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Standardized stress test scenario can improve climate risk reporting

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At a glance

- More and more countries, regions, cities, companies, and financial institutions are defining climate neutrality as a strategic goal. So far, however, it is not possible to verify to what extent the necessary measures are being implemented.
- Current sustainability reporting does not allow for a comparable and quantifiable assessment of transition risks. Reporting based on standardised scenarios, on the other hand, enables a more reliable assessment of transition risks and opportunities.
- A standardized stress test scenario facilitates internal decision-making processes for companies in the real economy, simplifies reporting, and avoids cutting off access to capital solely on the basis of sector affiliations. The financial sector can value transition risks and opportunities based on individual company data instead of using average sector values.
- In order for a stress test scenario to enable a comparable assessment of transition risks and opportunities, it should be specified in a standardized manner; for example, as part of mandatory reporting and in line with the recommendations of the Taskforce for Climate-Related Financial Disclosures (TCFD).
- The stress test scenario should focus on a few specifications to reduce the additional workload.

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Introduction

This policy brief shows how a systematic approach to physical and transitory climate risks and opportunities can support not just actors in the financial and real economy but also the public sector in achieving their climate goals. The focus of this report is on transition risks caused by changes in the policy, technology, or market environment.

As an instrument of sustainability reporting, stress tests and scenario analyses enable a systematic and standardised approach to climate risks and opportunities. Although rarely used at the corporate level in the real economy, central banks have been using this instrument for a long time. The results of the European Central Banks (ECB) macroeconomic climate stress test, conducted for the first time in 2021, show that global warming poses a systemic risk. The stress test examined the impact of climate change on over four million companies worldwide and 1,600 banks in the euro area under three climate policy scenarios.[1] In recent years, some central banks and European institutions[2] have also worked on developing stress test methodologies or scenario analyses to capture the impact of climate risks on the financial system. The main difficulties in further development are data availability, capturing financial risks over long periods of time, modelling physical risks, and developing models that can convert climate scenarios into financial variables (ECB 2021). In addition, top-down approaches usually rely on regional or sector-specific data, i.e., company-specific circumstances are not considered here.

To fill this data gap and facilitate comparable and quantifiable reporting for companies, we propose reporting on a standardised stress test scenario in which the goal of climate neutrality must be achieved as early as 2035. The orientation toward a shortened time horizon would help to link long-term goals with short- and medium-term measures. The results of such a scenario analysis could be used to demonstrate the robustness and resilience of business models in the event of a

[1] European Central Bank (2021): ECB economy-wide climate stress test. Occasional Paper Series 281 (available online, accessed on 10.06.2022. This also applies to all other online sources of this report, unless stated otherwise).

[2] For example, the Bank of England, Banque de France, De Nederlandsche Bank, and the European Banking Authority (EBA).

significant tightening of climate policy. This should be compared with the corporate strategy, which is based on the current political framework, climate policy reduction targets, and measures.[3] In the following, we show how scenario analysis can be integrated into forward-looking sustainability reporting.

For this purpose, interviews with representatives from the real economy and the financial sector as well as municipalities took place between November 2021 and January 2022. The resulting findings on the establishment of a standardized stress test scenario and the use of scenario analyses for future-oriented reporting are summarised in three key points.

Climate neutrality as the new norm

More and more countries, regions, cities, economic sectors, and companies are committing to becoming climate neutral within a certain period. With the European Green Deal, the European Commission aims to be the world's first climate neutral continent by 2050. Germany is currently aiming for the year 2045. In the international context, so far more than 140 **countries** have set a corresponding goal or are planning to do so, albeit with very different target years.[4]

Among **non-state actors,** too, the number of those committing to climate protection measures and the goal of climate neutrality by 2050 is steadily increasing. For example, the UNFCCC's Race to Zero campaign[5] now counts 1,049 cities, 67 regions, 5,235 companies, 441 of the largest investors, and 1,039 higher education institutions. Furthermore, more and more initiatives are emerging from **companies in specific industry sectors**, such as Mission Possible's Net-Zero Steel Initiative (NZSI) or the Leadership Group for Industry Transition (LeadIT).

In the financial sector, in particular, numerous initiatives have emerged in recent years aiming to achieve climate neutrality, such as the Glasgow Financial Alliance for

[3] In the final report of the Sustainable Finance Advisory Council, this is also referred to as the core scenario (p.67). In the context of climate scenarios, it is often also referred to as a business-as-usual (BAU) scenario.
[4] See information on the website of Climate Action Tracker, accessed on 30.03.2022.
[5] See Information on the website of the United Nations, accessed on 18.03.2022.

Net Zero (GFANZ), Net-Zero Banking Alliance (NZBA), Net-Zero Insurance Alliance (NZIA), Net-Zero Asset Owner Alliance (AOA), and the Climate Action 100+ initiative.

Public sector initiatives are also on the rise. Target years for climate neutrality in German municipalities are 2050; in some cases earlier: 2030 (Münster), 2035 (Gießen), or 2040 (Würzburg).[6] In November 2021, the EU Commission also launched the "Climate Neutral and Smart Cities" initiative, which aims to support and promote 100 European cities to become climate neutral by 2030.[7]

Thus, climate neutrality as a goal seems to have established itself as a norm worldwide.[8] However, a closer look reveals that a common understanding of what exactly climate neutrality encompasses and how the path toward it should be designed is lacking. Moreover, there is often no differentiation between **climate neutrality** and **greenhouse gas neutrality** as a goal. While greenhouse gas neutrality refers to "net zero" emissions and to the fact that emissions of climate-relevant gases, as defined e.g., in the Kyoto Protocol, no longer increase, climate neutrality is, according to the definition of the German Environment Agency (Umweltbundesamt – UBA) and the Intergovernmental Panel on Climate Change (IPCC), "a state in which human activities have no net effect on the climate system as a result." This includes "climate-impacting emissions, measures aimed at removing greenhouse gases from the atmospheric cycle, and human-induced activities that have regional or local biogeophysical effects," such as a reduction in the reflectivity of bright surfaces like snow and ice due to the melting of glaciers (UBA 2021).[9] The path to achieving this goal and the associated planned measures also vary considerably: for example,

[6] In the international context, the Global Covenant of Mayors for Climate & Energy (GCoM), an association of over 11,500 cities and municipalities working together to find solutions to climate change, and the Climate Change Initiative C40 (www.c40.org), a global network of over 80 major cities that have joined forces in the common fight against climate change. Other initiatives include the association Local Governments for Sustainability (ICLEI), which has joined forces with its carbon Climate Registry (cCR) and CDP to create a unified reporting system. This, in turn, is closely linked to the GCoM's Common Reporting Framework (CRF).

[7] See information on the website of the European Commission, accessed on 30.03.2022.

[8] See also SNAPFI (2022). Exploring emerging norms of climate neutrality: implications for international climate cooperation and finance. Synthesis report. (available online).

[9] Thus, in contrast to greenhouse gas neutrality, the goal of climate neutrality also requires "a different and more ambitious policy, since in addition to greenhouse gas emissions, all other effects of human activity on the climate must also be taken into account, e.g., land sealing by roads and settlements" (UBA 2021).

climate neutrality goals in both the public and private sectors vary in terms of the level of commitment and the timeframe. Likewise, the type of implementation and the understanding of which industries (in the case of country targets) and emission categories are covered by them differs. Furthermore, the accusation of greenwashing is often raised in this context because some actors want to achieve climate neutrality through the purchase of CO2 offset certificates and further compensation measures, rather than through savings of direct and indirect emissions, for example by switching to climate-friendly processes.

For the transformation of the economy toward climate neutrality to succeed, interaction between actors from politics, the real economy and the financial sector is necessary (Bolton, Hong, Kacperczyk, Vives, 2021; Giglio, Kelly, Stroebel, 2021). This interplay is important because climate-related risks pose particularly challenges for these actors.

Climate risks are not yet evaluated and reported in a comparable and quantifiable way

On the way to climate neutrality, **real economy companies** must deal with the impacts of climate change on their business model (outside-in perspective, financial materiality) and the impact of their activities on the environment and society (inside-out perspective, stakeholder, and comprehensive materiality). In practice, this still happens too rarely: On the one hand, more and more companies are setting science-based climate targets and orienting themselves to the Science Based Targets Initiative (SBTI); moreover, studies show that some companies do report climate-related risks - and assess regulatory risks as more important than physical risks or market risks (Sakhel, 2017). On the other hand, evaluations by the Carbon Disclosure Project (CDP) on reporting according to the guidelines of the Task Force on Climate-related Financial Disclosures (TCFD) show that companies have still made little progress in risk management and have implemented inadequate processes for identifying and managing climate risks.[10]

[10] See information on the website of CDP, accessed on 30.03.2022.

The fundamental changes caused by climate change affect all industrial sectors and, thus, to a greater extent, also the **financial sector**, i.e., those institutions that invest in the real economy. This means transition risks affect the portfolios, balance sheets, and business activities of banks, insurance companies, asset managers, pension funds, and pension schemes, among others. Despite the growing awareness and sensitisation about the impact of climate risks, it is apparent that reporting on these issues has so far been inadequate. In 2020, the ECB Banking Supervision published a guide for banks on how to deal with climate and environmental risks.[11] Yet, hardly any institution has lived up to these expectations. This conclusion was confirmed in 2022 in an ECB report on the banks.[12] The survey of the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht; BaFin) comes to a similar conclusion: many of the institutions surveyed consider sustainability and, thus, climate risks to be relevant but see them primarily as a reputational and strategic risk. Only ten percent of banks and 35 percent of securities institutions and capital management companies classify them as material for their credit risks. The question of materiality of sustainability risks is closely linked to the existence of suitable methods for identifying and assessing such risks and their integration into risk management. For example, only a minority of financial companies have carried out sustainability-related stress tests and scenario analyses as of 2021 (BaFin 2021). In particular, small and medium-sized investment companies as well as real estate companies and investment firms are rather reluctant to introduce more complex methods for assessing sustainability risks.[13] This reluctance is surprising because, in the financial industry, potential changes in one or more risk factors have been examined with the help of stress tests since the 2008 financial crisis at the latest. Thus, the use of stress tests and scenario analyses to examine and hedge the effects of extreme, unpredictable risks and to show the changes on the earnings and asset situation of the financial players is familiar. There are numerous procedures for the systematic and targeted implementation of stress tests.

[11] The Guidance for Banks on Managing Climate and Environmental Risks was published in November 2020 (available online).
[12] See information on the website of the European Central Bank, accessed on 30.03.2022.
[13] BVI (2021). BVI Survey on the integration of sustainability risks in risk management. (available online)

The public sector is also affected by climate risks for two reasons: on the one hand, municipalities, for example, are exposed to physical and transitory climate risks because their business tax revenues depend on local companies and industries. On the other hand, as municipal investors, they are confronted with investment risks and possible stranded assets, i.e., assets that are characterised by a loss of value or total loss due to climate risks, via their capital allocation - just like other actors in the financial industry. As issuers of bonds, sponsors of savings banks, and shareholders of energy-intensive companies, the public sector bears corresponding risks.[14] Stress tests and scenario analyses as a form of hypothetical crisis simulation are also hardly or not at all used by public sector actors. The lack of urgency is not the decisive reason here. Instead, they lack methodological knowledge, as is the case with companies in the real economy, and a standardised, structured methodology for conducting stress tests, as in the financial sector (Grebner 2015).

Relying on central bank scenarios leads to problems

Despite the basic knowledge of this methodology, however, financial institutions often fall back on climate scenarios provided by central banks in the absence of a standardized analytical framework regarding climate risks.[15] Moreover, existing corporate sustainability reports barely contain any information on climate-related risks and opportunities – and if they do, then on a variety of different climate scenarios (Loew et al. 2021). A particular challenge is bridging the gap between corporate reporting and the aggregated scenarios used by central banks. This is because most of these systemic stress test approaches focus on generic, sectoral risk parameters. If capital requirements for banks are derived from this, there is a danger that companies in sectors with a large ecological footprint today and, therefore, a particularly high need for investment in the transformation will find it difficult to gain access to appropriate financing instruments.

Thus, it would be helpful if information on the opportunities and risks associated with the transformation of the economy to climate neutrality were also reported by

[14] Verena Göppert and Birgit Frischmuth (2022): Taxonomie ist keine Zukunftsmusik. Der Neue Kämmerer vom 5. Januar 2022 (available online), accessed on 30.03.2022.

[15] The Network for Greening the Financial System (NGFS) makes various climate scenarios available via a data portal, accessed on 30.03.2022.

companies in the real economy and if this information were robustly and comparably quantified. Companies should be able to present to their investors and lenders the extent to which they have identified and considered relevant climate risks and opportunities as well as the extent to which their business strategy is compatible with their climate neutrality goal.[16] Thus, they should report on a standardized stress test scenario, which foresees a tightening of climate policy measures in the near future. Accordingly, companies should mandatorily report on what impact a "climate neutrality by 2035" scenario would have on core economic indicators and what strategies companies would use to respond to it. Such a stress test scenario was already called for in the final report of the Sustainable Finance Committee of the Federal German Government (Sustainable Finance Beirat). [17]

The establishment of such a standardised stress test scenario would bring advantages for all stakeholder groups mentioned so far. On the one hand, it could support companies in systematically collecting the relevant information on climate risks and opportunities. In particular, companies in sectors with major transition risks could demonstrate how they protect themselves against these risks with their specific business model or technology portfolio. Such a transparent presentation would also make it easier for companies to access the capital needed to finance the transformation. On the other hand, the financial sector and the public sector also benefit from the integration of a standardized stress test scenario into sustainability reporting, as it provides them with forward-looking, resilient, and comparable information on corporate risks. By disclosing relevant sustainability information, companies enable financial market actors and municipal investors to check the conformity of their investment or financing decisions with their own climate goals. In addition, municipal investors can use a stress test scenario to consider the probability of default on business taxes due to climate risks.

Recent regulatory developments and increasing demands for mandatory sustainability reporting support the integration of standardized stress test scenarios.

[16] See also Policy Brief – 1/2020 (available online).
[17] See also Policy Brief – 5/2021 (available online) and Final Report of the Sustainable Finance Advisory Council of the German Federal Government (available online).

Here, above all, the growing importance of reporting according to TCFD plays an important role.

Stress tests and scenario analyses become an essential part of forward-looking sustainability reporting

The TCFD guidelines are now considered the standard for forward-looking reporting on the impact of climate change on companies and associated financial risks. An essential component of the TCFD framework is a long-term, forward-looking consideration of climate risks using scenario analyses. The latter serve, on the one hand, as a tool for forward-looking corporate governance to assess the potential business impacts of climate-related risks and opportunities and, on the other hand, as a communication tool to inform stakeholders on how a company positions itself against these risks and opportunities (TCFD 2017).

So far, it has been applied exclusively on a voluntary basis.[18] However, numerous countries have already announced that they will base their plans for mandatory sustainability reporting on the TCFD recommendations,[19] with numerous other frameworks and initiatives also referring to them.[20] In the EU, the TCFD recommendations are to be integrated into the Corporate Sustainability Reporting Directive (CSRD).[21] The ISSB proposals (Prototype IFRS Sustainability Disclosure Standard, TRWG, 2021) also explicitly refers to the TCFD and call for disclosure on whether and how climate scenario analyses are carried out.[22] The UK is going one step further with the establishment of the UK Transition Plan Taskforce.[23] This taskforce is to develop a standard for transformation plans of listed companies and financial institutions that are in line with the 2050 climate neutrality target and the Paris

[18] See also Policy Brief – 3/2022 (available online).
[19] For example, Brazil, the European Union, Hong Kong, Japan, New Zealand, Singapore, Switzerland, and the United Kingdom. The German Sustainable Finance Advisory Council has also spoken out in favor.
[20] Including the Global Reporting Initiative (GRI), the Carbon Disclosure Project (CDP), Climate Disclosure Standards Board (CDSB) and the Value Reporting Foundation (formerly International Integrated Reporting Council (IIRC) and Sustainability Accounting Standards Board (SASB)). (SASB 2017, 2021). (available online), accessed on 09.02.2022
[21] See also European Commission, Draft CSRD, 2021, recital 37.
[22] IFRS (2022): Exposure Draft IFRS Sustainability Disclosure Standard (available online), accessed on 30.03.2022.
[23] See information on the website of the British government (available online), accessed on 30.03.2022.

Climate Agreement. The publication of the transformation plans is to become a mandatory part of the "UK's Sustainability Disclosure Requirements."

Insights from the field – how could a standardized stress test scenario climate neutrality 2035 be implemented?

How can a standardized stress test scenario (using the example of a "climate neutrality by 2035" scenario) be implemented? Which specifications would have to be made and which major uncertainty factors should be taken into account? For this purpose, interviews with representatives from the real economy, the financial sector, and municipalities were conducted between November 2021 and January 2022.[24] In the process, insights were gained into the current obstacles to integrating scenario analyses into future-oriented reporting. These findings are summarised below in key points and supplemented by recommendations for the specification and establishment of a standardized stress test scenario.

1 Key point: Reducing uncertainty and political inertia

The stakeholders interviewed made it clear that in order to achieve climate neutrality, a higher degree of certainty is considered necessary, which should be strengthened, in particular, by clear political guidelines. Above all, the discrepancy between long-term political objectives and concrete short- to medium-term political measures was criticised. According to their own statements, the industrial companies surveyed are prepared to tackle the challenge of climate protection proactively. However, a lack of framework conditions and an insufficient willingness on the part of policymakers prevent companies from investing in innovative technologies. Other investment barriers include the low market maturity of some technologies and the lack of infrastructure for green hydrogen and renewable energies. The associated uncertainties create high investment risks that make financing more difficult. Due to regulatory risks and a lack of political framework conditions, but also technical uncertainties, projects are classified as too risky and, thus, not worth financing ("bankable"). The interviewed companies emphasise that

[24] A total of 22 semi-structured interviews were conducted with experts from the cement, steel, and buildings sectors, as well as pension funds, insurance companies, banks, state banks, church banks, insurance companies, asset managers and municipal investors.

policy should support the decarbonisation domestically, so that shifting the production of CO2-intensive products abroad is not an option.

In principle, climate neutrality in 2035 could be achieved via a very high CO2 price or via other climate policy measures. Many of the companies surveyed are guided by CO2 price paths and targets for longer-term considerations. However, for an assessment of the profitability of investments, business models and companies, a CO2 price path alone is not sufficient, but should be combined with assumptions on technology costs, prices of fossil and renewable fuels, as well as other regulatory elements. It would probably be difficult to find a common assessment of these cost and price assumptions, and it would not be desirable for a regulatory authority to provide specifications for future technology costs.

Instead of focussing exclusively on a CO2 price, we recommend specifying a rapid development toward climate neutrality within the framework of a standardized stress test scenario. If climate neutrality is to be achieved as early as 2035, the necessary development path already results from the short timeframe. With a single specification, a comparable scenario can be made possible, which can then be enriched by companies with further details. In the stress test scenario, certain framework conditions should also be standardised. In particular, it should specify that climate neutrality must not be achieved by relocating production activities to other countries, but rather by switching to climate-friendly business models and technologies. Companies should then each specify their assumptions for the stress test scenario, for example the development and availability of new technologies or infrastructure they need for the company's transformation.

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2 Key point: Short time horizon, intermediate targets, and measures

Mark Carney's often-quoted statement from 2015 on the "tragedy of the time horizon" was once again confirmed in the interviews: There are fundamental conflicts between the strategic business planning horizon and the long-term time horizon of the impacts of climate change. Thus, at the operational level, companies usually plan for one to two years, at the strategic level for three to five years, and in the long term for a maximum of ten, and, in exceptional cases, for 20 years. This also

applies to the financial sector. The short-term system logic is also reflected in the actions of politicians, who are often oriented toward legislative periods and election cycles.

With regard to the climate neutrality targets of the stakeholders surveyed, it is evident that the majority are oriented toward the target year of the European Union (2050), but some are also oriented toward the target year of the German Federal Government (2045). However, the year 2030 is seen as an important intermediate goal. Companies in industry again pointed out that significant re-investment decisions would have to be made by 2030, for example in the steel industry for about half of the German blast furnaces. Annual emission reductions as a criterion for a company assessment are, therefore, not useful until a new plant is commissioned, as significant reductions can only be achieved by leaps and bounds from 2030 onwards. This example shows that long-term climate neutrality targets provide an insufficient information basis for decisions in the present. Information generated based on a standardized stress test scenario could provide more clarity here. Another aspect is the time lag between strategic (investment) decisions and their actual implementation. Therefore, annual emission reductions cannot represent the most important feature of a company's strategic orientation and investment planning. Ultimately, the orientation toward emission targets alone is not sufficient to assess developments in corporate strategy and investment pipelines.

Many of the financial institutions surveyed stated that they are already taking climate risks into account and gradually readjusting investments. In general, the financial sector is aware that new industrial plants as well as buildings have a lifetime beyond 2045 and that investments in conventional technologies and plants can easily become stranded assets. In particular, insurance companies already use scenario analyses that take time horizons of ten, 20, or 30 years into account. Many financial institutions – despite their commitment to the goal of climate neutrality – lack a concrete plan on how they want to and can reduce their transition risks in connection with emission-intensive industries. Thus, there is a discrepancy between long-term emission targets and concrete short- and medium-term measures to achieve them. Despite the growing awareness, players in the financial sector still find

it difficult to assess the future viability of companies with regard to climate change. To this end, the respondents would also like input from the scientific community.

As already described, many companies and financial institutions are oriented toward the climate neutrality targets of the EU or the German Federal Government (2050 and 2045). However, there are considerable differences in the ideas about which types of emissions are taken into account (Scope 1, 2, and 3 emissions), which reference year is used as a basis for medium-term emission reduction targets and which further packages of measures are considered, for example for dealing with residual emissions (e.g., additional purchase of certificates).

In order to influence investment decisions, the climate neutrality target of a stress test scenario should be defined sufficiently short term and standardized (e.g., with the year 2035). In the scenario presentation on the company side, "off-setting", i.e., the purchase of emission certificates or other compensation measures, should be excluded as an alternative to mitigation measures. In addition, reallocation of production and emissions should be avoided through appropriate climate policy measures. Furthermore, companies and financial institutions should report on important interim targets for 2025 or 2030. The focus is not on emission reduction targets, but on (objectively verifiable) transformation plans to achieve climate neutrality, especially in sectors where reductions tend to take place in larger steps or leaps. The developments should be credibly presented with corresponding investments to create a link between long-term goals and short-term measures. If necessary, some cross-sectoral and sector-specific indicators should also be defined, which companies should report on. These could be used to compare and review the implementation of the respective strategies.

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3 Key point: Importance of location factors and interdependencies between sectors

The interviews further showed that the relationship between the sectors, so-called sector coupling, is also relevant. Progress in other sectors and the availability of

technologies, such as electricity and district heating from renewable energies and hydrogen, as well as the necessary infrastructure, are crucial for transformation, both in the cement and steel industries but also in the building sector.

Proximity to the production site and access to electricity from renewable sources, e.g., offshore wind, as well as gas and hydrogen infrastructure, are increasingly becoming an important location factor. Industry representatives stressed that high uncertainty about the future availability of renewable energy and green hydrogen at the production sites should be mitigated by policy measures. Interview participants from the building sector emphasised that, in addition to the renovation activity, the emission factor of the respective energy source is decisive for the emissions of the building.

Material flows and substance flows will also change significantly in the course of the transformation to climate neutrality and with regard to an increased conversion toward a circular economy.

This can be illustrated by the example of the steel industry: as a basic material industry, it plays a key role and is an integral part of European and international value chains. In Europe, steel manufacturers convert waste gases into electricity and useful heat, but this releases CO2 into the atmosphere. Technically new processes applied in low-carbon processes create new substances that, in turn, can serve as raw materials in other industries. In the steel sector, for example, gas fermentation creates ethanol, which can be used as a fuel or feedstock in many chemical processes.

In a standardized stress test scenario, it should be specified which technologies and infrastructures are to be expanded in principle, but not to what extent. The extent to which companies need these energy sources and infrastructure should be reported for the respective scenario as a basis for calculation.

In addition to the specification of a standardized stress test scenario (climate neutrality in 2035, without relocation abroad, and without compensation via certificates), the public reporting of companies on the core assumptions made (e.g., production or purchase of renewable electricity, heat, and hydrogen) are important. If two companies achieve climate neutrality in 2035 in the stress test scenario, but

one has much more far-reaching infrastructure requirements than the other, analysts can identify which company has lower risks and can take this into account in the assessment.

Conclusions and recommendations

The current form of sustainability reporting, with its strong focus on historical emissions data and annual emission reduction targets, falls short of adequately reflecting climate risks and opportunities. Instead, forward-looking transformation paths are needed that illustrate the steps toward the goal of climate neutrality. However, these long-term strategies can only be communicated credibly if they are aligned with short- and medium-term measures.

Forward-looking climate reporting including scenario analyses is already envisaged within the framework of TCFD but is lacking guidance on how to implement it. The specification of a standardized stress test scenario can contribute to making forward-looking reporting more comparable regarding climate risks and opportunities. The expertise in the financial sector in particular can be of great use, as stress tests and scenario analyses are already part of many regulatory requirements.

If a standardized scenario is integrated into a mandatory sustainability reporting, not only will the financial actors benefit from a better information basis for strategic decisions, but also the reporting companies themselves. For example, investors can better assess transitory climate risks within their portfolios. However, it also means a certain amount of additional work – especially for companies from the real economy, which have little previous experience with future-oriented climate reporting. For the sake of practicability and to reduce additional workload, the stress test scenario should focus on a few specifications:

- select a short-term climate neutrality target (e.g., 2035);
- clearly formulate essential framework conditions (e.g., no compensation via certificates or other compensation measures, no relocation abroad, specifications on the type of technologies, and infrastructure development);

- require disclosure on intermediate targets, not only on emission reductions, but also on relevant costs and investment expenditures; and
- granting companies leeway for making decisions about the scope of new technology and infrastructure used, while clearly communicating these assumptions.

Thus, quantifying transition risks in a comparable, company-specific manner is a prerequisite for the financial sector to be able to accompany companies in the real economy on the path to climate neutrality. A standardized stress test scenario for all actors can contribute to the transformation of the economy toward climate neutrality.

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Bibliography

BaFin (2021). Der deutsche Finanzsektor und die Nachhaltigkeitsrisiken: Eine Sachstandserhebung durch die BaFin – Ausführlicher Bericht.

Bolton, P., Hong, H., Kacperczyk, M., & Vives, X. (2021). Resilience of the financial system to natural disasters. The Future of Banking 3, CEPR.

Deutsche Bundesbank (2022). Monatsbericht Januar 2022. Klimawandel und Klimapolitik: Analysebedarf und -optionen aus Notenbanksicht.

European Central Bank (ECB) (2021). ECB economy-wide climate stress test. Methodology and results. Occasional Paper Series. Available online: https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op281~05a7735b1c.en.pdf

Giglio, S., Kelly, B., & Stroebel, J. (2020). Climate finance. Working Paper 28226. NBER WORKING PAPER SERIES.

Gloger, A-M., van Kaldenkerken, P., McClellan, A., Schütt, S., Schwarz, J., Sterzel, T. (2020). Nachhaltige kommunale Finanzen – Handlungsempfehlungen zum Divestment und zur langfristigen nachhaltigen Ausrichtung kommunaler Finanzen und Kapitalanlagen. adelphi, Berlin.

Grebner, B. (2015). Stresstest für produzierende Unternehmen. Vorgehensweise und Methodeneinsatz für die Durchführung von Stresstest in produzierenden Unternehmen. TCW Transfer-Centrum GmbH & Co. KG.

Hale, T., Kuramochi, T., Lang, J., et al. (2021). Net Zero Tracker. Energy and Climate Intelligence Unit, Data-Driven EnviroLab, NewClimate Institute, Oxford Net Zero.

Kacperczyk, M. T., Peydro, J.-L. (2021). Carbon Emissions and the Bank-Lending Channel. Verfügbar online: SSRN: https://ssrn.com/abstract=3915486 oder http://dx.doi.org/10.2139/ssrn.3915486

Loew, T., Braun, S., Fleischmann, J., Franz, M., Klein, A., Rink, S., Hensel, L. (2021). Management von Klimarisiken in Unternehmen: Politische Entwicklungen, Konzepte und Berichtspraxis. Climate Change 05/2021 Umweltbundesamt, Dessau, available online: www.umweltbundesamt.de/publikationen

Sakhel, A. (2017). Corporate climate risk management: Are European companies prepared? In: Journal of Cleaner Production, Volume 165, 1, S. 103-118.

SASB (2017). Converging on Climate Risk: CDSB, the SASB, and the TCFD The Emerging Alignment of Market-Based Approaches to Climate-Related Financial Disclosure. Available online: https://www.sasb.org/knowledge-hub/converging-on-climate-risk/ , accessed on 09.02.2022

Sustainable Finance Beirat (2021). Shifting the Trillions. Ein nachhaltiges Finanzsystem für die Große Transformation. 31 Empfehlungen des Sustainable-Finance-Beirats an die Bundesregierung.

TCFD (2020). Task Force on Climate-related Financial Disclosures: 2020 Status Report. Available online: https://assets.bbhub.io/company/sites/60/2020/09/2020-TCFD_Status-Report.pdf

TCFD (2021). Support the TCFD - TCFD supporters around the world. Available online: https://www.fsb-tcfd.org/support-tcfd/

Umweltbundesamt (UBA) (2021). Treibhausgasneutralität in Kommunen. Available online: https://www.umweltbundesamt.de/publikationen/treibhausgasneutralitaet-in-kommunen

UNFCCC Standing Committee on Finance (2020). Fourth (2020) Biennial Assessment and Overview of Climate Finance Flows. Technical Report.

World Economic Forum (2021). The Global Risks Report 2021: 16th Edition, Insight Report. Available online: http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf.

WBGU – Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (2021). Über Klimaneutralität hinausdenken. Politikpapier 12. Berlin: WBGU.

About the project

The Sustainable Finance Research Platform is a joint project between five German research institutions conducting research on different aspects of Sustainable Finance, e.g. sustainable investments, sustainability risks and chances, and sustainability reporting. With their independent research, the project partners aim to support stakeholders in politics, the financial sector, and the real economy in understanding and shaping the central role of capital markets in achieving a net-zero economy. The researchers involved answer social, political, and business-related questions, provide established and new research findings, and participate in political and public debate. They also want to establish sustainable finance as a topic in the German research landscape and secure connections with international institutes and processes.

More information can be found on the project's website wpsf.de/en/.

Partners of the Sustainble Finance Research Platform are

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