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183 Report by Fernanda Ballesteros, Alexandra Hüttel, Karsten Neuhoff, and Catherine Marchewitz

On the way to climate neutrality: Scenarios can facilitate the transition of companies and the financial sector

- Study analyzes significance of scenarios related to climate change for management and portfolios
- Scenarios make forward looking reporting according to transition indicators possible
- Standards need to be developed to ensure comparability of reporting

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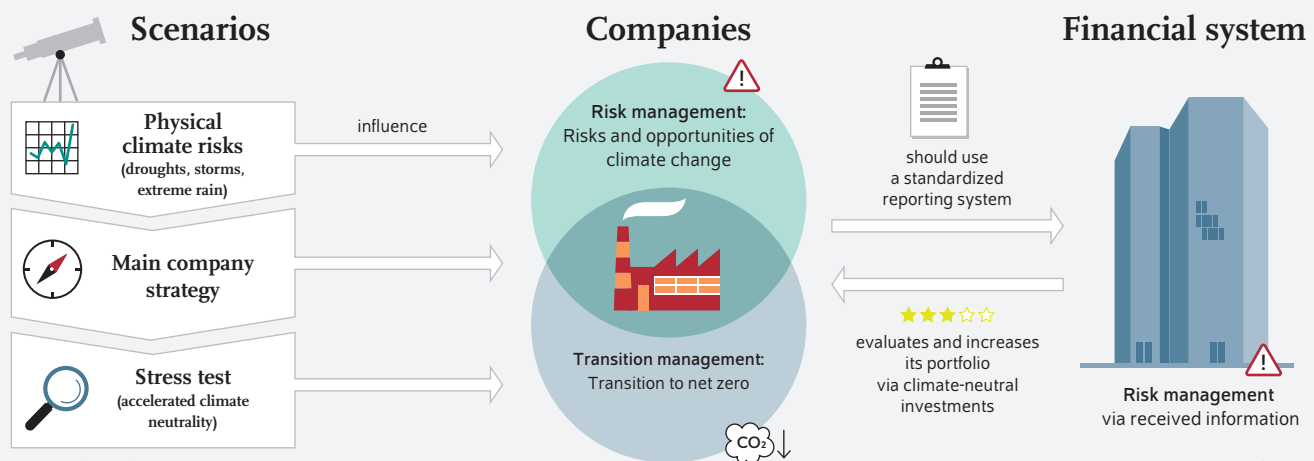
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On the way to climate neutrality: Scenarios can facilitate the transition of companies and the financial sector

By Fernanda Ballesteros, Alexandra Hüttel, Karsten Neuhoﬀ, and Catherine Marchewitz

- Study analyzes the significance of scenarios related to climate change for corporate and financial sector management
- Companies can use scenarios estimating physical and transitory risks to develop a climate neutrality strategy
- Scientific, scenario-based studies for Germany help companies make strategic decisions
- Scenarios enable climate reporting according to transition indicators that the financial sector can use to evaluate portfolios
- For the comparability and quantifiability of climate reporting, standardized scenarios must be developed

Using scenarios, companies can recognize climate risks and adjust their strategy; reporting requirements improve risk management in the financial sector as well



FROM THE AUTHORS

"For companies, scenarios are a scientific guide to identifying important transition factors to reduce their emissions as quickly as possible. For example, for a company with a building portfolio, the studies show what needs to be implemented in the building sector to reduce emissions and become carbon neutral."

— Fernanda Ballesteros —

MEDIA



Audio Interview with F. Ballesteros (in German)
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On the way to climate neutrality: Scenarios can facilitate the transition of companies and the financial sector

By **Fernanda Ballesteros, Alexandra Hüttel, Karsten Neuhoff, and Catherine Marchewitz**

ABSTRACT

In its Federal Climate Change Act, Germany has committed to achieving climate neutrality by 2045. To do so, companies from both the industrial and the service sectors must adjust their production and business practices, and financial institutions must adjust their evaluation criteria. In many cases, this requires a new strategic direction and investments in climate-neutral products, business models, and production technology. To achieve this, companies require capital and support from the financial sector, which thus plays a key role in achieving climate targets. For investors, civil society organizations, and government agencies to understand the investment needs, progress, and potential risks of companies as they transition to climate neutrality, companies are expected to provide forward-looking climate-related reporting based on scientific evidence and standardized procedures. Science utilizes scenarios, which can provide industrial and service companies as well as banks, funds, and insurance companies with standardized and comparable information about the transition to a climate-neutral business model and the resulting risks. Scenarios allow companies in the real economy to systematically consider transition risks and opportunities when making decisions about investments and strategic direction. Furthermore, the scenarios make it possible for the financial industry to gradually decarbonize its investment portfolio and to depict company-specific transition risks and opportunities in risk management.

To transition to a climate-neutral economy by the middle of the 21st century, companies, especially those in emission-intensive sectors, must implement strategies for climate and environmentally-friendly production processes and make long-term investments in technologies and products. The EU Commission developed the EU taxonomy, which classifies sustainable economic activities, so that investors and regulatory authorities would be able to determine if companies are on the path to climate neutrality. However, the EU taxonomy only lists existing climate-friendly or climate-neutral economic activities. This means that, for the large number of companies not yet operating sustainably, the taxonomy cannot adequately determine whether they are attempting to transition to carbon neutrality or if they are avoiding emissions in their economic activities.¹

Forward-looking climate-related reporting is necessary to determine if a company is on a path to climate neutrality. In 2022, the Transition Plan Taskforce (TPT), based in Great Britain, presented a draft for a disclosure framework for transition plans,² which describes four elements in creating a transition plan: assessing the current situation, setting metrics and targets, developing an implementation strategy, and ensuring responsibility and accountability for the implementation.³

While the idea of forward-looking climate-related reporting and plans for transitioning away from fossil fuels are becoming more popular, the question remains as to how comparability, credibility and quantifiability of reporting can be ensured.⁴ One tool used for developing transition plans are scientific scenarios, which analyze and model climate science findings on the impact of global warming as well as political

¹ See for example Franziska Schütze and Jan Stede, "The EU sustainable finance taxonomy and its contribution to climate neutrality," *Journal of Sustainable Finance & Investment* (2021): 1–33 (available online).

² A transition plan is a time-bound action plan that outlines how plants, operations, and business models will be adjusted to achieve carbon neutrality.

³ TPT, *The Transition Plan Taskforce Disclosure Framework* (2022) (available online).

⁴ Cf. Nicolas Kreibich, "Klimaneutralität in Unternehmen: Zehn Empfehlungen für die Umsetzung," *Zukunftsimpuls* 20 (2021) (in German; available online).

targets and laws.⁵ Using scenarios, companies can investigate possible developments of different future situations and take strategic measures to achieve the desired results and weaken or avoid undesired results. Thus, scenarios can be beneficial for both companies and investors.⁶ First and foremost, they serve as a means of forward-looking corporate management and strategy development. Yet investors and financial market regulators can also use them for risk assessment to ensure financial stability based on comparable and reliable information.⁷ Lastly, investors and companies can use scenarios when communicating with each other, as scenarios can serve as a benchmark for the rating and management of the risk of individual borrowers or portfolios.⁸

This Weekly Report discusses the use of scenarios for the transition and risk management of the real and financial economy as they transition to climate neutrality. It clarifies the types of scenarios and shows to what extent scientific net-zero scenarios (feasibility studies for achieving climate neutrality) can be used in companies' transition plans as a scientific benchmark (Figure 1, Box)

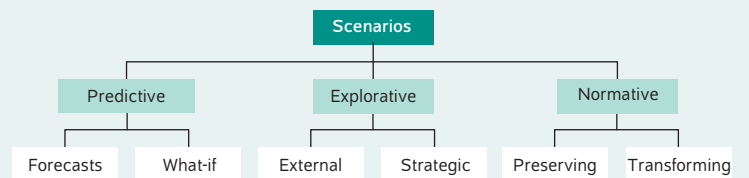
Paris Agreement paved the way for climate neutral scenarios

Signatories of the 2015 Paris Agreement have agreed to hold the increase in the global average temperature to below two degrees Celsius, ideally limiting it to 1.5 degrees Celsius compared to pre-industrial levels.⁹ Corresponding goals have been concretized in law on a European level: The European Green Deal commits EU Member States to the Paris Agreement, while the European Climate Law sets the goal of making Europe's economy and society climate-neutral by 2050.¹⁰ Member State governments have also enacted climate change legislation to contribute to the new agenda.¹¹ Germany, for example, has committed to net greenhouse gas neutrality by 2045 in its Federal Climate Change Act.¹²

Various institutes and scientific organizations have investigated the plausibility of achieving international or national reduction targets and greenhouse gas neutrality in net-zero

Figure 1

Overview of various scenario types Based on the Börjeson et al. scenario types



Source: Authors' depiction based on Börjeson et al., "Scenario types and techniques: towards a user's guide," *Futures* 38, no. 7 (2006): 723-739 (available online).

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The different types of predictive, explorative, and normative scenarios support firms in their risk and transition management.

Box

The three types of scenarios

The Börjeson et al. scenario typology differentiates between three types of scenarios. The first category involves predictive scenarios that answer the question "What would happen?" and offer forecasts or what-if scenarios. In contrast, explorative scenarios answer the question "What can happen?" and differentiate between external and strategic scenarios. Finally, the third category encompasses normative scenarios, which focus on possible approaches to achieving a certain objective.

This third category can be broken down into scenarios for maintaining as well as changing the status quo. While forecasts and what-if scenarios are useful to make predictions about the future, explorative scenarios are helpful if users are considering a variety of possibilities and may want to adjust for a variety of different types of outcomes. Normative scenarios help identify specific objectives and associated measures that can be taken to achieve the objective, such as climate neutrality.

scenarios. Typically, net-zero scenarios (scenarios for achieving climate neutrality) break down the various components of the transition, such as technologies, energy and resource efficiency, and policy instruments, and show their respective roles in achieving emissions reductions, which are often sector specific. Transition components include the switch to renewable energy sources, improving energy efficiency, and the use of climate-friendly technologies. In Germany, various institutes such as the German Environment Agency (*Umweltbundesamt*, UBA), the Federation of German Industries (*Bundesverband der Deutschen Industrie*, BDI), and the Fraunhofer Institute for Solar Energy Systems (*Fraunhofer-Institut für Solare Energiesysteme*) have investigated how Germany can achieve its goal of greenhouse gas neutrality by 2045 by following sectoral decarbonization paths.

⁵ Cf. TCFD, *Guidance on Metrics, Targets, and Transition Plans* (2021) (available online).

⁶ Cf. Karol Kempa et al., "Szenarioanalysen als Werkzeug für Unternehmen, Investoren und Regulatoren auf dem Weg zur Klimaneutralität," *Wissenschaftsplattform Sustainable Finance Policy Brief* no. 5 (2021) (in German; available online). The Wissenschaftsplattform Sustainable Finance (WPSF) brings together five German research institutes conducting intensive research on sustainable finance (see website). The WPSF receives funding from *Stiftung Mercator* as part of the *Rahmenprogramm Sustainable Finance* [funding code 19026202].

⁷ Cf. ECB, *ECB staff opinion on the first set of European Sustainability Reporting Standards* (2023) (available online).

⁸ Cf. Udeke Huiskamp, "The climate resilience cycle: Using scenario analysis to inform climate-resilient business strategies," *Business Strategy and the Environment* 31, no. 4 (2022): 1763–1775 (available online).

⁹ United Nations, *Paris Agreement* (2015) (available online).

¹⁰ European Union, *Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')* (available online).

¹¹ Cf. Mark Roelfsema et al., "Taking stock of national climate policies to evaluate implementation of the Paris Agreement," *Nature Communications* 11, no. 1 (2020): 2096 (available online).

¹² Bundesregierung, *Bundes-Klimaschutzgesetz (KSG)* (2019) (in German; available online).

Table

Studies on possible climate neutrality in Germany

Publicly accessible studies

Title	Date	Contracting organization
Wege in eine ressourcenschonende Treibhausgasneutralität [KN' 2050]	Nov 2019	German Environment Agency (available online)
Langfristszenarien für die Transformation des Energie systems in Deutschland 3 [KN 2050]	May 2021	Federal Ministry for Economic Affairs and Climate Action (BMWK) (available online)
Klimaneutrales Deutschland 2045 [KN 2045]	June 2021	Agora Energiewende (available online)
Net-Zero Deutschland. Chancen und Herausforderungen auf dem Weg zur Klimaneutralität bis 2045 [KN 2045]	Sept 2021	McKinsey (available online)
Klimapfade 2.0. Ein Wirtschaftsprogramm für Klima und Zukunft [KN 2045]	Oct 2021	Federation of German Industries (BDI) (available online)
Dena Leitstudie. Aufbruch Klimaneutralität [KN 2045]	Oct 2021	Deutsche EnergieAgentur (dena), (available online)
Deutschland auf dem Weg zur Klimaneutralität 2045 Szenarien und Pfade im Modellvergleich [KN 2045]	Oct 2021	KopernikusProjekt Ariadne (Ariadne) (available online)
Wege zu einem klimaneutralen Energiesystem. Die deutsche Energiewende im Kontext gesellschaftlicher Verhaltensweisen. [KN 2045]	Nov 2021	Frauenhofer Institute for Solar Energy Systems (ISE) (available online)

1 Climate neutrality

Source: Authors' depiction.

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Forward-looking climate-related reporting secures credibility of firms in transition

In the context of using scenarios related to climate change at corporate level, risk management and transition management are two separate areas. Risk management examines the transitory effects and changes in legislation as well as political conditions, such as prioritizing climate neutrality, on the company and how it can strengthen its resilience to them. Risk management also analyzes the physical effects of climate change, such as droughts or heatwaves, on the company.

In contrast, transition management focuses on managing a business model or value change toward a climate-neutral economy according to a net-zero scenario.¹³ This requires a comprehensive, future-focused approach that includes reducing emissions in all areas of a company's operations and value chain. This Weekly Report uses the building sector as an example and investigates its transition management, which includes switching to climate-friendly heating technology, such as heat pumps or a district heating network, as well as increasing energy efficiency through energy-related renovations.

Forward-looking climate-related reporting is necessary to ensure the transparency and credibility of a company's transition. A number of initiatives provide recommendations and assistance for climate-related reporting and for creating transition plans.¹⁴ The G20's Financial Stability Board's Task

Force on Climate-Related Financial Disclosures (TCFD) has developed recommendations for corporate climate reporting and published guidance on transition plans, which is also referenced in the UK's TPT proposal.¹⁵ According to the TCFD, the transition plan is recognized as a part of a company's climate strategy but is separate from its risk management and adjustment plan, which focuses on climate-related risks and opportunities.

Using scenarios is of central importance when creating transition plans. Scenarios fulfill two functions: They are used to derive milestones and metrics for achieving long-term company goals, and they are also used in stress tests to check how resilient the plan is, such as in the face of a change in political conditions.¹⁶ For example, the German Federal Government's Sustainable Finance Advisory Committee¹⁷ recommends that the government clearly report according to a central scenario (such as climate neutrality by 2045) as well as prescribe, use, and report on a stress test scenario (climate neutrality by 2035).¹⁸ According to an analysis by the TCFD, however, the majority of companies are not using the transition scenarios and are also not publishing any comprehensive transition plans.¹⁹ However, it is conceivable that as corporate reporting requirements become more stringent, transition plans will also have to be disclosed.

In the course of the revision of the European corporate sustainability reporting under the Corporate Sustainability Reporting Directive (CSRD), transition plans are envisaged under certain conditions as part of the disclosure requirements.²⁰ This is also being discussed at an international level, for example by the International Standard Setting Board (ISSB).²¹

Scientific net-zero scenarios for the transition to climate neutrality – Example of building sector

Eight comprehensive net-zero scenarios for Germany that were published following the passage of the Federal Climate Change Act are analyzed to identify key indicators for measuring the transition (Table). Following the logical framework approach,²² this Weekly Report identifies transition indicators that provide information on companies' progress in

¹³ Cf. Huiskamp et al., op. cit.

¹⁴ Cf. OECD, *OECD Guidance on Transition Finance: Ensuring Credibility of Corporate Climate Transition Plans, Green Finance and Investment* (2022) (available online); PwC and WWF, *Pathways to Paris. Transformation gestalten: Chancen der Klimawende nutzen* (2022) (in German; available online).

¹⁵ TCFD, *Guidance on Metrics, Targets, and Transition Plans* (2021) (available online).

¹⁶ Cf. Ibid.; TPT, *The Transition Plan Taskforce Disclosure Framework* (available online).

¹⁷ The committee, comprised of businesses, financial institutions, academia, and civil society, has been advising the German government on the development and implementation of its Sustainable Finance Strategy since 2019 (see the website of the Federal Ministry of Finance).

¹⁸ Sustainable Finance-Beirat der Bundesregierung, *Shifting the Trillions – Ein nachhaltiges Finanzsystem für die Große Transformation. 31 Empfehlungen des Sustainable-Finance-Beirats an die Bundesregierung* (2021) (in German; available online).

¹⁹ TCFD, *Taskforce on Climate-related Financial Disclosures. 2022 Status report* (2022) (available online).

²⁰ European Commission, *Draft delegated regulation supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards* (2023) (available online).

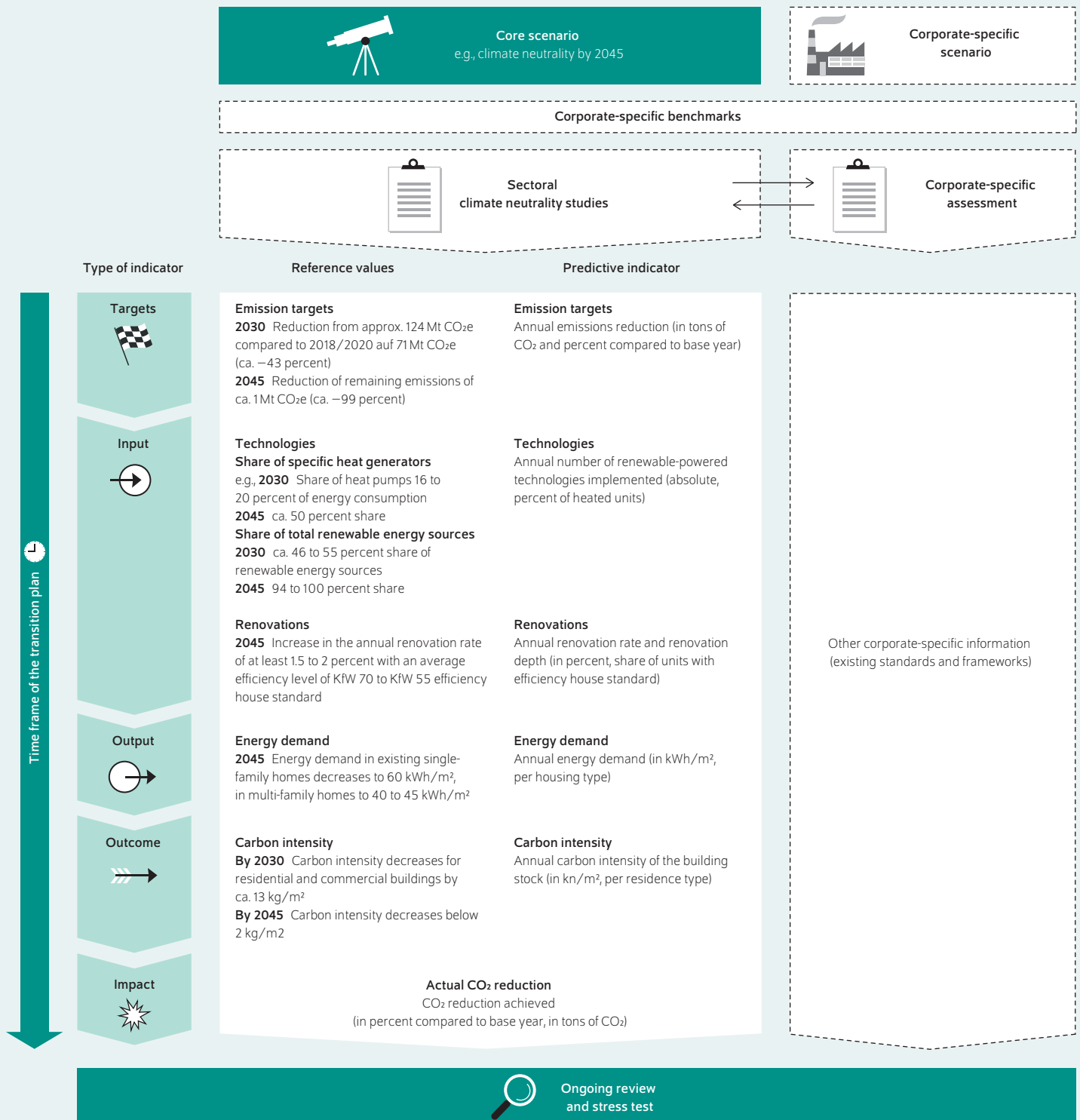
²¹ ISSB, *Staff paper. Climate-related disclosures* (2022) (available online).

²² Thomas Hale, "Sub-and non-state climate action: a framework to assess progress, implementation and impact," *Climate Policy* 21, no. 3 (2021): 406-420 (available online).

Figure 2

Overview of transition indicators with the building sector as an example

Scenarios from climate neutrality studies



Note: CO₂ is carbon dioxide; CO₂e are carbon dioxide equivalents (greenhouse gases converted into CO₂ quantities); KfW-70 and KfW-55: The Kreditanstalt für Wiederaufbau (KfW) has developed efficiency house standards such as 70 or 55, according to which it provides state subsidies for renovations. KfW 70 means that after renovation, the house consumes 30 percent less primary energy than reference houses. kWh = kilowatt hours; Mt = megatons; m² = square meter.

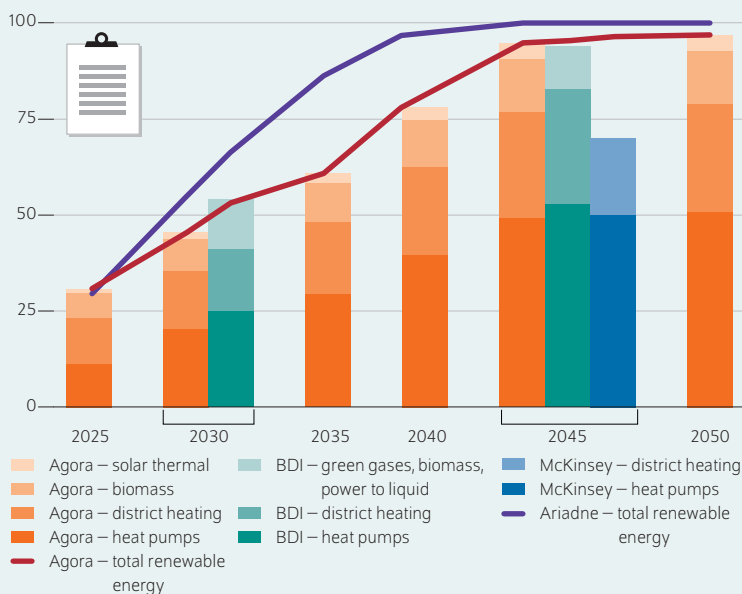
Source: Authors' depiction based on climate neutrality scenarios.

Indicators such as the transition to renewable energy sources as well as energy efficiency measures for the building sector can be derived from the scenarios in order to decrease energy consumption and greenhouse gas emissions.

Figure 3

Heat generated by renewable energy sources in the building sector according to selected climate neutrality studies

Share in percent of building sector energy consumption



Source: Authors' depiction based on selected climate neutrality studies. Data from Ariadne studies refer to the overall heating sector.

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The share of heat generators powered by renewable energy sources will reach 46 to 55 percent in 2030 and 94 to 100 percent in 2045, with heat pumps dominating.

their transition to climate-neutral business strategies and can be reported as part of transition plans to enable standardization according to a normative climate scenario, such as climate neutrality by 2045.

Net-zero scenarios can thus serve as a reference across various transition indicators that are of major significance in achieving climate neutrality. Despite differences in the modeling methods and in the calculations' depth of detail in the individual sectors, the studies come to similar results. As an example, this is shown for the building sector, which is responsible for around 30 percent of direct and indirect greenhouse gas emissions in Germany (Figure 2), is a prime example of this.²³

According to various scenarios, building sector emissions are decreasing from an average of around 124 megatons (Mt) of CO₂ equivalents (CO₂-eq) from 2018-2020 to 71 Mt CO₂-eq in 2030 (-43 percent). By 2045, only an average of around 1 Mt CO₂-eq (-99 percent) of residual emissions will remain.²⁴

²³ This includes the direct carbon emissions of the buildings in both private households and the trade, commerce, and services sectors as well as emissions from the use of electricity, district heating, and industrial buildings. The share of direct carbon emissions is around 15 percent. See Umweltbundesamt, *Energiesparende Gebäude* (2022) (in German; available online).

²⁴ Net-zero scenario (NZS) from Agora, Ariadne, BDI, and dena (see Table).

To measure the resilience of the emissions targets they set, companies can report the share of heat supplied by renewable energy sources in heatable housing units as an input factor. All net-zero scenarios examined cite this as a key transformation lever. According to the studies analyzed, around five to six million heat pumps must be in use by 2030 and around 15 to 16 million heat pumps must be in use by 2045-2050 to achieve the emissions targets.²⁵ The share of technologies powered by renewable energy sources will reach 46 to 55 percent by 2030 and increase to 94 to 100 percent by 2045, with heat pumps being the dominant technology at about 50 percent (Figure 3).²⁶

A further input factor could be energy efficiency measures such as energy-related renovations. The scenarios analyzed assume that the annual renovation rate²⁷ could increase from around one percent to 1.5 to two percent²⁸ or even to over two percent²⁹ by 2045. Depending on the type of residence, the renovation depth corresponds roughly to the KfW 70 to KfW 55 efficiency house standard.³⁰ Accordingly, companies could report their annual renovation rate and renovation depth, i.e., the percentage of housing units with an ambitious efficiency house standard.³¹

This should be reflected in energy consumption at the output level, which decreases in the scenarios from an average of 125 kilowatt hours per square meter in 2021³² to an average of 60 kilowatt hours (kWh) per square meter (m²) in existing single-family homes and to around 40 to 45 kWh/m² in multi-family buildings.³³ Accordingly, companies would be able to report their average energy consumption target per square meter and also per building type.

At the outcome level, the combined effect of improving efficiency and switching to renewable energy sources is reflected in the reduction of carbon emissions, which drop from an average of 22 kg/m² in 2020 to 13 kg/m² in 2030, and then to well below 2 kg/m² in 2045 for residential and non-residential buildings in the scenarios.³⁴

These indicators show how the net-zero scenarios can serve as guides for decarbonizing corporate portfolios. Generally, companies should have as much freedom as possible in achieving climate neutrality as long as their strategies are

²⁵ NZS from BDI, BMWK Langfristszenarien, Ariadne, and Agora (see Table).

²⁶ The interactive graphic is available on the Open Energy Tracker page on the Energy, Transport, Environment Department's page on the DIW Berlin website (available online).

²⁷ The percentages refer to full renovation equivalents in each case.

²⁸ NZS from BDI, Agora, and dena (see Table).

²⁹ NZS from Ariadne, Umweltbundesamt, and BDI (see Table).

³⁰ NZS from Agora, Ariadne, BDI, and Fhg-ISE (see Table).

³¹ Cf. Daniele Fietze, Mats Kröger, Thorsten Möller, and Karsten Neuhoff, "An effective Federal Climate Change Act"; Matthias Duwe et al., *Measuring progress towards climate neutrality* (Ecologic Institute: 2021) (online verfügbar).

³² Umweltbundesamt, *Energieverbrauch privater Haushalte* (2023) (in German; available online). Data refer to space heating (excluding hot water).

³³ NZS from Agora. Data refer to space heating excluding hot water (see Table).

³⁴ NZS from Agora and Ariadne (see Table).

scientifically plausible and, to this end, they map the transition using key transition indicators. In their reporting, companies can thus show and explain deviations from net-zero scenarios. Allowing this supports new technologies and innovative strategies.

Scenario analysis shows risks and opportunities of corporate climate neutrality

In risk management, companies can use scenarios to investigate future risks and opportunities from the transition to climate neutrality that can impact a sector, the company, or the business model financially and strategically. This facilitates companies in weighing investments and supports banks', investors', and financial market regulators' portfolios and financial market risk assessments.

Transition risks involve the financial and economic impact of the transition to a climate-neutral economy, political and regulatory changes, technological upheavals, and changes in consumer behavior. The physical risks involve the direct impact of climate change, such as more frequent and powerful natural disasters such as rainfall, droughts, storms, rising sea levels, and high temperatures. The resulting risks can impact a company's infrastructure, supply chains, and operations, which can lead to delays, damages, and losses.³⁵

Transition risks

- Political and legal risks
- Market and economic risks (for example firm valuation)
- Technological risks (for example stranded assets)
- Reputational risks

Physical risks

- Acute physical risks (such as real estate)
- Chronic physical risks (such as limited availability of resources due to droughts)

These risks can also impact the stability of a country's overall system or of an economically interdependent association of states such as the EU. For central banks and financial market regulators, capturing the transition risks is thus essential.³⁶ If investments or assets lose value or become redundant due to technological advancement, changes to laws, or market conditions, they weigh on entire portfolios as stranded assets. One example of business model risks due to regulatory changes can be seen in the automobile industry. The accelerated transition to electric vehicles in many countries in recent years may result in the industry being unable to find a sales market for internal combustion engine vehicles sooner than expected. By understanding and managing these risks, companies in the financial and real economies

can be better positioned to be successful in a rapidly changing global economy.³⁷

Scenarios must be standardized and comparable

The Task Force on Climate-Related Financial Disclosures (TCFD) recommends that companies report on climate-related risks and opportunities. To this end, they should also present the strategy's resilience under various climate-related scenarios, including a "two degrees or less" scenario. Companies use scenarios from organizations such as the International Energy Agency, the Deep Decarbonization Project, and the International Renewable Energy Agency.³⁸

The Network for Greening the Financial System (NGFS) also offers a series of hypothetical climate scenarios that contain a number of possible events relating to the climate, economy, and politics.³⁹ Overall, however, no one has yet succeeded in establishing a standardized scenario for implementation at a corporate level.⁴⁰ This would not only make corporate implementation easier, but also increase the comparability of reporting, which is especially crucial for the quantitative analysis of portfolios in risk management.⁴¹ Therefore, in addition to standardized reporting on a company's main scenario, reporting on a standardized stress scenario for climate neutrality in 2035 is also required, as recommended by the Sustainable Finance Advisory Committee.⁴²

Conclusion: Standardized transition indicators and net-zero scenarios could facilitate transition planning and risk management

Many companies have already set their own target of climate neutrality by 2045; some German companies even report already being climate neutral or that they will achieve climate neutrality before 2045.⁴³ Standardized forward-looking reporting, such as the publication of transition plans, is needed to strengthen the transparency and credibility of these objectives and associated measures. From scientific net-zero scenarios, key transition levers and indicators can be derived to decarbonize the enterprise and bring it in line with the goal of climate neutrality. By aligning or correlating their strategies and reporting with selected transition indicators from scientific net-zero scenarios and reporting on them in transition plans, the financial sector can also use the information they contain.

³⁷ Cf. Karol Kempa et al., "Szenarioanalysen als Werkzeug."

³⁸ TCFD, *Recommendations of the Taskforce on Climate-related Financial Disclosures* (2017) (available online).

³⁹ NGFS' scenario portal (available online).

⁴⁰ Cf. Loew et al., *Management von Klimarisiken in Unternehmen: Politische Entwicklungen, Konzepte und Berichtspraxis* (2021) (in German; available online).

⁴¹ Cf. Catherine Marchewitz et al., "Einheitliches Stresstest-Szenario kann Berichterstattung zu Klimarisiken verbessern," *Wissenschaftsplattform Sustainable Finance, Policy Brief no. 5* (2022) (in German; available online).

⁴² Sustainable Finance-Beirat der Bundesregierung, "Shifting the Trillions".

⁴³ Cf. Union Investment, *Wind of Change. Dekarbonisierung bei DAX 40-Unternehmen* (2022) (available online).

³⁵ Cf. NGFS, *Guide to climate scenario analysis for central banks and supervisors* (2020) (available online).

³⁶ Cf. Stefano Battiston, "Climate risks and financial stability," *Journal of Financial Stability* 54 (2021): 100867 (available online).

For this to be successful, comparable forward-looking reporting to a company's core scenario in the current political environment is required, e.g. climate neutrality in 2045. On the other hand, the transition plan should also be resilient to future developments in national and international climate policy. A change such as bringing forward the climate neutrality target to 2035 also requires reporting on a resulting stress test scenario, which must be comparable to the core scenario. Based on the two scenarios and the transition indicators in the transition plans, finance can quantify the progress in decarbonization as well as the transition risks for the company-specific. This strengthens transparency in individual lending and portfolio management, and thus risk management in finance. Forward-looking reporting can avoid that companies are evaluated only on the basis of current sector information. Thus, with comparable transition plans, the financial sector can also accompany CO₂-intensive companies on their way to climate neutrality, instead of removing them from portfolios due to transition risks or current still high CO₂ emissions.

International climate reporting frameworks are already laying the groundwork for a common scenario framework and standards for forward-looking reporting on the path to climate neutrality. For example, the frameworks of the international Taskforce on Climate-Related Financial Disclosures of the 20 most important industrialized and emerging economies and the EU, as well as the Transition Plan Taskforce of the British government. The German government should also work internationally to achieve further standardization of forward-looking reporting standards and scenario frameworks so that reports are comparable and quantifiable. Other relevant processes for this are the negotiations on the planned disclosure requirements of the EU regulatory proposal, CSRD (Corporate Sustainability Reporting Directive), and the global sustainability reporting standards of the ISSB (International Sustainability Standards Board). This can contribute to strengthening the trust of investors, companies, and the public in the effectiveness and comparability of forward-looking climate-related reporting and transition plans.

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