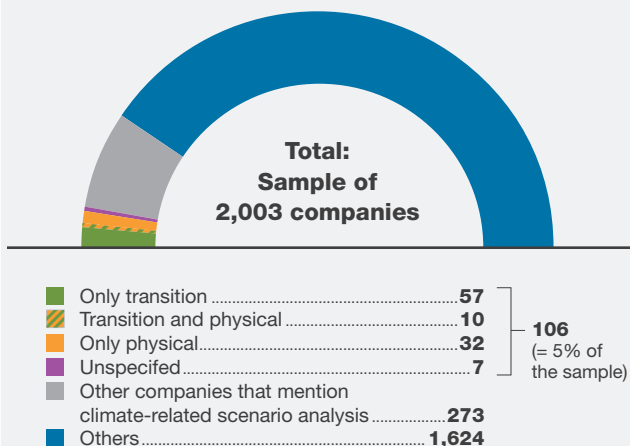
The use of scenario analysis to assess transition risks is slightly more common than to assess physical risks (respectively 67 companies – around 3% of the sample – and 42 companies – around 2% of the sample). A very small number of companies disclose that they use scenario analysis both to assess their transition and physical risks (10 companies, which represents 0.5% of the sample). Seven companies indicate using scenario analysis to assess their climate-related risks and opportunities, but the information given is not sufficient to infer whether the objective is to assess transition or physical risks.

The proportion of companies disclosing the use of scenario analysis varies significantly across sectors of activity. While more than 20% of energy utilities and oil and gas companies from the sample indicate that they use scenario analysis, this proportion falls drastically in other sectors (see Figure 2). These two sectors, in which scenario analysis has already been applied to other issues than climate change for many years, also provide the highest absolute numbers of companies disclosing their use of climate-related scenario analysis.

Unsurprisingly, almost all oil and gas companies that indicate using scenario analysis focus on the evaluation of their resilience to the low-carbon transition. The focus on transition risks is also visible in some other sectors: insurance and financial services, energy utilities and other manufacturing industry. On the contrary, scenario analysis in all the other sectors – except mining,

**FIGURE 1. NUMBER OF COMPANIES DISCLOSING THAT THEY CARRY OUT A SCENARIO-BASED ANALYSIS OF THEIR CLIMATE-RELATED RISKS AND OPPORTUNITIES**

About a hundred companies – 5% of the sample – give information indicating that they carry out a scenario-based analysis of their climate-related risks and opportunities.



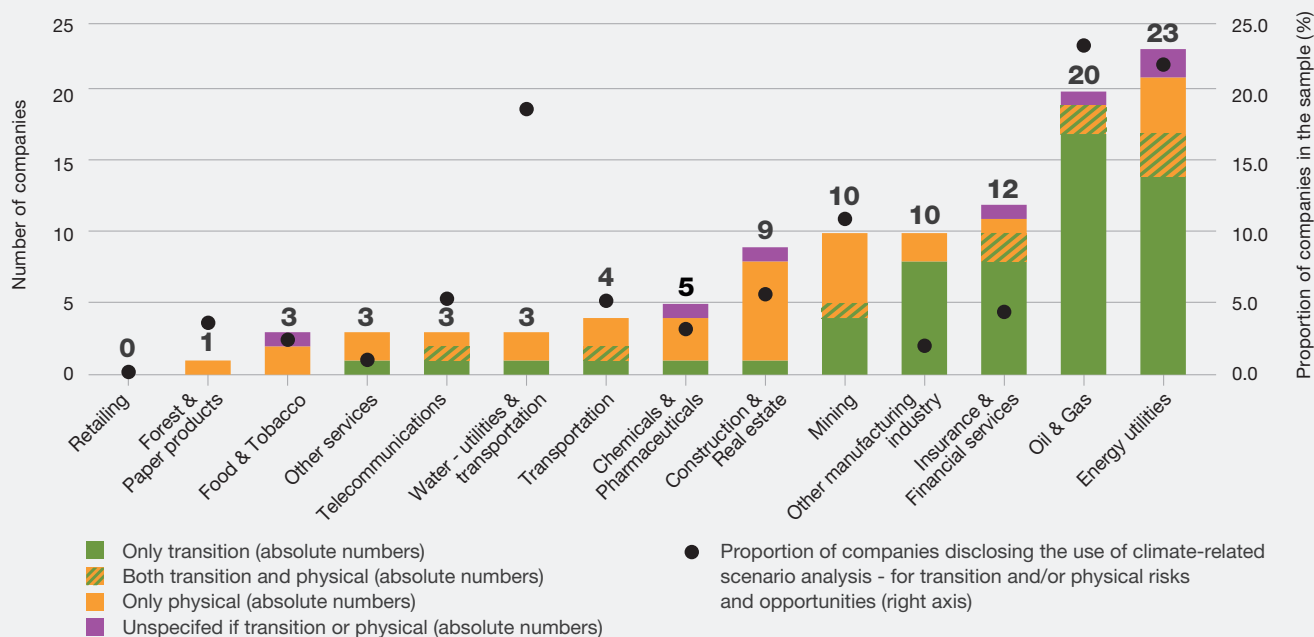
Source: I4CE, 2018, based on data provided by CDP

Note: Companies represented in the grey area are companies that indicate using climate-related scenario analysis, but either the information provided corresponds to something different from an analysis of climate-related risks based on scenarios or it is not sufficient to infer that companies carry out an analysis of their climate-related risks based on scenarios. More information on the methodology is provided in the Technical Supplement to this Climate Brief.

for which the situation is more balanced – is largely dedicated to the evaluation of the physical risks of climate change. Some absolute numbers are however too small to be truly meaningful.

**FIGURE 2. NUMBER OF COMPANIES DISCLOSING THAT THEY CARRY OUT A SCENARIO-BASED ANALYSIS OF THEIR CLIMATE-RELATED RISKS AND OPPORTUNITIES BY SECTOR - IN ABSOLUTE NUMBER (LEFT AXIS) AND IN PROPORTION (RIGHT AXIS)**

The proportion of companies that inform carrying out scenario analysis reaches respectively 23% and 22% in the oil and gas sector and among energy utilities.



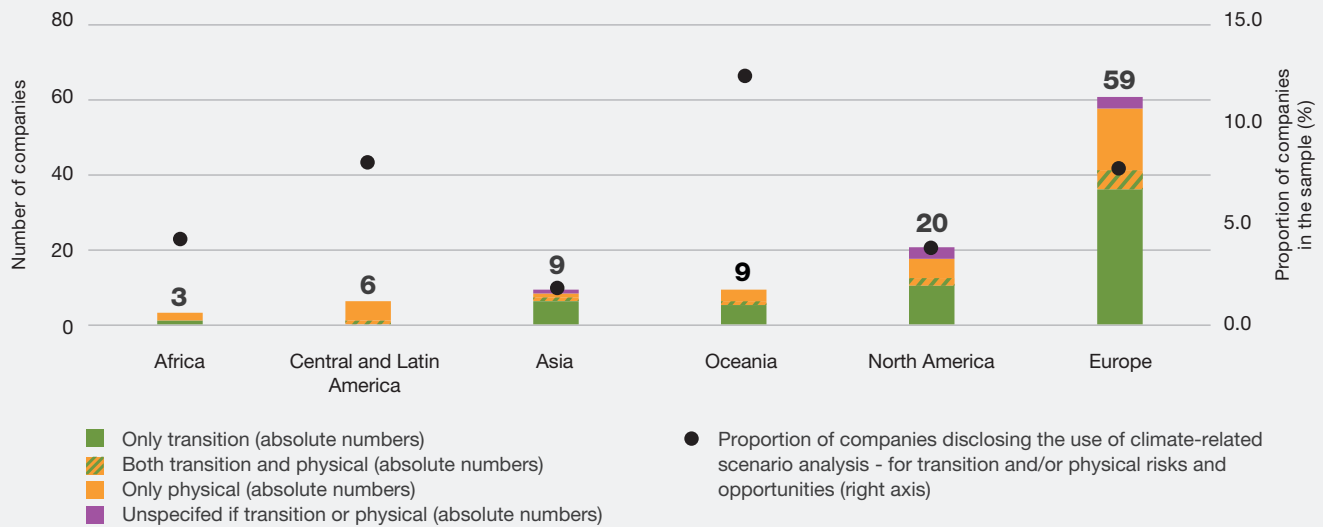
Source: I4CE, 2018, based on data provided by CDP

Note: When interpreting the absolute number and the proportion of companies disclosing the use of scenario analysis in the different sectors, it should be kept in mind that the sizes of the sectorial samples are very unequal: from 16 companies for “Water – utilities and transportation” to 490 for “Other manufacturing industry”.\*

\* Please refer to the Technical Supplement for the sectorial and geographical distributions of the total sample of companies.

**FIGURE 3. NUMBER OF COMPANIES DISCLOSING THAT THEY CARRY OUT A SCENARIO-BASED ANALYSIS OF THEIR CLIMATE-RELATED RISKS AND OPPORTUNITIES BY GEOGRAPHICAL AREA - IN ABSOLUTE NUMBER (LEFT AXIS) AND IN PROPORTION (RIGHT AXIS)**

More than half of the companies that inform carrying out scenario analysis are based in Europe.



Source: I4CE, 2018, based on data provided by CDP

Note: When interpreting the absolute number and the proportion of companies disclosing the use of scenario analysis in the different geographical areas, it should be kept in mind that the size of the geographical samples are very unequal: from 71 companies in Africa to 754 in Europe\*.

\* Please refer to the Technical Supplement for the sectorial and geographical distributions of the total sample of companies.

The proportion of companies that disclose carrying out scenario analysis varies from less than 2% in Asia to almost 13% in Oceania (see Figure 3). In total, **more than half of the companies that disclose using scenario analysis are based in Europe** (59 out of 106).

Scenario-based analysis of climate-related risks and opportunities seems concentrated in a handful of countries. Countries totaling the highest numbers of companies disclosing their use of scenario analysis are the **USA (15), the UK (12), France (10), Australia (8), and Germany (8)**. Companies based in those countries represent **half of the companies disclosing they use scenario analysis**. Among those five countries, the proportion of companies that disclose using scenario analysis is the highest in Australia and France, where it reaches 13% in both cases.

## Information provided by companies on their scenario analyses

### Transition risks

**About 40% of companies that disclose carrying out a scenario-based analysis of their transition risks indicate using tailored scenarios** – either elaborated by a research center (2 companies), or internally designed and modelled (25 companies) (see Figure 4). The great majority of these companies (20 out of 25) are from the energy sector (energy utilities or oil and gas companies).

Some of these companies explain that they have also stress-tested the resilience of their portfolio under some of the parameters of a 2°C scenario elaborated by the International Energy Agency (IEA).

Another fourteen companies inform that they use publicly available scenarios for the analysis of their transition risks and opportunities. All of them but one say explicitly that they use

**IEA scenarios**, in some cases among other scenarios (without information on the origin of these other scenarios).

Finally, for some companies, transition scenario analysis takes place within an industry federation.

Among companies that disclose carrying out a scenario analysis of their transition risks and opportunities, **only half (33 companies) explicitly mention using a 2°C or more ambitious scenario** (about 1.6% of the total sample). A third of them (22) provides no information on the climate ambition of scenarios considered.

**FIGURE 4. INFORMATION GIVEN BY COMPANIES ON THEIR TRANSITION RISKS SCENARIO ANALYSIS**

More than a third of companies that disclose conducting a scenario analysis of their transition risks indicate using scenarios developed with their internal modelling capabilities.



Source: I4CE, 2018, based on data provided by CDP

## Physical risks

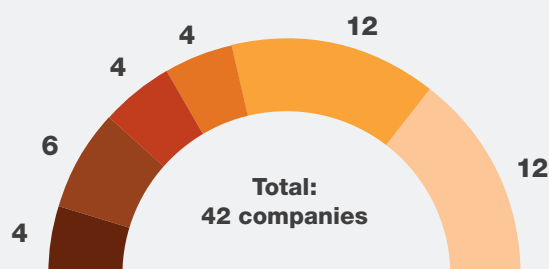
About a fourth of companies that disclose carrying out a scenario-based analysis of their physical risks indicate that they use external scenarios and tools (see Figure 5). Almost all of them use the **Representative Concentration Pathways (RCPs)** of the Intergovernmental Panel on Climate Change (IPCC).<sup>3</sup> Some of them use the **Aqueduct tool developed by the World Resources Institute (WRI)** – a risk-mapping tool that helps understand potential water risks, taking into account the impact of climate change.<sup>4</sup> A company bases its scenario analysis on UK Climate Projections (UKCP09<sup>5</sup>).

A few companies say that they **cooperate with a research center to better understand the possible impacts of climate change** – such as the impact on the hydroelectricity potential in a given region, or the link between climate change and the occurrence of extreme weather events – to feed into their risk assessment.

Some others just indicate taking into account the results of climate research in their assessment of physical risks linked to climate change, but they do not mention the source, and some give the temperature pathways considered: all of them take into account at least a scenario with a warming of 2°C or more.

**FIGURE 5. INFORMATION GIVEN BY COMPANIES ON THEIR PHYSICAL RISKS SCENARIO ANALYSIS**

About a fourth of companies that disclose conducting scenario analyses of their physical risks explicitly mention using external scenarios and tools.



- Take into account results from climate science research in their scenario analysis
- Cooperate with external technical experts or have hired a consultancy
- Cooperate with research centers to better understand the possible impacts of climate change
- Consider one or several scenarios resulting in a given temperature pathway
- Use external scenarios and tools
- No information

Source: I4CE, 2018, based on data provided by CDP

## Some confusions in the way scenarios are understood and used

Based on the answers to CDP questionnaire, there seems to be some confusion over the **understanding of the concept of scenario**, in particular a **conflation of scenarios and forecasts**. For example some companies oppose a scenario – considered as a forecast of the future – with other scenarios deemed hypothetical, such as a 2°C scenario. Furthermore, some companies highlight the difficulty of using scenario analysis to evaluate their physical risks because of the uncertainty around the possible evolution of climate. Scenario analysis is precisely useful to explore a variety of possible future states in a context of uncertainty.

There also seems to be a **confusion between the different types of scenarios that exist** (in particular scenarios presenting mitigation pathways and scenarios presenting the impacts of climate change), and between the organizations developing these scenarios. Besides, some companies mention using scenarios that date back to more than ten years ago, while both climate change science and scenarios presenting mitigation pathways have greatly evolved during this period.

Furthermore, there seems to be a need for methodologies to integrate forward-looking scenarios into risks assessments. For example, a significant number of companies indicate that they have assessed their physical risks (e.g. linked to extreme weather events) based on historical data series, which does not enable to evaluate the effect of climate change on the probability of occurrence and the severity of hazards. A few companies mention collaborating with research centers to better understand the possible impacts of climate change, and integrate them into their risk assessments.

## Conclusion

Scenario analysis is a very useful tool to evaluate the resilience of a business to a range of future states. Its application to climate-related risks and opportunities is however very recent. **For now, only a small proportion of companies indicate that they have implemented climate-related scenario analysis** (5% of the sample analyzed), but it seems to spark more and more interest, with some companies mentioning their intention to carry out scenario analysis in a near future. Another observation is that there seems to be **confusions in the way climate-related scenarios are understood and used**.

Based on these results, we identified a need for **guidance on climate-related scenarios and on how to carry out scenario analysis**. This publication will be followed by additional work on climate-related scenario analysis over the course of 2019, which will be publicly available:

- An **informative publication on climate-related scenarios** to explain key concepts and provide a framework to interpret scenarios;
- An analysis of the **information needed by financial stakeholders** to assess the vulnerability of their portfolio to transition risks, based on scenario analyses carried out by companies, and the evaluation of the information currently disclosed by non-financial companies;
- A **“step-by-step” guide on how to carry out a scenario-based analysis** of transition risks and opportunities for non-financial companies.

3 The RCPs of the IPCC are scenarios that include time series of emissions and concentrations of greenhouse gases (GHGs) and represent more or less drastic efforts to reduce global GHG emissions. The IPCC fifth Assessment Report presents projected changes in the climate system for the different RCPs. Please refer to the Technical Supplement for a detailed Glossary.

4 The Aqueduct tool is available online: <https://www.wri.org/our-work/project/aqueduct>

5 UK climate projections is a climate analysis tool that provides climate change projections out to 2100 in the UK and globally. A new version of UK climate projections was made public in November 2018 (UKCP18), available online: <https://www.metoffice.gov.uk/research/collaboration/ukcp>.