

How to use the power of AI to reduce the impact of climate change on Switzerland

**Recommendations for the Swiss society and economy to become
more resilient against the impact from a radically changing climate**

Make key technologies broadly available and overcome challenges through key methodologies in
climate- and AI-related fields.

4.2 Managing transition risks – towards a lower-carbon economy

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For stakeholders to move towards a low-carbon economy, bears administrative, legal, and other economic risks, beyond the obvious physical climate disaster risks, as depicted in Figure 4.4 These transition risks related to climate change are critical for organizations that need to manage the transition from a carbon-intensive economy to a more sustainable, lower-carbon economy. Transition risks are multi-faceted and arise from the need to adapt to evolving climate change mitigation policies, technological advances and changing consumer preferences. They pose significant challenges, including potential fluctuations in the value of assets, the emergence of stranded assets due to unforeseen or premature depreciation and shifts in operating costs. These changes are inseparably linked to a company's carbon emissions, as efforts to reduce these emissions often require significant changes in business operations and strategies.

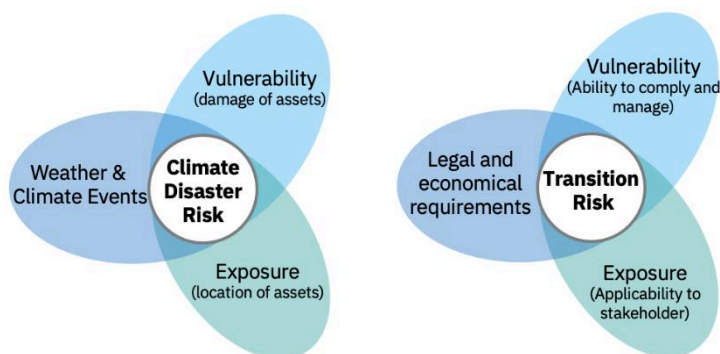


Figure 4.4: “Definition” of Climate Disaster Risk vs. Transition Risk

In this chapter we aim at providing guidance on how to identify exposures of stakeholders and how to deal with them, based on the examples of “Assessing Carbon Emissions” and linked “Required Reporting”. As to what extent an organization is vulnerable, i.e., has the ability to deal with imposed requirements, is beyond the scope of this introduction.

4.2.1 Assessing carbon emissions

As the global community intensifies efforts to combat climate change, a critical step for organizations is the comprehensive assessment of their carbon emissions across all scopes, including those directly produced (Scope 1), indirectly from purchased energy (Scope 2), and other indirect emissions related

to the organization's activities (Scope 3). This provides a clear understanding of an organization's environmental impact and lays the foundation for targeted reduction strategies and sustainable business practices.

These assessments are of central importance for understanding and steering effective climate actions by organizations. Research has outlined a large need for investment shifts towards net-zero pathways (Klaassen et al., 2023). Recognizing these needs, organizations are increasing their efforts to define and pursue ambitious net-zero targets. While these efforts theoretically support an effective transition (Höhne et al, 2021), unstructured strategies about net-zero targets alone will very likely not contribute to the needed drastic emission reductions (see also Bingler et al., 2022). For instance, the failure to define clear projections for residual emissions represents a major obstacle to achieving net-zero emissions (Buck et al., 2023).

4.2.2 Required reporting (e.g., ESG, TCFD, TNFD)

While the immediate risk might not be apparent, the evolving legal requirements for detailed corporate reporting on environmental, social, and governance (ESG) matters are introducing significant organizational and operational challenges, which could lead to substantial economic transition risks (see Figure 4.4). In today's era, where transparency and sustainability are increasingly at the forefront of corporate responsibility, the demand for accurate and comprehensive ESG reporting frameworks has intensified. Entities are now expected to disclose their ESG performance, align reporting standards such as with the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD), or increasingly, adopt the principles outlined by the Taskforce on Nature-related Financial Disclosures (TNFD). This section provides insights into the significance of these reporting standards, their implementation, and the advantages they bring to organizations, stakeholders, and the environment.

While the reporting standards serve as guidelines or soft boundaries for reporting on sustainability matters, governments are increasingly tightening enforcing their application. Amongst the forerunners is the European Union. With the verification of the European Sustainability Reporting Standards, the EU is advancing towards mandatory disclosure from 2025 on (EU, 2023). Thus, more rigorous and strict reporting can be expected in the near future.

From a theoretical asset pricing perspective, disclosures mitigate investors' uncertainty, driven, for instance, by climate regulations. This results in the benefits of emissions disclosure manifesting as higher liquidity of a company's securities, consequently reducing the firm's cost of capital. The empirical evidence related to the impact of carbon disclosure on the cost of capital is growing fast (He et al., 2013; Kleimeier, 2016; Bolton and Kacperczyk, 2021).

4.2.3 How to guide companies on their net-zero strategy

Embarking on the journey towards achieving net-zero emissions is an ambitious but essential goal for companies aspiring to align with global climate objectives. This outlines key steps, from conducting a baseline emissions assessment to setting interim targets and selecting appropriate mitigation measures. By providing a roadmap tailored to an organization's specific context and industry, this guide empowers companies to navigate the complexities of their net-zero transition, fostering a sustainable and resilient future.

There is currently great interest from companies to reduce emissions associated with their products. This is due to the growing demand for more sustainable products and legislation to reduce emissions in productive sectors, including industry, transport, agriculture, and construction. Current efforts by companies to reduce emissions are aligned with the Special Report on Global Warming produced by

the IPCC (SR15), indicating the limit of 1.5°C above pre-industrial and 2050 as target year for net-zero CO₂ emission levels (IPCC, 2018). It is also important to consider that the European Green Deal was established in line with SR15, by defining several policy initiatives with the goal of making Europe the first climate-neutral continent by 2050 (Fetting, 2020). Following the new rules and legislation in the scope of the European Green Deal is vital for companies whose consumer market includes EU countries.

Baseline emission assessment: A first major challenge for companies to establish net-zero targets is defining reliable frameworks for reducing emissions. In this sense, initiatives such as Science Based Targets (SBTi) have emerged guidance protocols for companies towards net-zero emissions (Watson, 2021). Fundamentally, this type of initiative is focused on standardized strategies, known as 'net-zero standards', for guiding companies to reduce their emissions by 50% by 2030 and achieve net-zero emissions by 2050 using reliable procedures based on climate science. To reach SBTi-based net-zero standards, companies must reduce emissions in the scope 1, 2 and 3 to zero or to a residual level that must be neutralized by removing atmospheric CO₂ and adopt measures to sustain C sinks over time. The comprehension of potential trade-offs should be also taken into consideration by companies when defining the mitigation strategies (Sharifi, 2021). These strategies towards net-zero emissions have to follow mitigation pathways, which gives the basis for definition of mitigation targets (Bataille, 2020; Bergero et al., 2023). The net-zero guidance is usually set up in several parts, including (i) preparation of mitigation actions, (ii) measurements of emissions, (iii) definition of mitigation targets, such as base year, target year and interim target, (iv) neutralization of residual emissions, (v) reporting of the mitigation progress, and (vi) assessment of impacts (McGivern et al., 2022).

All these stages require intense processing of unstructured data, for which new AI-based tools can provide very robust support. Combining this intuition with a vast amount of existing transition plan frameworks, Bingler et al. (2023) provide a first conceptual basis for an automated AI tool that can assist the decision-making process. Assessing the common ground among 28 transition plan frameworks, the authors create a holistic set of 88 indicators to investigate inconsistencies and potential greenwashing behavior of companies. Highlighting the importance of this analysis, it is crucial for companies developing their own net-zero strategies to be aware of these indicators. This awareness not only helps in ensuring their strategies are genuinely effective and transparent but also aids in distinguishing their authentic efforts from superficial or misleading claims of sustainability.

4.2.4 Beyond emissions

While the global threat of climate change to economies is widely recognized, along with the feedback loop between climate change and economic factors, there is considerably less understanding of the economic impact posed by other nature-related challenges. These impacts include water stress and pollution, deforestation, biodiversity loss, invasive species, and soil degradation. Each poses significant risks that are yet to be fully quantified in economic terms, suggesting a gap in our current understanding of environmental challenges. Similarly, the influence of economic activities extends beyond the scope of increasing greenhouse gas emissions and their contribution to climate change. Economic actions have broader implications for nature loss, affecting diverse aspects of our environment. The development of policies effectively mitigating the negative impacts of economic activities on nature, and vice versa, remains an area only partially explored.

Nature underpins many economic activities, and its degradation poses real and financial risks to the economy. However, the quantification of such risks is challenging for several reasons. First, nature involves several dimensions and cannot be reduced to a single measure. Second, the direct

consequences of nature loss tend to be local and context specific. Hence, looking at indirect effects of nature loss – for instance, by analyzing the propagation of nature-related shocks through supply chains – is crucial to understand the actual risks of nature loss for the economy and the financial system. Third, nature loss is deeply interconnected with climate change. For instance, deforestation is not only harmful for biodiversity, but also increases climate risks as less carbon emissions are absorbed from the atmosphere going forward. A more accurate quantification is the first of many steps that we need to take to appropriately deal with these risks and achieve a more sustainable allocation of resources.

Measuring the economic and financial risks associated with natural hazards is a major challenge given the diverse and complex interactions in nature. However, valuable insights can be obtained from the data in company disclosures and reports that provide information on the risks and impacts associated with nature. By using Natural Language Processing (NLP) technologies, we can gain deeper insights into the behavior of companies. However, for these tools to be fully effective, more comprehensive and standardized environmental reporting by companies is needed. Such improved reporting would provide the necessary breadth and quality of data to feed into analytical tools, enabling more accurate risk assessments and informed decisions. This synergy of technological advances and data practices is crucial for investors and policymakers to protect both economic stability and environmental health.

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