

HOW TO IMPROVE CLIMATE-RELATED REPORTING

SUPPLEMENT 2:
SCENARIO ANALYSIS PRACTICES

*ASSESSING RESILIENCE,
RISKS AND OPPORTUNITIES*

HOW TO IMPROVE CLIMATE-RELATED REPORTING

SUPPLEMENT 2:
SCENARIO ANALYSIS PRACTICES

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Disclaimer

This supplement, *Supplement 2: Scenario analysis practices*, the related main report [How to improve climate-related reporting: A summary of good practices from Europe and beyond](#) and the first accompanying supplement, [Supplement 1: Climate-related reporting practices](#) have been prepared by the European Lab Project Task Force on Climate-related Reporting (PTF-CRR) for making available in the public domain. The contents of the main report and its two supplements are the sole responsibility of the PTF-CRR. The European Lab Steering Group Chair has assessed that appropriate quality control and due process had been observed and has approved the publication of the main report and its two supplements.

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References to specific screenshots from corporate reports as ‘good reporting examples’ do not imply that the overall climate-related reporting of the associated company is considered to be good. Screenshots from corporate reports may not provide all the relevant information, and further information and context may be provided in the associated corporate report. For each screenshot, a reference to the corporate report, or other source from which it was extracted, is included.

This supplement, the related main report and the second accompanying supplement include interactive links to facilitate readers accessing the source documents of the good reporting examples and reference material included. All such links were active and functioning at the time of publication.

Questions about the European Lab and its projects can be submitted to EuropeanLab@efrag.org.

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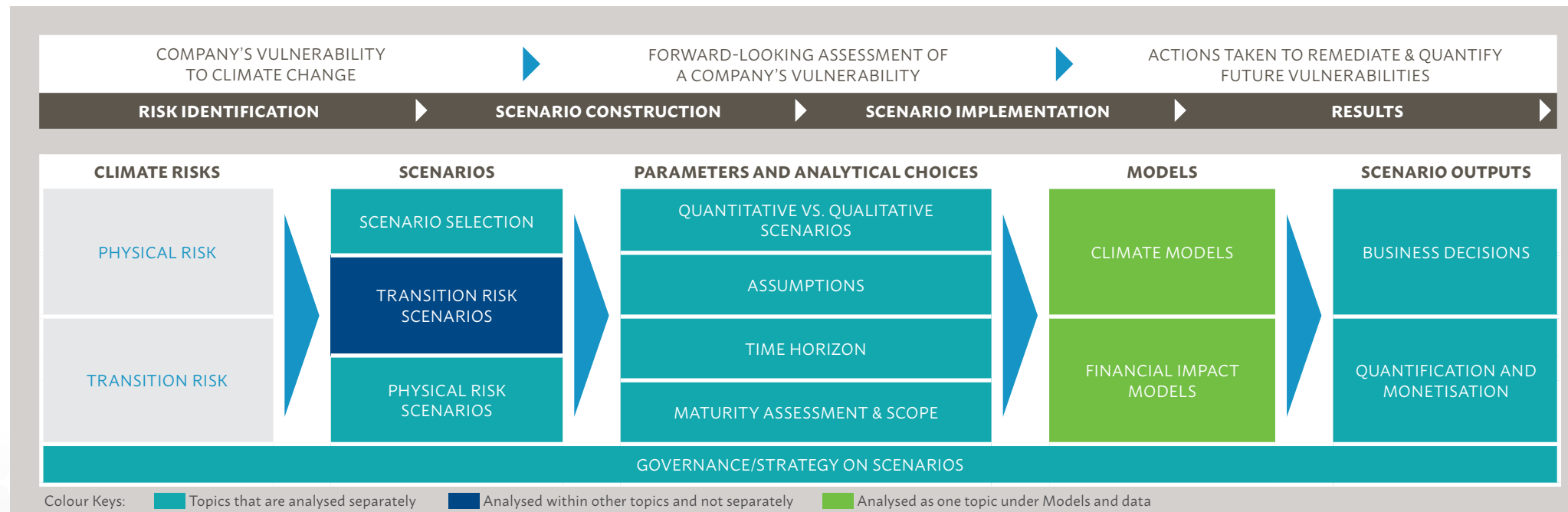
In order to provide insights on useful scenario analysis information, the PTF-CRR focused on identifying good scenario analysis practices that could inspire companies in their implementation of [Task Force on Climate-related Financial Disclosures \(TCFD\) recommendations](#).

To do this, scenario analysis was broken down into a set of building blocks (see diagram below). A detailed topic analysis was carried out for the key building blocks, based on the review of a targeted sample of companies as described in the 'Sample selection' section [How to improve climate-related reporting: A summary of good practices from Europe and beyond](#).

There is an overall analysis of ten topics. Climate models and Financial impact models are treated as one topic under 'Models and data'. It should be noted that 'physical risk scenarios' is a topic of analysis but there isn't a separate analysis of 'transition risk scenarios' because of the following: companies more frequently report on transition risk than they do on physical risk; and transition risk is incorporated within the rest of the analysed topics.

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Below is a high-level overview of what is covered in each of the ten topics, as well as the names and sectors of the companies that are referred to as examples of good reporting for that topic. Overall, 39 examples (38 examples from 21 companies and one mock-up example) are included within the analysis of the ten topics. The 21 companies include 19 large capitalisation companies (i.e. market capitalisation

greater than €15 billion), two medium capitalisation companies (CNP Assurances and Landsec) and one unlisted company (ATP). Multiple illustrative examples have been included because scenario analysis is a relatively new and challenging climate reporting aspect. Therefore, showing many illustrative examples on different aspects of scenario analysis will benefit both reporting preparers and users.

Topic	What is covered?	Examples
GOVERNANCE/STRATEGY ON SCENARIOS		
Governance/strategy on scenarios	Governance in relation to scenarios and integration into strategic decisions	BP (oil and gas), Eni (oil and gas), Unilever (consumer goods)
PARAMETERS AND ANALYTICAL CHOICES		
Quantitative vs. qualitative scenarios	Choice between qualitative, quantitative or 'directional' scenario analysis approach	Lendlease (property development), Oil Search (oil and gas), Société Générale (banking)
Assumptions	Transparency on qualitative and quantitative assumptions	Arcelor Mittal (steel), ATP** (pension fund), Citibank (banking), Oil Search (oil and gas)
Time horizon	Integration of time horizon into scenario analysis and specific meaning of short term, medium term and long term	Aviva (insurance), Rio Tinto (mining), South32 (mining), Société Générale (banking)
Maturity assessment and scope	Progress on scenario reporting journey and portion of operations and value chain that are included in the scenarios	Citi (banking), CNP Assurances* (insurance), Equinor (oil and gas), Rio Tinto (mining), South32 (mining), Oil Search (oil and gas)
SCENARIOS AND MODELS		
Scenario selection	Choice of scenarios and disclosure of process and rationale for scenario selection	EDP (utility), GALP (oil and gas), Iberdrola (utility), Rio Tinto (mining), South32 (mining)
Physical risk scenarios	Physical risk disclosure	Commonwealth Bank of Australia (banking), Landsec* (real estate), South32 (mining)
Models and data	Transparency and clarity on the models and data used for scenario modelling	Aviva (insurance), ATP** (pension fund), Citibank (banking), CNP Assurances* (insurance), Unilever (consumer goods)
INTEGRATION INTO BUSINESS DECISIONS		
Scenario outputs and business decisions	Translation of scenario results into business decisions	AXA (insurance), Eni (oil and gas)
Quantification and monetisation of scenario outputs	Disclosure of impacts within scenario reporting (e.g. financial impacts such as EBITDA, NPV)	AXA (insurance), BHP Billiton (mining), Equinor (oil and gas), mock-up example

*Medium capitalisation (market capitalisation less than €15 billion)

**Unlisted

The analysis of each topic consists of current reporting practices, areas for improvement, and examples of good reporting practices. It also addresses the perspectives of both preparers and users of corporate reports on good reporting practices for each topic. The analysis is structured as follows:

Sub-heading	Question(s) addressed
Rationale for consideration	What is being addressed as part of the scenario topic? Why is this topic important for preparers and users? Why is it essential to tackle this topic?
Summary of current reporting practices	How do the companies whose scenario-related disclosures were reviewed by the PTF-CRR generally address the particular scenario topic?
Preparer and user perspective	What do preparers try to achieve, what challenges do they face? What do users of scenario analysis information expect to find in climate-related reports?
Areas for improvement	How can companies practically improve the quality of their current reporting on the scenario topic?
Selection of good reporting practices	What are good examples the PTF-CRR has identified for the scenario topic and why are they considered good examples?

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Rationale for consideration

The analysis below focuses on climate-related disclosures in terms of governance, management's role and responsibilities in relation to climate scenario analysis, and the integration of outputs from climate scenario analysis into overall strategy, policies and operations.

The TCFD final report explains that companies need to ensure that their governance process (1) integrates scenario analysis into strategic planning and/or enterprise risk management processes, (2) assigns oversight to the relevant board committees/sub-committees, and (3) identifies which internal (and external) stakeholders to involve, and how boards are accountable to shareholders for the long-term health of their companies. As such, they are also responsible to shareholders for overseeing the effective management of climate-related impacts on their companies.

Summary of current reporting practices

Among the reports reviewed by the PTF-CRR, there is limited evidence of adequate governance oversight of the scenario analysis process. For instance, there are only a few examples of companies

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disclosing processes demonstrating that the executive management and board are involved in climate-related decisions based on climate scenario analysis results. There is limited disclosure of both the governance structure supporting climate scenario analysis and the role of the board or senior management in the validation of the scenario analysis results is rarely mentioned. Companies also generally fail to detail how internal climate expertise is being developed and embedded into all operational teams impacted by climate change. However, the PTF-CRR did observe some good examples of linkages between scenario analysis and strategy or business objectives.

Preparer and user perspective

PREPARER PERSPECTIVE

Reporting on governance in relation to scenario analysis is a useful indicator for stakeholders of the maturity and sophistication of climate-related scenario analysis within companies. At the same time, the governance around scenario analysis needs to ensure that all relevant internal stakeholders are properly involved in the scenario analysis and strategic decision-making processes. The involvement of all key functions within the company is paramount if all relevant aspects of the impact of climate change adaptation and mitigation (e.g. socio-economic, technological, regulatory, environmental change) are to be taken into account, and to ensure optimal buy-in to the outcomes of the analysis. Because scenario analysis deals with uncertainties and calls for the review of a company's resilience in diverse, extreme and,

from a company perspective, potentially uncomfortable future states, management needs to take a strong leadership role to keep the exercise on track. They will also have to guide debates on controversial findings towards conclusions about the current status and how to improve robustness of scenario outcomes. The objective of this work is to make senior management comfortable with the assumptions used, the nature of the models they rely on, and the output obtained.

USER PERSPECTIVE

It is important to have a scenario analysis process and accompanying disclosure that reassures users that the company's board has considered how the company's business model and strategy may be affected by climate change. This includes how the board takes risks and opportunities into consideration, as well as their continuous, consistent management in view of changes in the environment over time. As investors increasingly factor in climate resilience when forming an investment view of a company, the board's approval of scenario analysis outputs has become an important source of reassurance for investors. As a result, the sophistication of the climate governance process can be seen by some investors as a proxy indicator of a company's performance. Any corporate strategy put forward by the board should integrate a range of potential climate scenarios in order to increase the directors' confidence that their strategic decisions are resilient. Investors also expect boards to demonstrate solid competence on climate change, be it amongst members themselves or via access to climate expertise.

Areas for improvement

Companies can improve how they report and demonstrate their maturity in strategy and governance on scenario analysis by making further disclosures around the following aspects:

- **Governance:** Disclosures around the governance oversight of the scenario analysis process (including its scope and narrative) and who is accountable for it. In particular, disclosures about the involvement of the board or senior management in the validation of the assumptions, parameters and models used. Boards should have enough collective awareness and understanding of potential business impacts of climate change, or at least have access to the expertise.
- **Strategy:** Disclosures about the use of scenario analysis to (1) understand the range of risks and opportunities associated with various scenarios, and (2) support the board/senior management's strategic decisions.
- **Resources and competence:** Disclosures detailing how internal climate expertise is being developed and embedded into all operational teams impacted by climate change, and what training senior management is receiving on the topic. It would also be useful to understand the resourcing strategy applied to the scenario analysis work.

Examples

On the next page are three examples of good reporting practices on governance around scenario analysis.

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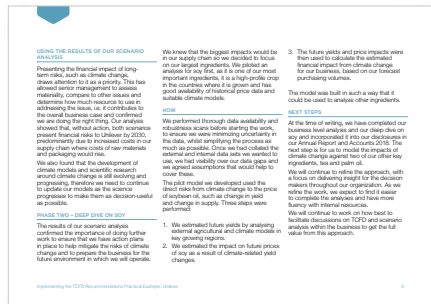
Unilever

Unilever company presentation, page 9



Why this example is selected

In a company presentation available on the Accounting for Sustainability (A4S) website, Unilever's management explains that scenario analysis has allowed senior management to assess materiality of climate change risk, compare this issue to other issues, and determine the resources needed to address it, i.e. it contributes to the overall business case and confirms that Unilever is integrating climate factors.



BP

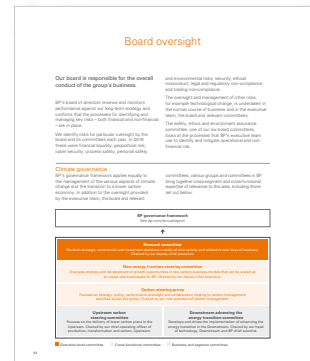
BP (2018) Sustainability Report 2018, page 64



Annual report and Form 20-F 2018, page 9

Why this example is selected

BP's Sustainability Report provides details of its climate governance framework and explains the executive accountability that is in place. It also relies on scenarios when defining long-term strategy.



Eni

Eni (2018) Path to Decarbonization report, page 4



Why this example is selected

Eni's climate change report explains that the company has a dedicated Sustainability and Scenarios Committee that examines climate scenarios as part of the preparation of its Strategic Plan.



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Rationale for consideration

The analysis and examples below are related to the choice of quantitative versus qualitative scenarios by companies that may be at different stages of maturity in the exploration or adoption of scenario analysis reporting. Companies in the earlier stages could start with qualitative narratives or storylines to explore the potential range of climate change implications. Experienced companies with greater sophistication in the use of datasets could be more inclined to have quantitative scenario analysis.

Summary of current reporting practices

Only a few of the reviewed companies with disclosed scenario analysis conduct in-house quantitative scenario modelling, while several others use quantitative scenarios from external providers. Some of the advanced examples of comprehensive quantitative scenario modelling are from the oil and gas sector, where scenario analysis thinking is more established, and from financial institutions that are participants in the [UNEP- Financing Initiative](#).



Quantitative vs. qualitative scenarios

Many of the reviewed companies that disclose scenario analysis tend to have qualitative descriptions of scenarios with minimal disclosure of quantitative scenario assumptions, models and outputs. There also are a few companies that disclose exclusively qualitative scenario narratives/storylines. The observed examples of exclusively qualitative scenarios lacked a description of possible company-specific implications and instead focused on the broad implications of climate-risk adaptation and mitigation at an industry, market and/or national economy level.

Preparer and user perspective

PREPARER PERSPECTIVE

Discussions and stakeholder outreach by the PTF-CRR highlighted that there is sometimes a difference between companies' internal progress on scenario analysis and the quantified information that they choose to disclose. For example, companies choose not to disclose quantified impacts for various reasons, including concerns about legal risk, commercial sensitivity of forward-looking information, and to minimise the risk of users misinterpreting the uncertain albeit plausible quantified long-term impacts.

Some preparers indicated that narrative scenarios can be helpful in fostering internal awareness and buy-in and ensuring alignment across different departments on the responses that should be made by the company to climate change risk. These scenarios can also be useful for educating investors about the potential implications of transition risk choices on the business model.

USER PERSPECTIVE

Both qualitative/narrative-driven and quantitative scenarios can be informative for users and are often seen as complementary. In outreach to stakeholders, users acknowledged the inherent uncertainty associated with quantified scenario analysis information. Nevertheless, they expressed support for quantitative scenarios, as these can be a step towards providing users with comparable scenario analysis information. As elaborated in the 'quantification and monetisation of scenario outputs' topic, quantified scenario analysis information could also be potential inputs to or help contextualise financial statements information (e.g., asset impairment). Users also indicated that they saw the benefit of qualitative scenarios, as these can reveal unquantifiable effects that companies are taking into consideration while analysing their resilience to climate change effects. They also show that management is at least considering the impact of climate risk on the business.

Areas for improvement

Explanation of choice: The PTF-CRR recognises that companies that are in the early stages of their journey in conducting and disclosing scenario analysis may start off with qualitative scenarios. At the same time, as noted earlier, some of the more advanced companies may be reluctant to disclose internally quantified scenarios due to concerns about commercial sensitivity and legal risk.

Therefore, it would be helpful for users if companies that choose exclusively qualitative scenarios could be more transparent about the

reasons for their choice. These could include whether a qualitative scenario approach is the most meaningful choice for their business model or whether it has only been adopted as a transitional choice whilst they are in the early stages of scenario analysis reporting, before adopting a quantitative approach. Similar transparency would be helpful from companies that either do not provide any scenario analysis information or only provide partly quantified and largely qualitative scenarios.

Company-specific focus: Qualitative scenarios that are focused on the broad implications for the economy and/or industry and include qualitative descriptions of cause and effect relationships can provide useful contextual information for the analysis of companies' risk. However, such qualitative scenarios could be even more informative if they outlined specific implications for the company – even if only by using qualitative descriptions or directional indicators of possible impact on specific variables (e.g. production capacity, production mix, product profile demand, profitability).

Examples

The next page has three examples of quantitative and exclusively qualitative scenarios from different sectors including financial, oil and gas and property investment.

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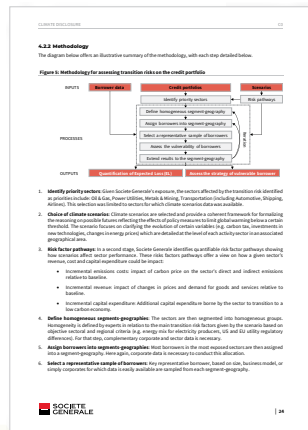
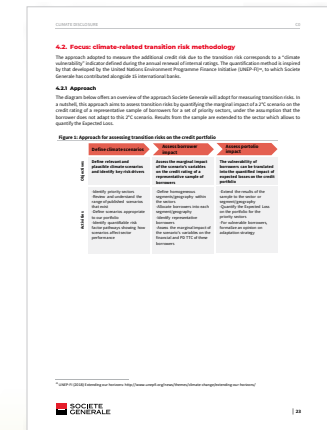
Quantitative vs. qualitative scenarios

Société Générale

Société Générale (2019) Climate Disclosure – Société Générale’s Task Force on Climate-related Financial Disclosures Report, pages 23 and 24

Why this example is selected

Société Générale’s TCFD report outlines the borrower impact assessment and the portfolio impact assessment to explain the quantitative scenario approach. Its disclosure of quantitative modelling is helpful in detailing its approach to assessing the adverse financial impact of climate change at the corporate borrower and investee level. This type of disclosure is insightful as stakeholders may have questions on how financial institutions model their borrower and investee companies’ exposure to climate risk given the usually incomparable and unquantified climate-related reporting by many companies.



Oil Search

Oil Search (2017) Climate Change Resilience Report, page 20

Why this example is selected

Oil Search’s Climate Change Resilience Report discloses quantitative scenario analysis, outlining how it generates oil and price forecasts based on third-party scenarios and applies these forecasts to internal models and resilience assessment. Furthermore, in other parts of its report, Oil Search discloses an outline of related quantitative assumptions and a summary of possible portfolio impacts.

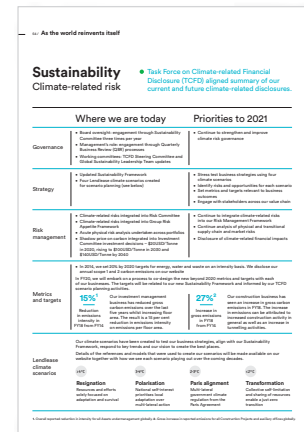


Lendlease

Lendlease (2019) Lendlease Annual Report 2019, page 54

Why this example is selected

Lendlease’s Annual Report includes an example of qualitative, narrative scenarios. Lendlease indicates that details of references and models used for these scenarios will be available on its website. Furthermore, the concise, easily understandable disclosure gives a sense of where Lendlease is on a journey towards what seems to be the possible consideration of quantitative scenarios at a future date (e.g. stress testing business strategies is included in ‘Priorities to 2021’).



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Rationale for consideration

The analysis and examples below are related to the disclosure of qualitative and quantitative assumptions applied for scenario analysis. The disclosure of qualitative and quantitative scenario parameters and assumptions can help preparers to highlight circumstances that are unique to their companies and enable users to contextualise and interpret the reported scenario analysis outputs, including companies' expected financial impact and business decisions. Such disclosure is consistent with the TCFD's fundamental principles of effective disclosure, which recommend that disclosures should be specific and complete, and further note that "For future-oriented data, this includes clarification of the key assumptions used. [...] Where appropriate, the organization should also demonstrate the effect on selected risk metrics or exposures to changes in the key underlying methodologies and assumptions, both in qualitative and quantitative terms."

Summary of current reporting practices

There are varied practices in the disclosure of scenario assumptions across the companies reviewed by the PTF-CRR. Among these companies, some have comprehensive disclosure of their relevant

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scenario-related assumptions, but many do not adequately disclose these assumptions. Some companies tend to only disclose market outlook or industry level scenario related assumptions with no clear link or outline of implications for the companies' specific circumstances.

Preparer and user perspective

PREPARER PERSPECTIVE

The varied levels of disclosure of scenario assumptions could reflect a struggle by preparers to determine what assumptions to disclose without having a sufficient understanding of what would be helpful for users. Many [respondents to the EU Non-Binding Guidelines \(NBG\) consultation](#) felt that the current guidelines would not enable comparable reporting by companies and that for scenarios to actually be used in the market, more direct guidance was needed (e.g. on which scenarios to use, across which time horizons, and based on which assumptions). The need for additional guidance on assumptions was echoed by some preparers participating in the PTF-CRR outreach.

Concerns about legal risk and commercial sensitivity is also a factor that influences the willingness of preparers to disclose quantified inputs used in scenario analysis.

USER PERSPECTIVE

During the PTF-CRR internal discussions and stakeholder outreach, users indicated that they recognise that scenario analysis is intended for companies to assess and communicate their resilience to climate change risk, and that it is not a prediction of companies' future cashflows or a projection of exposure. This is because probabilities of occurrence are not considered when conducting scenario analysis.

Nevertheless, to contextualise this information, users expect transparency on key quantitative assumptions related to the inputs and models used to conduct scenario analysis. These include assumptions about carbon prices under different scenarios, implications of key supply/demand assumptions and any other key model inputs. Users expressed the need to understand how carbon price assumptions and policy choices translate to specific sectoral and company-specific impacts.

The disclosure of quantitative assumptions can, to some extent, enable users to have a sense of the comparability of quantified scenario analysis information across reporting companies. But as confirmed during the PTF-CRR outreach, users also recognise that key quantitative assumptions will differ across sectors, and that there are potential limitations with some of the disclosed key assumptions as highlighted in the [2019 Massachusetts Institute of Technology \(MIT\) publication](#). For example, a question could arise about whether any underlying carbon prices included in the scenario analysis have taken co-operative and coordinating actions across jurisdictions into account, and whether different carbon prices should be applied across different jurisdictions. In addition, the assumptions could include unproven technologies (e.g. carbon capture storage and net emissions technologies).

Some users assess the resilience of companies starting from financial statements information and therefore emphasised the usefulness of an alignment between assumptions related to scenario analysis and financial statements information (e.g. outlook of commodity price in scenario analysis versus asset impairment-related commodity assumptions, discount rates etc.) or alternatively, of disclosures that highlight and explain any differences.

In addition to the usefulness of quantitative assumptions, users also expressed the importance of disclosure of qualitative assumptions in helping them better understand companies' strategic adaptation choices.

Areas for improvement

Companies could consider communicating key scenario assumptions in a manner that is comprehensive and informative on the specific business context of the company (i.e. that goes beyond only giving a broad market and industry outlook). Companies could also consider explaining if, how and why any key assumptions that were applied for scenario analysis may differ from similar assumptions related to their financial statements information (e.g. asset impairment-related assumptions such as discount rate, or time horizon related to financial asset impairment).

Examples

The four examples shown on the following pages include disclosures of both qualitative and quantitative assumptions relating to transition risk and physical risk.

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Citibank

Citigroup (2018) Finance for a Climate-Resilient Future – Citi's TCFD Report, pages 16,13 and 12



Why this example is selected

Citibank's TCFD Report discloses the underlying assumptions for transition scenarios related to two sectors (oil and gas, and utilities). It also discloses assumptions for the underlying REMIND model. As noted in the 'models and data' topic analysis, model assumptions are useful for assessing scenario analysis outputs.

The screenshots show detailed text-based assumptions for various scenarios, including key scenario assumptions, transition scenario analysis, and a table of key scenario assumptions. The text discusses the impact of different scenarios on the company's portfolio and the underlying REMIND model.

Oil Search

Oil Search (2017) Climate Change Resilience Report 2017, pages 24, 25, 34



Why this example is selected

Oil Search's Climate Change Resilience Report discloses underlying transition risk assumptions related to three reference scenarios and presents them in a reader-friendly table. Oil Search separately discloses its internally applied assumptions. It also has a 'Scenario insights' section that explains underlying assumptions of the three reference scenarios, includes oil and gas price projections and signposts the key takeaways.

The screenshots show the 'Scenario Insights' section with charts and text explaining the underlying assumptions of three reference scenarios. It also includes a table titled 'Key Scenario Assumptions' with columns for Scenario, Reference Scenario, and Key Assumptions. The table lists scenarios like 'Reference Scenario 1' and 'Reference Scenario 2' with their respective assumptions.

The screenshot shows the 'Basis of Preparation' section, which details the methodology and data sources used in the scenario analysis. It includes a list of key assumptions and the scope of the analysis.

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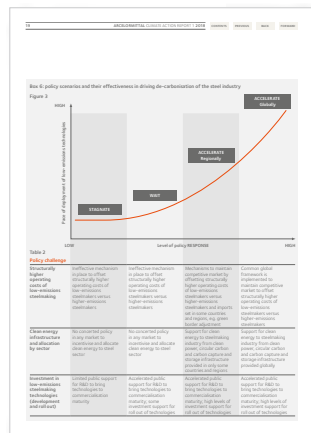
Arcelor Mittal

Arcelor Mittal (2019) Climate Action Report 1, pages 18 and 19



Why this example is selected

Although the below example of narratives/qualitative scenarios from Arcelor Mittal's Climate Action Report only outlines industry information, there is a qualitative description of the assumptions behind each scenario, and a graph that highlights two key transition risk levers (policy response and technology choice). These assumptions give context to the description – made elsewhere in the report and outside the scenario analysis section – of how adopting six new technologies could have a potential impact (in percentage terms) on Arcelor Mittal's operating and capital expenditure.



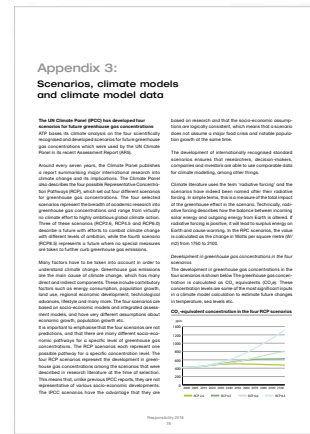
ATP

ATP (2018) Responsibility Statement, pages 78 and 79



Why this example is selected

ATP's Responsibility Statement describes the assumptions used for four Representative Concentration Pathway (RCP) scenarios. These scenarios model different levels of temperature rise while assessing the climate change exposure of its five forest investments.



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Rationale for consideration

The analysis and examples below relate to the extent to which companies integrate time horizon assumptions into scenario analysis, and disclose what they specifically consider to be short-, medium- and long-term horizons. The TCFD guidance calls for companies to disclose what they consider to be short-, medium- and long-term horizons taking into account the useful life of their assets, and what they consider to be the implications of timing in the scenarios used. Similarly, [REQ-02 of the Climate Disclosure Standards Board \(CDSB\) Framework](#), highlighted in the [2019 SASB-TCFD implementation guide](#), requires that disclosures include the timelines, targets, and KPIs used to assess the effectiveness of an organization's environmental strategy and policies.

Time horizon disclosure informs on possible risk impacts across different time frames: The impact of climate risk factors can vary according to time horizons and can depend on the choice of measures to limit global warming (e.g. carbon taxes, adoption of new environmentally friendly technologies) under different scenarios. For example, in the long term, the crystallisation of physical risk exposures

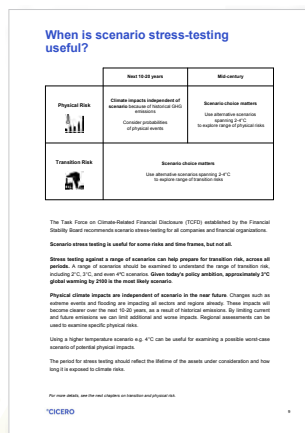


Time horizon

will depend on the choice of mitigation measures. While measures implemented to ensure a 2°C or lower rise in temperatures will likely limit medium- to long-term physical risk exposures, other transition scenarios (e.g. limiting to a 3 or 4°C temperature rise) or late political response may lead to increases in physical risk exposures in the future. In contrast to long-term physical risk exposures, short-term physical risk exposures are likely to be more certain and difficult to offset.

Relevance of time horizon for analytical choice: The appropriateness of conducting scenario analysis and the choice between qualitative and quantitative scenarios can depend on the time horizon being considered. For example, a [2018 Cicero Climate Finance](#) publication suggests a differentiated approach towards the analysis of physical risk according to the time horizon being considered (see below diagram). A similar view was expressed in the [May 2018 European Bank for Reconstruction and Development \(EBRD\)](#) publication, which stated that for shorter time horizons, taking the probabilities of events into account is more appropriate than performing scenario analysis.

Cicero-Climate Finance, Climate Scenarios Demystified 2018, page 9



Summary of current reporting practices

Only a few of the reviewed companies' disclosures specified what they considered to be short-, medium- and long-term horizons and how these different time horizons are integrated into scenario analysis and the related business decisions. In many cases, companies only have qualitative descriptions of time horizon, or none at all.

Preparer and user perspective

PREPARER PERSPECTIVE

The disclosure of climate risk factors according to clear and distinct time horizons can help companies and their stakeholders identify, analyse and mitigate climate risk exposure (i.e. physical and transition risk) and/or capitalise on opportunities. In other words, a clear breakdown of time horizons can enhance business planning and decision making.

Furthermore, the PTF-CRR internal discussions and stakeholder outreach confirmed that, to be meaningful, the time horizons applied in scenario analysis should extend to climate change time horizons (e.g. considering the impacts that may arise in 2050 and 2100). However, there is an acknowledgment that the climate change time horizons may extend beyond the planning horizon for some business models, and that this may explain why some companies do not specify what short term, medium term and long term means for them.

USER PERSPECTIVE

During PTF-CRR discussions and the stakeholder outreach, users emphasised the importance of the visibility of companies' specific definition of time horizon. This helps users compare and assess time horizon definitions across similar companies, and lets them challenge companies that appear to have unusual definitions. Users also highlighted that companies tend to quantify short-term horizon impacts and qualitatively consider impacts due to long-term risks and opportunities.

The importance for users of the disclosure of time horizons has also been highlighted by several publications including a [2018 Climate scenario compass report by Kepler Cheuvreux](#) that was informed by the viewpoints of 150 analysts. It highlights that climate-related risks tend not to be fully captured and priced by current financial models, analyses or recommendations, and that they are considered unevenly across sectors. This noted failure to incorporate climate risk could, in part, arise due to the difficulty users may face in distinguishing the climate-related risks and opportunities that relate to different time horizons. A [2018 Principles for Responsible Investment \(PRI\) publication](#) on environmental, social, and governance (ESG) issues and credit risk also raises the importance of time horizon for investors. The PRI publication notes that time horizon considerations depend on the visibility of future risks, the probability that they will materialise, and whether they impact investee companies' cash flow and balance sheet and companies' ability to adjust their business models.

Hence, the disclosure of which time horizons are being considered can potentially help inform users about the uncertainty associated with companies' future cash flows, and to identify which possible future impacts could be meaningfully included in valuation and risk analysis models.

Areas for improvement

The disclosure of time horizon assumptions and their effective integration into scenario analysis is an area for possible improvement for many companies. Consideration of long-term climate change-relevant time horizons further enhances scenario analysis. Finally, the time horizon-based disaggregation of risk factors will make reports more informative for users if it is done for all material climate risk factors.

Examples

On the following pages are four examples of good reporting practices in specifying and integrating time horizon into scenario analysis.

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Time horizon

Rio Tinto

Rio Tinto (2018) *Our approach to climate change 2018*, pages 18 and 23



Why this example is selected

Rio Tinto's climate change report discloses sensitivity analysis and scenario analysis information related to both physical and transition risk. The disclosure clarifies the meaning of time horizon as follows: short to medium term (0 to 20 years) and long term (20 to 50 years). Furthermore, Rio Tinto distinguishes the potential impact of a 2°C scenario on its commodity product profile (iron ore, copper and aluminium) by time horizon. In a different section of the report, it also highlights that the analytical approach to physical risk exposure depends on time horizon.

The screenshot shows two pages from Rio Tinto's 2018 climate change report. The left page, titled 'CLIMATE SCENARIOS', discusses the company's approach to climate change, including a 2°C scenario and a 1.5°C scenario. It includes a 'Pace of technology change' chart showing the transition from fossil fuels to renewable energy. The right page, titled 'Energy Transitions Commission: hard-to-abate sectors', discusses the company's approach to climate change, including a 2°C scenario and a 1.5°C scenario. It includes a 'Pace of technology change' chart showing the transition from fossil fuels to renewable energy.

Société Générale

Société Générale (2019) *Climate Disclosure – Société Générale's Task Force on Climate-related Financial Disclosures Report*, pages 10, 11, 20



Why this example is selected

Société Générale's Climate Disclosure includes time horizon considerations for credit analysis purposes, and highlights that while climate risks and opportunities may not influence immediate decision-making, they could influence long-term strategy. Société Générale then discloses how different climate scenarios are applicable for different time horizons.

The screenshots show three pages from Société Générale's 2019 Climate Disclosure report. The first page, titled '3. STRATEGY', discusses the company's approach to climate change, including a 2°C scenario and a 1.5°C scenario. The second page, titled '3.1. Climate-related risks identified', discusses the company's approach to climate change, including a 2°C scenario and a 1.5°C scenario. The third page, titled '3.1.1. Risk taxonomy used', discusses the company's approach to climate change, including a 2°C scenario and a 1.5°C scenario.

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South32

South32 (2018) Our Approach to Climate Change 2018, page 17



Why this example is selected

The South32 climate change report disclosure includes an outline of how different time horizons are mapped to different transition risks (policy, legal, reputation, shareholder action, technology, market changes), the most relevant scenarios as well as mitigation and opportunities. The footnote clarifies time horizons as follows: short term (next 3 to 5 years), medium term (6 to 10 years) and long term (11 to 50 years).



Aviva

Aviva (2018) Aviva's Climate-Related Financial Disclosure 2018, pages 17 and 18



Why this example is selected

Aviva's TCFD report disclosure highlights a 15-year horizon for the scenario analysis (Climate Value-at-Risk approach). It also communicates the likelihood of physical risk exposure over the next 15 years and over longer time horizons (until 2100).



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Rationale for consideration

In its [2017 Final Report](#), TCFD noted that 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*” and expects “*that organizations will evolve and deepen their use of scenario analysis over time*”. As companies have differing levels of experience with scenario analysis, stakeholders find it useful to have information on where companies are in their journey of conducting and reporting scenario analysis. This kind of disclosure allows stakeholders to understand the applicability of the results and how much confidence they can place in related conclusions.

Transparent and clear disclosed information on the maturity and potential limitations of companies’ scenario analysis approaches is helpful for users. This is especially the case when such disclosures address methodological aspects (e.g. quantitative vs. qualitative scenario and time horizon – see the respective topic analyses), overall scope and granularity of the analysis (e.g. parts of value chain, businesses, types of assets, geographies and/or sectors considered, risk types included).



Maturity assessment and scope

Summary of current reporting practices

Companies that report on scenario analysis rarely give explicit information on the level of completion, maturity of the analysis and scope of coverage. Those that provide more advanced reporting typically disclose information on the level of completion and maturity of their scenario analysis (e.g. complete, partially complete, initial assessment). Their description of the status of the assessment includes information on significant scope exclusions (e.g. limited regional coverage, selected business areas), data gaps and/or conceptual weaknesses. If gaps have been identified, the summary is accompanied by an outline of next steps to enhance the analysis.

Preparer and user perspective

PREPARER PERSPECTIVE

Disclosure and clarity on the maturity and scope of the scenario analysis helps reporting companies and their stakeholders to understand both the usefulness and limitations of scenario analysis as a tool for specific internal risk assessments and strategic decisions. Furthermore, disclosing the maturity and scope sets a clear starting point for formulating a path to enhance the analysis over time. A detailed scenario analysis supported by a transparent scope ensures that senior management will understand the impact of the analysis on the various business lines and geographical location of operations, and will be able to make appropriate decisions.

USER PERSPECTIVE

Disclosure of the maturity and scope of scenario analysis helps users of company reports identify where companies are in the journey of conducting and reporting scenario information. This information can enhance users' decision making by helping them assess what the scenario results address, which data gaps exist (i.e. what further work needs to be undertaken by preparers), and what level of confidence they can have in the conclusions of the analysis.

Areas for improvement

As noted, companies that report on scenario analysis rarely give explicit information on the level of completion and maturity of the analysis. It would be helpful if companies that are still in the early stages of scenario reporting could consider disclosing basic key messages about the overall status of the assessment, major limitations as well as plans to enhance the scenario analysis process. With progress in scenario assessment, companies can consider advanced reporting of the maturity level by outlining details of any gaps in the scope of assessment, scenario inputs and analytical choices, business impacts and adaptive strategic decisions made.

Finally, users would benefit from a consolidated, structured presentation of the detailed information (e.g. lists, tables). Presentation is a potential area for improvement for all report preparers.

Examples

On this and the following pages are six examples of advanced reporting on maturity assessment and scope drawn from companies in different sectors.

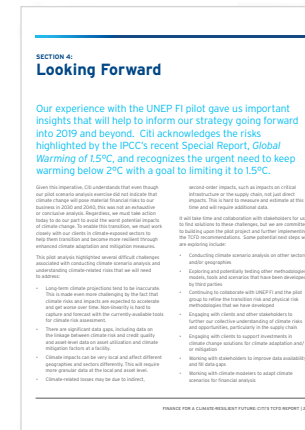
Citibank

Citigroup (2018) Finance for a Climate-Resilient Future – Citi's TCFD Report, page 29



Why this example is selected

Citibank's TCFD Report notes that Citibank conducted a pilot scenario analysis and has identified a set of challenges associated with conducting climate scenario analysis. The report also outlines a series of potential next steps to find solutions for these issues.



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South32

South32 (2018) Our Approach to Climate Change 2018, page 29



Why this example is selected

South32's climate change report gives a clear description of the progress the company has made in terms of scenario analysis in the past years and of intended extensions in the current year.



Rio Tinto

Rio Tinto (2018) Our approach to climate change 2018, page 35



Why this example is selected

Rio Tinto's climate change report provides a clear and comprehensive overview of the level of completion of its assessments in the area of physical risks.



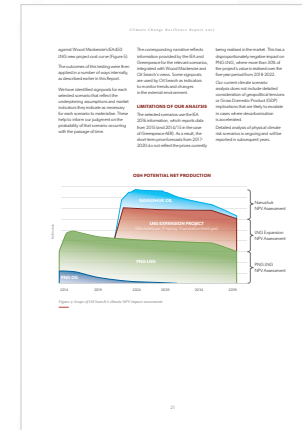
Oil Search

Oil Search (2017) Climate Change Resilience Report 2017, page 21



Why this example is selected

Oil Search's Climate Change Resilience Report summarises the limitations of its scenario analysis in a separate chapter.



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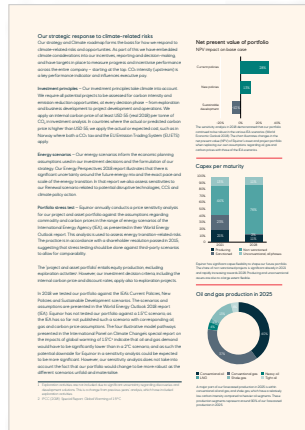
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Equinor

Equinor (2018) 2018 Sustainability Report, page 18

Why this example is selected

Equinor's Sustainability Report highlights the scope of the portfolio resilience stress test that it conducted.

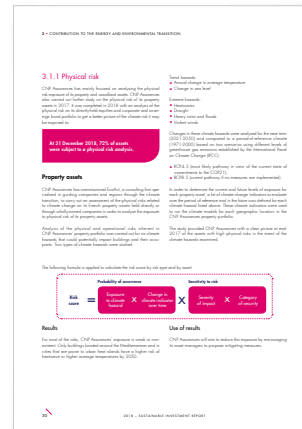


CNP Assurances

CNP (2018) 2018 Sustainable Investment Report, page 30

Why this example is selected

CNP Assurances Sustainable Investment Report highlights the use of scenario analysis to make conclusions on physical risks and gives a clear indication of the scope of assessment and level of coverage.



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Rationale for consideration

The set of scenarios selected by companies is an important analytical choice as it defines the scenario range (i.e. range of plausible future states) that companies can explore and determines the extent to which companies can assess different types of risks (transitional and/or physical). The choice of scenarios also determines whether companies can compare their development under different scenarios (e.g. base case vs. higher/lower climate action levels). Consequently, [TCFD](#) highlighted the selection of scenarios as a key analytical choice and encourages companies “to disclose the approach used for selecting scenarios”.

The Institutional Investors Group on Climate Change ([IIGCC](#)) also confirms that “the starting point for the analysis itself is to identify which scenarios, or future states of the world, will be used to provide a view of the potential implications of climate change on investments.” The Center for Climate and Energy Solutions ([C2ES](#)) recommended using “a range of scenarios when conducting a scenario-based risk analysis, including those that do not meet 2°C. Exploring a broad range of futures [...] will help illustrate financial resilience under a variety of climate-related outcomes.”

Scenario selection

In line with C2ES, [CDSB](#) concludes that “it is necessary to consider a number of plausible future paths to stress test the organization at the extremes of the “wedge” of future risk and opportunity and use scenario analysis to test an organizations’ resilience and strategy responses to these.” Defining a range of scenarios should allow companies to assess transition risks (e.g. under a global warming well-below 2°C scenario) as well as physical risks (e.g. under a high warming scenario).

Summary of current reporting practices

Companies that report on scenario analysis tend to provide rather short descriptions of their process and rationale for defining the scenario range. In some cases, companies use a single scenario for the analysis, which is not in line with TCFD recommendations.

The more advanced companies, in line with TCFD, define a set of scenarios (including a 2°C scenario) which include a range of transitional and physical risks relevant to the company. The description of the scenario range outlines the rationale for selecting a scenario (e.g. coverage of a certain type of risks relevant to the company, build-up of a reference case) and provides information about potential interdependencies with external reference scenarios (e.g. full/partial adoption of an International Energy Agency (IEA) or Intergovernmental Panel on Climate Change (IPCC) scenario). Furthermore, it gives an insight into the positioning and relationship of the scenarios included in the scenario range.

Preparer and user perspective

PREPARER PERSPECTIVE

Selecting appropriate scenarios is a major challenge for preparers. Referencing external scenarios for company-specific analysis can be constrained by a range of factors such as limited public access to output data, gaps in the overall coverage of the scenario and insufficient level of detail in the results for certain business sectors. Internal scenarios can be tailored to company-specific needs but require a level of expertise in scenario preparation that is typically not available within companies. Consequently, during the PTF-CRR outreach, several preparers expressed the need for guidance on selecting appropriate scenarios.

USER PERSPECTIVE

In assessing the decision-usefulness of companies’ scenario selection, users think about the number, type, plausibility and information content of scenarios that are applied. Companies consideration of a range of scenarios, covering both physical and transition risks and reflecting unfamiliar and unfavourable outcomes, represents a good practice in this context. Many users expect better comparability and standardisation of applied scenarios across similar companies within sectors. Sector-specific scenario development or the use of common databases were proposed as a way to foster standardisation. Some feedback during the PTF-CRR outreach noted a trade-off between user needs for comparable information across companies and information that reflects company-specific situations. A combination of external reference scenarios with internal scenario elements may help to overcome this trade-off between the need for comparable versus company-specific information.

Areas for improvement

As noted earlier, companies reporting on scenario analysis tend to mainly provide short descriptions of their process and rationale for defining the scenario range.

Companies that are at a basic level of reporting on scenario selection often only describe scenarios using simple, short outcome-oriented phrases (e.g. ‘2°C scenario’ to indicate the level of global warming that the scenario represents) or by short reference to certain widely used scenarios (e.g. IEA Sustainable Development Scenario). This kind of description lacks context about the rationale for scenario selection (i.e. the overall relevance for the company and the relevant risks addressed) and whether there are correlations between multiple applied scenarios.

As noted earlier, companies that are more advanced in their reporting tend to disclose more information about the set of scenarios selected including the rationale for their selection, and their positioning in the scenario range. Disclosure of these different aspects of scenario selection in an integrated and non-dispersed manner, is a potential area for improvement for all preparers.

Examples

On the following pages are five examples of good reporting on scenario selection drawn from companies in different sectors.

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Scenario selection

EDP

EDP (2018) Sustainability Report 2018, page 108

Why this example is selected

Energias de Portugal's (EDP) Sustainability Report indicates that separate scenarios were used for the analysis of physical risks and transition risks, and outlines the scenarios that were considered relevant for each risk type.



Galp

Galp (2018). Galp Integrated Report 2018, page 34

Why this example is selected

Galp's Integrated Report outlines a range of scenarios at the level of technological disruption and political consensus, which are considered the main uncertainties for its sector. The key characteristics, positioning and relationship of the scenarios are summarised in an overview figure.



Iberdrola

Iberdrola (2018) Statement of Non-Financial Information. Sustainability Report 2018, page 61

Why this example is selected

Iberdrola's Sustainability Report gives a clear overview on the number of scenarios considered and their purpose (transition or physical risk analysis).



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Scenario selection

Rio Tinto

Rio Tinto (2018) *Our approach to climate change 2018*, pages 18-19

Why this example is selected

Rio Tinto's climate change report explains that three scenarios, reflecting different political framework and technological conditions, were used to assess the resilience of its businesses over clearly defined time horizons. One scenario serves as a reference case, and the positioning of the scenarios is shown clearly in a 2 x 2 matrix (i.e. choice of policy versus pace of technology adoption). The disclosure covers the main differences between the chosen scenarios and the anticipated impact for each scenario in relation to the reference case.



South32

South32 (2018) *Our Approach to Climate Change 2018*, pages 23, 29, 36

Why this example is selected

South32's climate change report notes the use of three scenarios, which are characterised as divergent and intentionally extreme, to assess business resilience in a range of contrasting futures. One scenario is clearly marked as a base case against which business impacts due to transition risks and physical risks, each represented by another scenario, are assessed. South32 also notes that the three customised scenarios combine elements from well-known external scenarios (including IPCC, IEA and World Economic Outlook (WEO)). At some level, this link of custom scenarios to external reference scenarios could help to balance users' needs for both company-specific and comparable information.



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Rationale for consideration

TCFD recommendations identify climate-related physical risk and transition risk as the two main types of risk that financial sector and non-financial sector companies should disclose. Physical risk is one of the main ways climate change will impact companies. Climate change can impact physical risk through:

- Acute (event-driven) risk such as extreme weather events (e.g. floods, droughts, storms, heat stress, cold snaps etc.); and
- Chronic risks (those due to longer-term shifts in climate patterns such as an increase in average temperature or a change in average precipitation).

Climate change can impact the chronicity of physical risk and the severity and geographical location of extreme weather events. This leaves companies with the uncertainty of how potential climate-related physical risk may affect their operations and value chain.

Transition risk within TCFD recommendations has a goal of limiting temperature rise relative to pre-industrial levels to at least a 2°C or below. Transition risk and physical risk are inversely related (i.e. policy action, technology and business model adaptation that limit carbon emissions increase transition risks and opportunities, but limit long-term physical risk exposures).

Physical risk scenarios

Given the relevance of climate-related physical risk, information about the extent to which companies have assessed the physical impact on their portfolio of assets and incorporated physical risks into investment screening and future business strategy is an important element of disclosure (see also [CDP technical note](#)). There is also a need to consider if physical risk has impacts across companies' value chains (supply chain, distribution networks and markets).

Summary of current reporting practices

Physical risk is one of the most challenging aspects of scenario analysis, and physical risk disclosures are less often provided and less developed than those of transition risk. So far, not many companies have performed and disclosed physical risk scenario analysis. At this stage, the leading reporters provide only some description of the models but not key assumptions. Often the analysis is partial, performed for only part of the portfolio and stressing only some of the physical risk variables.

There are usually some high-level figures or maps provided to help the users judge the materiality of the results, but no comprehensive financial impact assessment is provided. Potential action points and adaptation strategies are outlined but there is no disclosure of specific adaptation plans that will be undertaken as a result of the physical risk assessment.

Preparer and user perspective

PREPARER PERSPECTIVE

During PTF-CRR discussions and stakeholder outreach, preparers highlighted the challenge of assessing the impact of physical climate risk because it requires granular details of the exposure of companies' facilities and information about both companies' value chains and supply chains that are difficult to gather. Indeed, many companies lack this level of information and there are also challenges in obtaining this data from third-party providers as highlighted in a [March 2019 publication from Cicero](#) on physical climate risk. The Cicero publication

highlights the limited availability of counterparty-specific information and notes that data service providers offer limited coverage of climate data and make limited use of scenarios reflecting long-term climate change.

USER PERSPECTIVE

Due to the limitations of currently disclosed information and alternative datasets, investors struggle to integrate physical risk exposure into their portfolio analysis. Even when asset location data is available, there are still challenges in identifying the potential impact and risk mitigation measures (e.g. property and business interruption insurance).

During the stakeholder outreach, some investors indicated that they would find it useful if companies disclosed both asset-level and supply chain-related physical risk exposure, as well as the type of event creating physical risk (e.g. extreme precipitation, sea level rises, extreme heat) and a quantification of the impact.

Given that very few companies have quantitatively assessed their exposure to physical climate risk and that those who have, have done partial assessments, the usefulness of current disclosure is limited and likely falls short of user expectations of best practice. Nevertheless, even when there is only qualitative disclosure, this is still useful as it shows that companies are taking the first steps to assess and adapt to the impact of physical climate risk.

Areas for improvement

Current reporting on physical risk is less developed than the reporting of transition risk. This is likely to be due to greater uncertainty associated with assessing physical risk compared to transition risk, be this in terms of time horizon or climate developments. The main area for improvement is to perform full rather than partial analysis of the exposure to physical climate risk, to disclose the financial impact and to provide more detail on actions taken to adapt. In order to do so, companies need to source the necessary exposure and climate data, which may require significant efforts given the challenges in obtaining them internally and externally.

Examples

On this and the following pages are three examples of more advanced reporting practices on physical risk.

South32

South32 (2018) Our Approach to Climate Change 2018, page 37



Why this example is selected

South32 climate change report discloses that South32 performed a partial analysis covering only their Australian business, while providing an outlook on plans to expand the analysis to cover other operations. The disclosure includes a high-level description of the scenario and model used.

For one mine, there is more detailed information which includes a qualitative description of the expected impact and the resilience of the operations. For other mines in Australia, the only information disclosed is the high-level impact.

The company has outlined the adaptation options that are available. However, it has not indicated what specific adaptation actions will be undertaken.



Physical risk scenarios

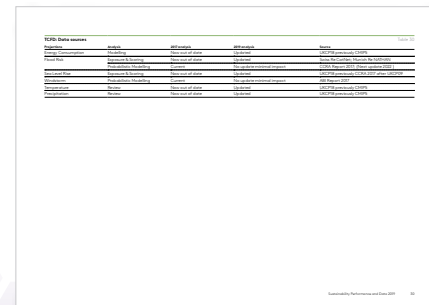
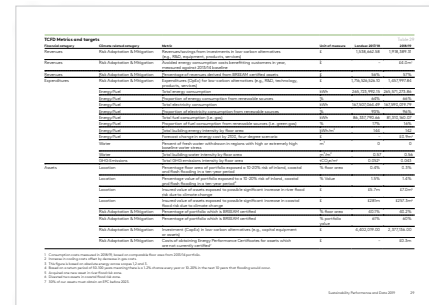
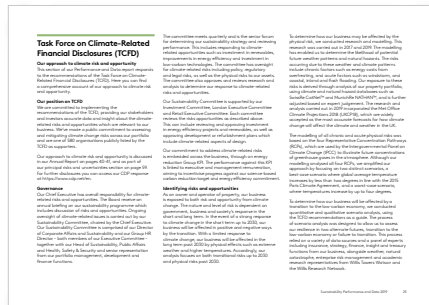
Landsec

Landsec (2019) Sustainability Performance and Data 2019, pages 25, 28-30



Why this example is selected

Landsec's Sustainability Performance and Data report provides a high-level description of the scenario and model used. A largely qualitative description of the impact is disclosed. The only financial metrics provided are the proportion of assets exposed to flood risk in the next ten years. Available adaptation options are disclosed but there is no information on what specific adaptation actions will be taken.



Physical risk scenarios

Commonwealth Bank of Australia

Commonwealth Bank of Australia (2019) 2019 Annual Report, pages 56, 59-60

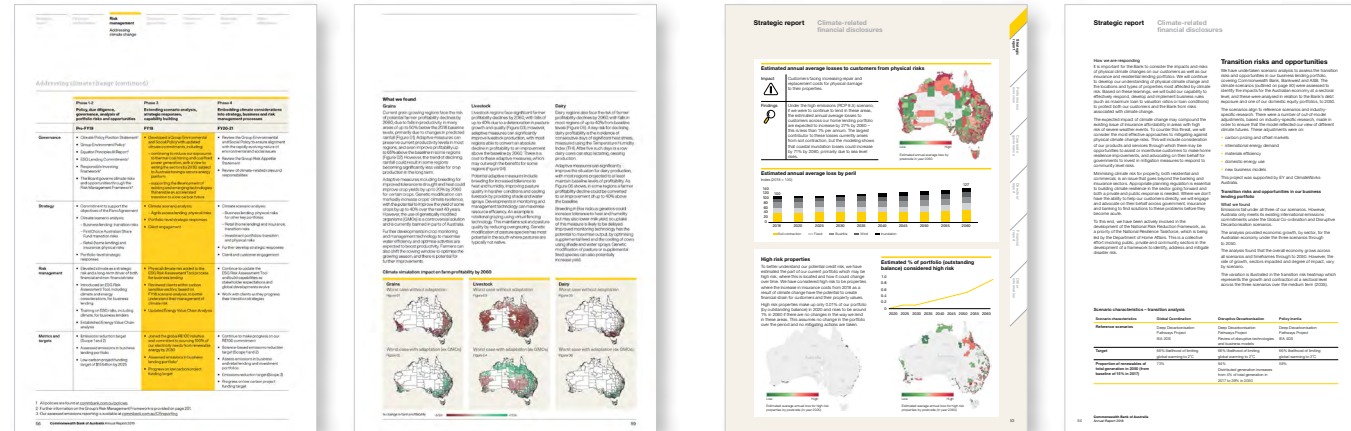
Commonwealth Bank of Australia (2018) Annual Report 2018, pages 53-54

Why this example is selected

Commonwealth Bank of Australia (CBA) Annual Report discloses that every year the CBA performs a physical climate scenario analysis on a different portfolio. The table below shows the progress up to FY 2019 and the plans for FY 2020-2021. The approach intends to cover a broad range of activities, but the analysis is still partial.

There is a detailed description of the analyses performed. However, key assumptions are not disclosed.

CBA presents results of the impact on their counterparties through risk maps and high-level risk impact, concluding that impacts on the company's own balance sheet are minimal. Also, the report provides a summary of the actions CBA may take based on the analyses performed. The report states that the analyses are still a work in progress and the strategic responses in the near future will not be based on these preliminary assessments.



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Rationale for consideration

The analysis and examples below relate to transparency on the models and data used for conducting and disclosing scenario analysis. As outlined in a [2019 Institute for Climate Economics \(ICE\) publication](#), scenarios are quantified using the following models:

- Models that are a representation of human activities that ultimately impact the climate and that occur within the economy and via the energy system and/or land use. These models are applied in transition and other human activities' scenarios.
- Climate or circulation models that simulate the climate response to human activities (e.g. response to current and future greenhouse gas emissions) and depict the evolution of temperature, precipitation and sea-level rise, often until the year 2100. These models are applied in climate change scenarios.
- Models that represent the impact of climate change on the economy (e.g. financial impact). These models are applied in climate impact scenarios.

A detailed description of different models (climate models, energy system, land use, hazard, integrated assessment and macroeconomic models) can be found in the [2019 UN Environment – Finance Initiative \(UNEP-FI\) publication](#) and [2019 MIT publication](#). The choice of models, related implicit and explicit scenario input data and underlying assumptions (e.g. technology development and energy consumption assumptions), as well as information on the focus of the scenario analysis (e.g. specific asset, portfolio of assets, physical location) can significantly impact the results of a scenario analysis.

Companies' disclosure of any models and related data applied whilst conducting scenario analysis can help users to interpret scenario outputs and compare information across companies. Transparency on models and the underlying data also enable users to assess the credibility of underlying assumptions and validity of the outcomes. More specifically:

- Disclosure of the underlying models, including the methodologies applied, allows readers of companies' scenario analysis information to assess: the expectations and plausibility of technology developments implicit in the scenario(s) such as negative emissions technologies; emission reduction pathway assumptions; and whether the underlying model is an integrated model or consists of aggregated subsector models.
- Disclosure of the underlying data can inform on the coverage of the analysis (e.g. whether the analysis has been performed globally). It can also shed light on the nature of data applied (e.g. carbon emissions data, financial performance or technology innovation data such as the type of steel plants or vehicles) for specific sectors, companies, or projects.
- Disclosure of models can help users determine the appropriateness of the application of these models by companies (e.g. whether the interaction and process flow between different models is logically coherent, or whether there is a logical linkage between carbon budget, other assumptions and the translation to climate and financial impacts).

Furthermore, as highlighted by the [2019 MIT publication](#), some models are a highly simplified representation of the interaction between economic, emission activities and the climate system response. They can be only partial representations of energy systems, with potentially unrealistic assumptions for specific sectors being considered. The need for a critical review of assumptions is discussed in detail in the 'assumptions' topic analysis. In effect, many of the existing models were not designed for corporate reporting purposes and therefore transparency on how they are used, and their limitations is important.

Another limitation is the unavailability of key data (i.e. data gaps) on sector and geography. Financial companies also face challenges related to sourcing relevant climate risk data for scenario modelling purposes related to their borrower and/or investee companies. Hence, stakeholder awareness of the choices made by companies and third-party service providers they rely on to address model limitations and data gaps, can be helpful in the interpretation of model outputs.

Summary of current reporting practice

Current disclosure does not consistently provide transparency on the models and data underlying the scenario analysis. While some companies disclose climate and energy system models, the disclosure on financial impact models and the data describing the item being analysed (project, specific asset, portfolio of assets, physical location) is often lacking.

Preparer and user perspective

PREPARER PERSPECTIVE

Clarity on the model and data choices enables report preparers to illustrate thoroughness, quality and validity of the analyses performed.

During the PTF-CRR outreach, several preparers from both financial and non-financial companies expressed the challenges they face in obtaining suitable data for scenario modelling. Some highlighted the

current unavailability of sectoral pathways for their sectors. Several financial companies noted the challenges that arise due to a lack of climate risk data related to their borrower and/or investee companies (e.g. lack of adequate multi-year data that can be inputs to risk prediction and measurement models). The lack of relevant data is more pronounced for Small and Medium-Sized Enterprises (SMEs) due to their relative immaturity in climate reporting. At the same time, SMEs can be a significant customer base for financial companies. Another challenge lies in the limited transparency on the concepts, assumptions and data integrated in many externally available models (e.g. energy system models providing respective external reference scenarios).

The combination of model and data gaps may create a need for companies to have to develop and apply their own assumptions to address these gaps but it may also, in some cases, make it difficult to model quantitative information about climate-related risks, especially for longer time horizons. In such cases, disclosure of qualitative information by companies can be more meaningful until these methodological and data issues are adequately addressed.

USER PERSPECTIVE

For users to interpret and apply reported scenario analysis information, they need to both understand and be able to trust the underlying models and data. Additionally, some users might want to compare reported information across companies whilst anticipating possible future states arising due to climate change risks. Such analysis is only possible if there is transparent and clear communication of the underlying scenario analysis models and data. During the stakeholder outreach, some users observed the need for improved clarity in reporting and overall transparency on the climate models and data including their source and how they are applied.

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Areas for improvement

Transparency and clarity in reporting on models and data can enhance the understandability and credibility of scenario analysis outputs. Disclosure of the following can help contribute towards clarity on the role of models:

- Overview of type of scenarios (i.e. transition and other human intervention, climate change or climate impact scenarios), models and data;
- A clear description of the function, inputs, interaction with other models, outputs and any limitations of different models;
- If applicable, methodology, and potentially model(s) used to derive financial impact on the company;
- An illustration of the level of analysis, and the sources of the data;
- The approach chosen to address any model and data gaps.

Examples

On this and the following pages are five examples of good practices of reporting scenario models and data. To a varying extent, they include the following:

- Explanation of the model and dataset choice;
- Differences between models and some detail on the type of models;
- Details of different data sources (external and internal) and related sources;
- Limitations of models and steps taken to overcome these.

Aviva

Aviva (2018) Aviva's Climate-Related Financial Disclosure 2018, pages 17, 18, 20, 21



Why this example is selected

Aviva's TCFD report provides a clear linkage between the in-scope scenarios, outputs and underlying models. After outlining four scenarios considered for its Climate VaR measure, Aviva outlines the model used (REMIND through Carbon Delta) and gives a high-level description of the model outputs, including financial metrics and some of the capabilities (i.e. consideration of socioeconomic pathways where population, economic growth, urbanisation and rate of technological development are considered). In a different section of the TCFD report, Aviva describes the methodology it applies to translate climate change effects to financial impacts, and the underlying limitations of the analysis.



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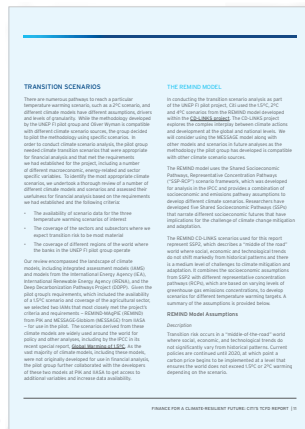
Citibank

Citigroup (2018) Finance for a Climate-Resilient Future – Citi's TCFD Report, page 11



Why this example is selected

In its TCFD Report, Citibank explains its review of different climate models considered for transition risk and the reasons for its choice of two integrated assessment models (IAMs), namely REMIND and MESSAGE, and the related model developers. There is clarity on the application of these models for Citibank's pilot objectives (coverage of the agricultural sector, 1.5°C scenario). Citibank notes the limitation of the chosen models for the purpose of financial analysis. It also gives a high-level description of the steps taken with the model developers to address these scenarios in order to select the most appropriate ones.



Unilever

Unilever (2018) Annual Report and Accounts 2018, page 34



Why this example is selected

Unilever's Annual Report has an example of a financial impact model. At a high level, it discloses the modelling steps used to derive the financial impact of climate change on one of its key commodities, soybean oil. Unilever indicates that the impact analysis is a pilot, and that it intends extending the analysis to palm oil and tea for which suitable climate change models will be available in 2019. In the narrative following the example shown, Unilever outlines results and aspects that were outside the scope (e.g. catastrophic events and policy responses). However, there is no disclosure or indication of any limitations of the methodology.



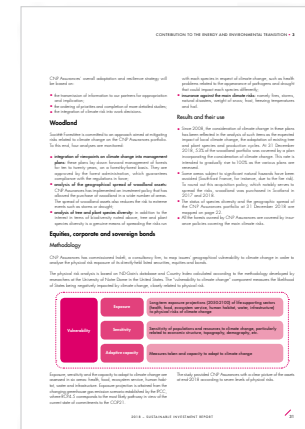
CNP Assurances

CNP (2018) Sustainable Investment Report, page 31



Why this example is selected

In its Sustainable Investment Report, CNP Assurances gives a high-level description of the database and methodology service providers used to calculate the physical risk exposure. This is an example of the type of high-level minimum disclosure that could be useful during the early stages of companies' reporting on scenario analysis.



Models and data

ATP

ATP (2018) Responsibility Statement, page 29



Why this example is selected

ATP's Responsibility Statement describes the role and type of climate models used in modelling temperature rise under four Representative Concentration Pathways (RCP) scenarios. It considers the implications of climate change exposure on its five forest investments. ATP highlights the sources of data.



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Rationale for consideration

TCFD recommends that companies use scenario analysis with the objective to “assist investors and other stakeholders in better understanding:

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

In applying scenario analysis, companies should consider general implications for their strategies, capital allocation, and costs and revenues, both at enterprise-wide level and at the level of specific regions and markets wherever material implications of climate change for the company are likely to arise. Financial sector companies should consider using scenario analysis to evaluate the potential impact of climate-related scenarios on individual assets, underwriting or lending activity when relevant, as well as to assess the resilience of their aggregated portfolios.

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Summary of current reporting practices

Current reporting practices show very different levels of maturity. This is largely linked to the degree of uncertainty of climate change developments either on time horizons or in terms of the consequences on business models. Below are some observations on the state of reporting based on the sample of companies reviewed:

- Energy and material companies are most advanced when translating their scenario analyses into business decisions. The transition risk is material and a low degree scenario (2°C or lower) is most often referred to when using scenario analysis for business decisions.
- Consumer companies are at an early stage of translating scenario results into business planning even when their strategy already integrates strong environmental concerns.
- Financial sector companies provide information on their investment portfolios largely relying on external consulting support.

TCFD recommendations call for more in-depth analysis. But companies are struggling with developing integrated scenarios linking climate change (and potential mitigation/adaptation measures) with key economic/business metrics in a time horizon that is compatible with their financial and business planning. As a result, poor information is currently available on potential adaptation of business models and strategy under various climate change scenarios.

Preparer and user perspective

PREPARER PERSPECTIVE

From the report preparer's perspective, integration of scenario outputs into decisions and the corresponding disclosure of that integration is one major step in the scenario analysis process. It should ultimately help companies to better position themselves in a changing environment, including by influencing and informing stakeholders on companies' adaptation to climate-related risks and opportunities. However, given the current limitations and uncertainties around scenario analysis, companies may be cautious about taking strategic decisions based only on outputs of their scenario analysis models. Nevertheless, conducting scenario analysis is still a useful exercise to increase internal awareness. It may help frame strategic decisions by offering complementary information.

Regarding disclosure of strategic decisions taken based on scenario analysis, report preparers also have to weigh transparency against potential concerns about confidentiality and business sensitivity.

USER PERSPECTIVE

During the stakeholder outreach, users confirmed the importance of disclosing the linkage between scenario analysis outputs and companies' strategic decisions. For example, some users that cover the oil and gas sector highlighted the importance of disclosure on sanctioned investment projects.

Several users highlighted the current lack of transparency on decisions arising from scenario analysis outputs. Some considered this to be the biggest gap in current scenario reporting. They expected visibility of a feedback loop that shows how strategy affects scenario analysis and,

where applicable, how scenario outputs lead to the re-orientation of the strategy and business model.

From the investor decision-making perspective, the translation of scenario outputs into investment decisions can be used differently depending on their analytical needs:

- When taking investment decisions, investors may want to better understand the positioning of companies in respect to climate risks and opportunities, and assess the impact on the companies' business models. The analysis and required reporting information can be sector-specific as it helps investors to perform sound analysis prior to their investment decisions.
- At portfolio monitoring level, where capital has been allocated across different sectors, investors seek more comparable information to assess the resilience of their entire portfolio in selected scenarios. In this context, sector-specific information may be too customised to allow for aggregation at portfolio level and is therefore only partially useful for portfolio monitoring.

In effect, investors are interested in having both sector-specific information and comparable information across sectors as they make investment decisions and monitor the risk of their portfolios.

The linkage between scenario analysis and strategic decisions is still at a preliminary stage. Furthermore, users may be waiting for more robust information before applying it to investment decisions and portfolio monitoring. Meeting investor expectations and their needs for better comparability may require additional scenarios, stress tests or sensitivity analyses.

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Areas for improvement

Even in the most advanced reports, the translation of scenario results into business decisions seems to be at an early stage. This may be due to a lack of maturity or robustness of scenarios and the underpinning methodologies. It can also be that companies consider this information as too sensitive to be disclosed.

- Energy and material sectors companies: these companies are starting to disclose results of their scenario analyses, either in a qualitative or in a quantitative manner. Disclosures mostly intend to demonstrate the resilience of companies to climate change thanks to their positioning or decarbonisation path. Clear business decisions taken as a result of their scenario analyses are still missing.
- Consumer sector companies: some disclosures on how climate strategy is designed are available but there is no clear link between scenario outcomes and strategic decisions.
- Financial sector companies: even if extensive analysis is performed, links with strategy are not clearly stated. The most promising approaches in portfolio monitoring are: 1) the 'temperature' of the assets portfolio, which provides information on the alignment with a 2°C path, addressing the 'inside out' effect on climate change (i.e. companies' impact on the environment), and 2) stress tests assessing potential physical and transition losses a portfolio may face under different scenarios. The impacts of these results on business decisions are however missing at this stage. Investors that perform these analyses stress that these are currently more experimental than practical.

Examples

Two examples of good reporting practices are shown on this page.

Eni

Eni (2018) Path to Decarbonization report, page 23



Why this example is selected

Eni's climate change report provides a good explanation of the use of sensitivity analysis. The scenario used is mentioned, as well as the low impact on the business. To further improve the disclosure, a clear link between the results of the sensitivity analysis and decisions taken to (re-)position the assets portfolio and/or decide on new investments could be elaborated.



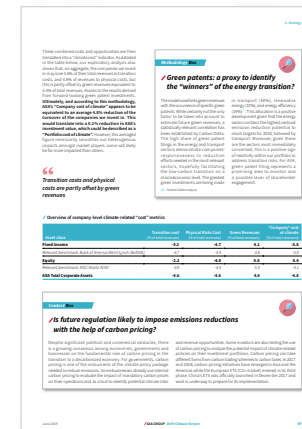
AXA

AXA (2019) 2019 Climate Report, page 19



Why this example is selected

AXA's Climate Report explains how the portfolio shows resilience to transition risk in line with the strategic analysis of 'green patents'. AXA also explains the strategy leading to lower physical risks in its real estate portfolio. The use of scenario results to decide on the portfolio positioning may be strengthened to clearly address the third TCFD recommendation on strategy, i.e. "c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario".



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Rationale for consideration

TCFD's primary focus is to ensure that climate reporting by companies is useful to the institutional investor.

"The FSB Task Force on Climate-related Financial Disclosures (TCFD) will develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders [...] The work and recommendations of the Task Force will help companies understand what financial markets want from disclosure in order to measure and respond to climate change risks and encourage firms to align their disclosures with investors' needs." ([TCFD's mission](#))

For many investors, especially those allocating capital based on an analysis of companies' fundamentals, 'useful climate reporting' would include scenarios/sensitivity with inputs and outputs that are quantified and monetised (i.e. translated into financial impacts). Quantified scenario inputs and outputs can potentially help investors to normalise and compare information across similar companies.

The topic analyses on 'qualitative vs. quantitative scenarios' and 'assumptions' focus on the quantification of analytical choices and >>

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scenario modelling inputs. The focus of the current topic analysis is on the quantification and monetisation of scenario analysis outputs. It is closely linked to the topic analysis on 'scenario outputs and business decisions' where it is noted that scenario outputs should translate into decisions.

Summary of current reporting practices

Of the reviewed companies, and as highlighted in the 'quantitative vs. qualitative scenarios' and 'assumptions' topics, very few quantify their scenarios. The few quantified scenarios are most often related to the business outlook/market development, but are rarely calculated specifically for the company itself.

Regarding the companies that provide company-specific approaches, scenarios are often performed as sensitivity analyses, where the company considers one quantified risk/opportunity factor at a time. The more advanced companies also monetise the potential impact on the company.

Preparer and user perspective

PREPARER PERSPECTIVE

During the stakeholder outreach, some report preparers indicated a trade-off between transparency and competition risks. Too detailed and prescriptive requirements for quantitative scenarios can be inappropriate for some situations, as they may raise confidentiality/competition issues. In some cases where confidentiality concerns exist a workaround for companies is that the information is provided at an aggregated level.

In some jurisdictions, the reporting of opportunities within scenario analysis may pose a problem that could potentially lead to litigation from users to whom it may not be clear that such opportunities may not necessarily be realised. The challenges of legal risk and confidentiality

are also highlighted in the analyses of 'quantitative vs. qualitative scenarios', 'assumptions' and 'scenario outputs and business decisions'.

USER PERSPECTIVE

As noted in the analysis of 'qualitative vs. quantitative scenarios', some users consider quantified scenarios to be complementary to qualitative scenarios. However, during the stakeholder outreach, users also noted the insufficient quantification and lack of comparability of scenario analysis inputs and outputs. Some users expressed concerns about the use of scenarios with limited plausibility that are not comparable across companies or industries. This is particularly problematic when there is limited transparency on the underlying assumptions and no linkage made between the assumptions of companies' scenarios and those of the more well-known external reference scenarios.

Below are some of the user expectations expressed during the PTF-CRR outreach in respect to the reporting of scenario analysis outputs and impacts:

- Though visual illustrations of impact (e.g. different circle sizes and colour codes) can be informative, users find it difficult to apply this information when there is no accompanying quantitative data. Visual representations tend to be company-specific and incomparable across companies, and possibly even incomparable across reporting periods for the same company. Thus, graphics/visuals need to be supplemented with quantitative data to allow comparison.
- Some users emphasise the importance of, and expect, an alignment of the assumptions related to scenario analysis and to financial statement information. This is especially the case for those that are potentially related to risk outcomes. Moreover, [existing International Financial Reporting Standards \(IFRS\) accounting standards](#) already require that material risks be reflected in financial statements information. Assumptions where there could be an alignment between scenario and financial statements information include: impairment-related assumptions such as commodity price and

discount rate projections; costs and liabilities due to physical risk exposure; provisions; and asset depreciation time horizon. Alignment would not be expected in all cases, especially as scenarios are neither a prediction of the future nor a projection of companies' specific exposure. Nevertheless, scenarios should reflect plausible outcomes and where appropriate, an alignment between scenario and financial statements information can also help users' assessment of companies' risk profiles (e.g. assessment of balance sheet resilience).

- Some users prefer scenario analysis outputs that consider the effects of multiple interacting variables at the same time, including adverse outcome factors, rather than only outputs derived from sensitivity analyses that consider the effects of a single factor at a time.

Areas for improvement

As noted earlier, scenario reporting is primarily qualitative and rarely quantitative, and monetisation of impacts is found even more rarely. In general, there is a need for more quantification and monetisation of both scenario inputs and outputs.

In many cases, non-quantified reports conclude that the potential impact is immaterial, which may be why the individual company chooses not to report the quantified and monetised impact. To contextualise unreported, immaterial impacts, it could be helpful for users to at least be made aware of the basis of companies' materiality assessment, including the materiality threshold applied. Transparency on companies' materiality threshold can enable users (investors) to better assess whether the potential impact of unreported quantified amounts is also immaterial for their analytical and investment decision-making purposes (e.g. where users normalise this information).

Currently, monetised scenarios are often based on sensitivity analysis, where one factor is quantified at a time, and then monetised. A scenario analysis that reflects the impact of the change in all factors at the same time would require consideration of possible correlations

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and interdependencies between the different factors. This is likely to be much more complex than a sensitivity analysis. It is also easier for companies' financial department personnel to focus on the calculation of impacts through sensitivity analysis within financial statements, as such reporting is based on IFRS requirements (IFRS 7 *Financial Instruments Disclosures*) (CDSB 2018).

There might be lessons to be drawn from the existing application of IFRS requirements for sensitivity analysis reporting in financial statements that could perhaps be extended to the reporting of scenario analysis outputs. For example, guidance for the reporting of scenario information, as called for by many [respondents to the EU Non-Binding Guidelines \(NBG\) consultation](#), could facilitate the ability to provide related assurance and increase the likelihood of inclusion of quantified and monetised scenario outputs in the mainstream report, as recommended by the TCFD.

It is also worth noting that many companies are disclosing this information in special TCFD/climate reports, outside the mainstream reports, which could be minimising the review and application of this information by users. The reporting of monetised scenario outputs that include financial impacts is even more helpful if the information is included in the mainstream report. When this is the case, users can more easily make linkages between related information (e.g. on asset impairments), and it may also help mainstream investors to consider climate risk as a financial risk.

Finally, companies should consider the analytical challenges users face when scenario outputs are only represented by graphs and other visual illustrations but with no accompanying data tables that can facilitate comparative analyses. What can be helpful is a user-friendly presentation of scenario reporting information with related data presented in tables to enable users' easier access and comparative analyses (i.e. to compare similar data across companies). Where available, it is useful to have year-to-year comparative data to allow trend analysis.

Examples

On this and the following pages are examples from three companies that report on financial impact due to climate change, plus a mock-up example illustrating an approach to describing the impacts.

BHP Billiton

BHP Billiton (2015) Climate Change: Portfolio Analysis, pages 13-14 

Why this example is selected

BHP Billiton's climate change report highlights the impact of a 2°C scenario on the commodity market and the financial impact on the company under these conditions. It also outlines the impact of what is described as a 'shock event':



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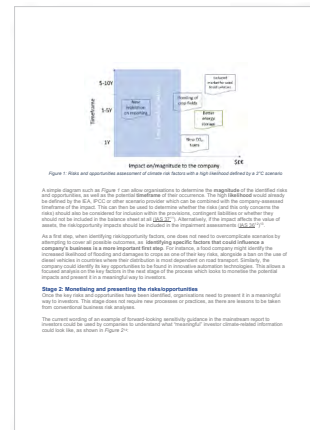
Jagd, J.T. (2018) *How to make TCFD scenarios useful for investors – a short guide*, Center for ESG Research & CDSB, pages 3, 5



Why this example is selected

Because good practice examples are typically from a limited range of companies – often related to oil and gas – the PTF-CRR wants to show how other preparers could provide useful TCFD scenarios. To do so, reference is made to the model from the short guide on TCFD scenario reporting prepared by the Center for ESG Research and CDSB. By using a relatively simple two-step model, the guide shows how companies can work with scenarios in a stress-test model, using this to provide useful TCFD reporting that is both quantified and monetised.

It should be pointed out that this kind of scenario analysis would require consideration of the likelihood of the risks. Companies would also need to assess whether the monetised impacts from the scenario analysis should be considered when making impairment assessments of assets, provisions, contingent liabilities. Risks that are unlikely to occur should not be reflected in balance sheet line items. See also [IAS 36](#), [IAS 37](#), and [CDSB \(2018\)](#).



Scenario	Risk	Impact	Value
Scenario 1	Risk 1	Impact 1	Value 1
Scenario 2	Risk 2	Impact 2	Value 2
Scenario 3	Risk 3	Impact 3	Value 3
Scenario 4	Risk 4	Impact 4	Value 4
Scenario 5	Risk 5	Impact 5	Value 5
Scenario 6	Risk 6	Impact 6	Value 6
Scenario 7	Risk 7	Impact 7	Value 7
Scenario 8	Risk 8	Impact 8	Value 8
Scenario 9	Risk 9	Impact 9	Value 9
Scenario 10	Risk 10	Impact 10	Value 10

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Acronyms and abbreviations

2°C	2° Celsius
ADEME	French Environment & Energy Management Agency
BNEF	Bloomberg New Energy Finance
IIRC	International Integrated Reporting Council
Cap (large-cap, mid-cap or small-cap)	Market capitalisation (large, medium or small)
C2ES	Centre for Climate and Energy Solutions
CDP	Formerly Carbon Disclosure Project
CDSB	Climate Disclosure Standards Board
COP21	21st session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). See also <i>Paris Agreement</i> below.
CRR	Climate-related Reporting
EBRD	European Bank for Reconstruction and Development
E P&L	Environmental profit and loss account
ESG	Environmental, social and governance
European Lab	European Corporate Reporting Lab @EFRAG
European Lab SG	European Lab Steering Group
FSB	Financial Stability Board
G20	Group of Twenty nations
GeSI	Global e-Sustainability Initiative
GHG	Greenhouse gas
GICS	Global Industry Classification Standard
GRI	Global Reporting Initiative
I4CE	Institute for Climate Economics
IAMs	Integrated Assessment Models
IAS/IFRS	International Accounting Standards/International Financial Reporting Standards

IEA	International Energy Agency
IIGCC	Institutional Investors Group on Climate Change
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
MIT	Massachusetts Institute of Technology
NBGs	European Commission's non-binding guidelines on non-financial reporting
NFRD	Directive 2014/95/EU – the EU Non-Financial Reporting Directive
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
Paris Agreement	Paris Agreement under the United Nations Framework Convention on Climate Change (also called Paris Climate Agreement or COP21)
PRI	Principles for Responsible Investment (PRI)
PTF-CRR	European Lab Project Task Force on Climate-related Reporting
RCP	Representative Concentration Pathway
SASB	Sustainability Accounting Standards Board
SBT; SBTI	Science Based Targets; Science Based Targets Initiative
SDGs/UN SDGs	Sustainable Development Goals of the United Nations General Assembly
SDS	Sustainable Development Scenario
TCFD	Task Force on Climate-related Financial Disclosures
TRE	Thomson Reuters Eikon
UN	United Nations
UNGC	United Nations Global Compact
UNEP	United Nations Environment Programme
VaR	Value at Risk
WEM	World Energy Model

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