German Environment Agency

Corporate reporting on climate-related risks

Key findings of a German survey for decision-makers and multipliers

Dessau, 2021

Imprint

Authors

Thomas Loew, Sabine Braun, Johannes Fleischmann, Matthias Franz, Axel Klein, akzente kommunikation und beratung GmbH,
Munich and Berlin

Lara Hensel, Sebastian Rink,
Frankfurt School of Finance and Management gGmbH, Frankfurt

Commissioner and publisher

German Environment Agency, Wörlitzer Platz 1, 06844 Dessau-Roßlau
www.umweltbundesamt.de

Project advisor

Kirsten Sander, Department FG I 1.6 KomPass - Competence Centre Climate Impacts and Adaptation

Citation

Loew, T.; Braun, S.; Fleischmann, J.; Franz, M.; Klein, A.; Hensel, L.; Rink, S. (2021) Corporate reporting on climate-related risks. Key findings of a German survey for decision-makers and multipliers.

Basis of the summary

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. [Management of Climate Risks in Business: Public Policy Developments, Concepts and Reporting Practices.] Climate Change 05/2021 Umweltbundesamt, Dessau
Download www.umweltbundesamt.de/publikationen/management-von-klimarisiken-in-unternehmen

Project details

Title: Economics of Climate Change: New Management Instruments to Reduce Climate Risks for the Public and Private Sector.

Duration: August 2019 – December 2022

Research Plan of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

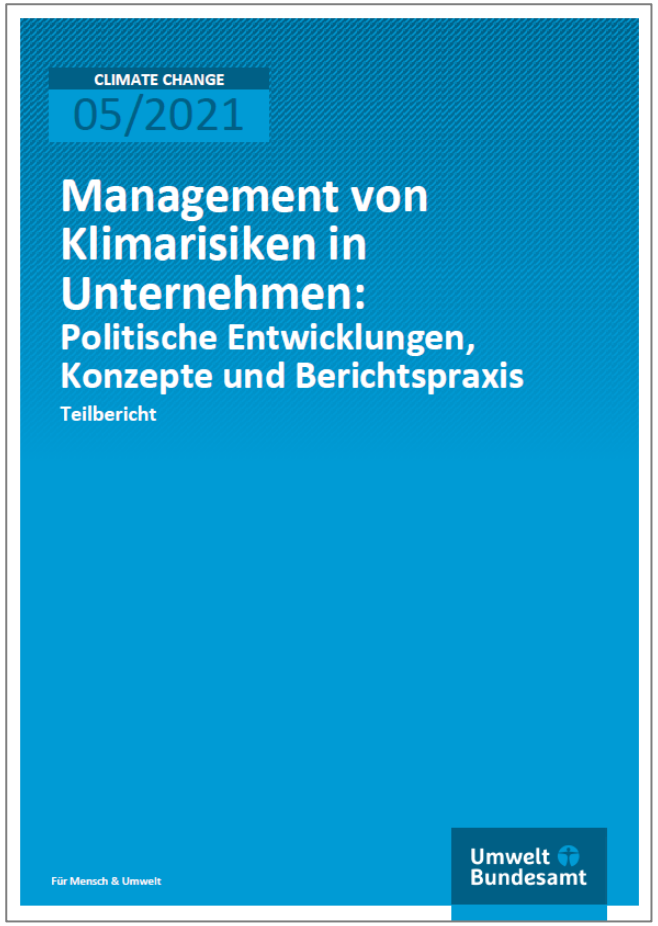
Research code 3719 48 1030

About this summary

THIS SUMMARY OF KEY FINDINGS DESCRIBES THE STATUS OF CLIMATE RISK REPORTING AMONG THE 100 LARGEST GERMAN COMPANIES

Detailed results and methodology can be found in the study "Management of Climate Risks in Companies: Policy Developments, Concepts, and Reporting Practices" (Loew et al. 2021). The German study includes an English summary (10 pages).

Download available at www.umweltbundesamt.de/publikationen/management-von-klimarisiken-in-unternehmen.



Purpose and research questions

The results of the study provide insight into the relevance and management of climate-related risks in large companies. They also show the extent to which companies report in accordance with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).

The overarching goal of the research project "Economics of Climate Change" is to foster the management of physical climate risks in companies.

We used sustainability reports, non-financial statements and CDP's database for the analysis. Not only physical but also transition risks were considered, because both types of risk are relevant for companies and the financial markets.

Relevance of climate-related risks	Governance and management Relevance of climate-related risks	Reporting according to TCFD
Are physical risks taken into account? How relevant are climate-related and specifically physical risks from the companies' point of view?	How are they integrated into existing governance and management structures? To what extent do companies already have climate-related governance and management structures?	To what extent is already being reported in accordance with TCFD?

Influencing factors
Which industry- and size-specific differences can be identified? What differences can be seen between the non-financial statement, sustainability reports and the CDP climate?

Terminology

Physical risks: direct and indirect risks due to climate change

Transition risks: risks due to the transition towards a decarbonized economy

Climate-related risks: physical and transition risks

Source: Loew et al. (2021)

Sample by company size and report type

REPORTING OF THE 100 LARGEST COMPANIES IN GERMANY

All sustainability reports and non-financial statements of the 80 largest German companies in the real economy, the 10 largest German banks and the 10 largest German insurance companies published in 2020 up to the reporting date of August 1, 2020 were examined. For the DAX-30 companies, their publicly available reporting in CDP's climate database, reporting year 2019, (hereafter "CDP Climate") was also analyzed.

REPORTING OF PIONEERING „MITTELSTAND“ COMPANIES

In addition, current sustainability reports of 20 medium-sized companies that had performed best in the 2019 ranking of German sustainability reports (IÖW, future e.V. 2019) were examined. Of these companies, 16 current sustainability reports are available.

	Sustainability reports	Non-financial statements	CDP Climate
DAX-30-companies	24	26	20
Top-100-companies without DAX-30	33	24	
SME	16		
Sums	**73**	**50**	**20**

Terminology

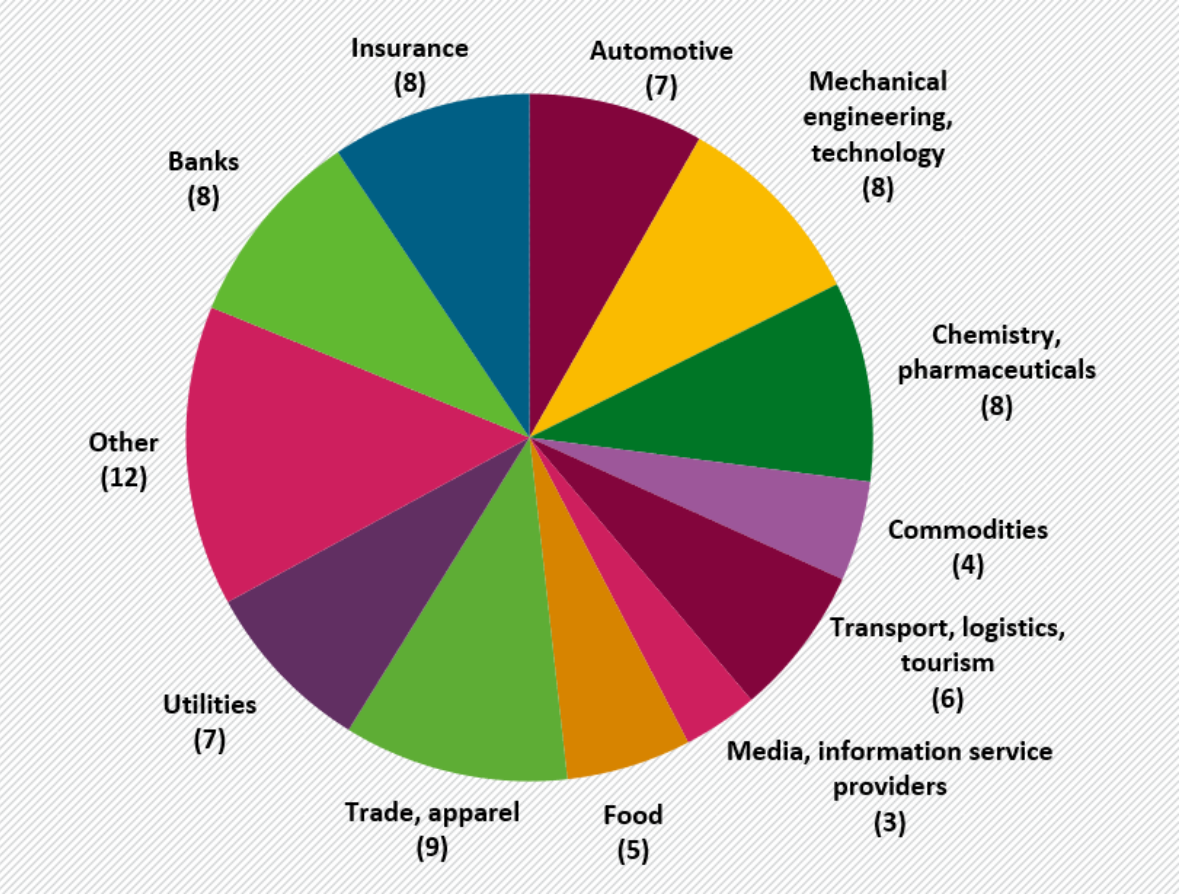
DAX 30: German stock index with the 30 largest stocks in terms of order book turnover or market capitalization at the German stock exchange. See: https://www.boerse-frankfurt.de/indices/dax/constituents

Source: Loew et al. (2021)

Sample by industry

THE 143 REPORTS EXAMINED COME FROM 85 COMPANIES.

Some companies report in all three reporting formats (sustainability report, non-financial statement, CDP Climate), others in two and some in only one of the reporting formats considered. This results in an average of 1.7 reports per company.



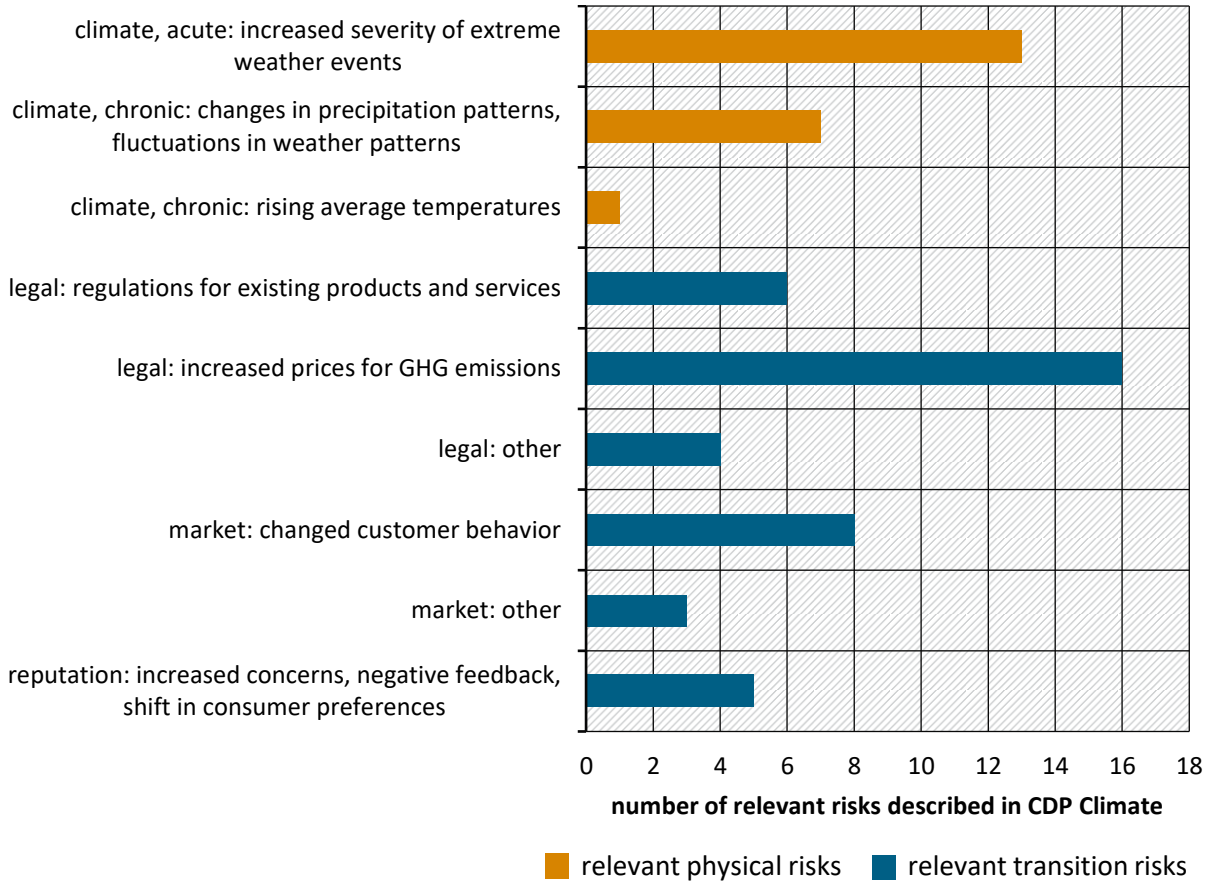
Source: Loew et al. (2021)

Type of climate-related risks

COMPANIES SEE THEMSELVES THREATENED MORE OFTEN AND STRONGER BY TRANSITORY THAN BY PHYSICAL RISKS.

When companies address climate-related risks in sustainability reports, they mostly address both transition and physical risks.

In CDP Climate, DAX 30 companies systematically report on both types of risk (see figure). When it comes to risks that companies believe may be essential for their business performance, twice as many transition risks are described as physical risks. Obviously, the companies see themselves threatened more often and stronger by transitional than by physical risks.



Reporting of DAX 30 companies to CDP climate, data from 15 companies

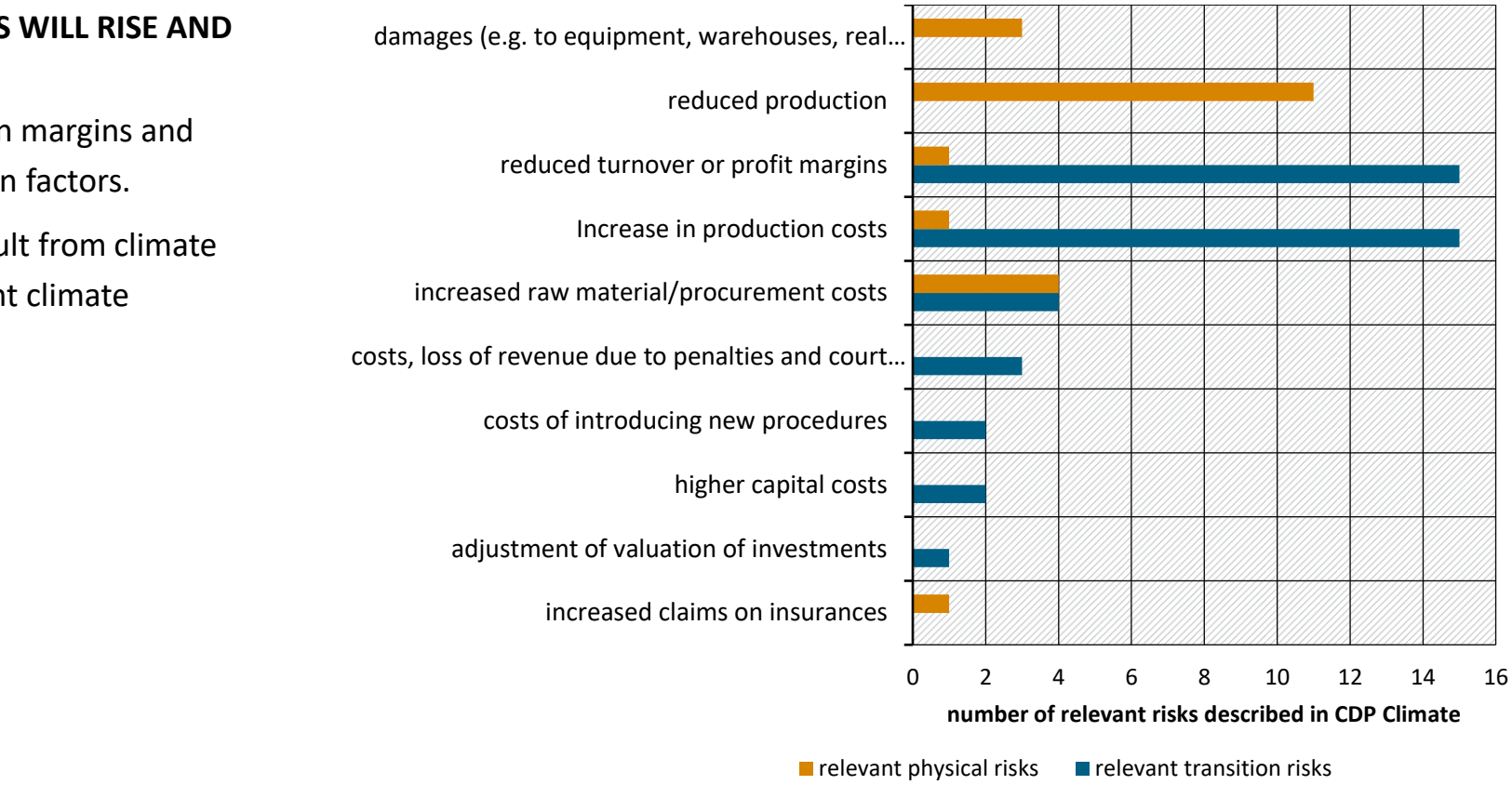
Source: Loew et al. (2021), Data: CDP Climate 2019

Potential impact of climate-related risks

THE MOST COMMON CONCERN IS THAT COSTS WILL RISE AND SALES WILL FALL.

The risk of declining sales, reduced contribution margins and increased costs is mainly attributed to transition factors.

Increased procurement costs could equally result from climate change as well as from measures of government climate protection policies.



Reporting of DAX 30 companies to CDP climate, data from 15 companies

Source: Loew et al. (2021), Data: CDP Climate 2019

Potential impact of climate-related risks in figures

TRANSITION RISKS ARE CONSIDERED TO HOLD A GREATER DAMAGE POTENTIAL THAN PHYSICAL RISKS.

Because twice as many transition risks as physical risks are reported, the information on the potential financial impact of transitory risks is higher overall.

Based on the information provided by the companies on the probability of occurrence (e.g. unlikely, very likely), expected values were calculated for the reported risks (see study). The calculations show that the gap between physical risks and transition risks widens in the expected values (see right-hand column).

However, if we consider "only" the probabilities of occurrence, we cannot see that physical risks are generally regarded as less probable.

	Number of risks described	**Potential damage (company statements)** Total over all assessed risks in euro	**Expectation value (calculated)** Total over all assessed risks in euro
Risks due to climate change	16	6,624,600,000 €	2,216,400,000 €
Transition risks	32	11,230,800,000 €	8,868,000,000 €
Total	48	17,855,400,000 €	11,084,400,000 €

Reporting of DAX-30 companies to CDP climate, data from 13 companies.

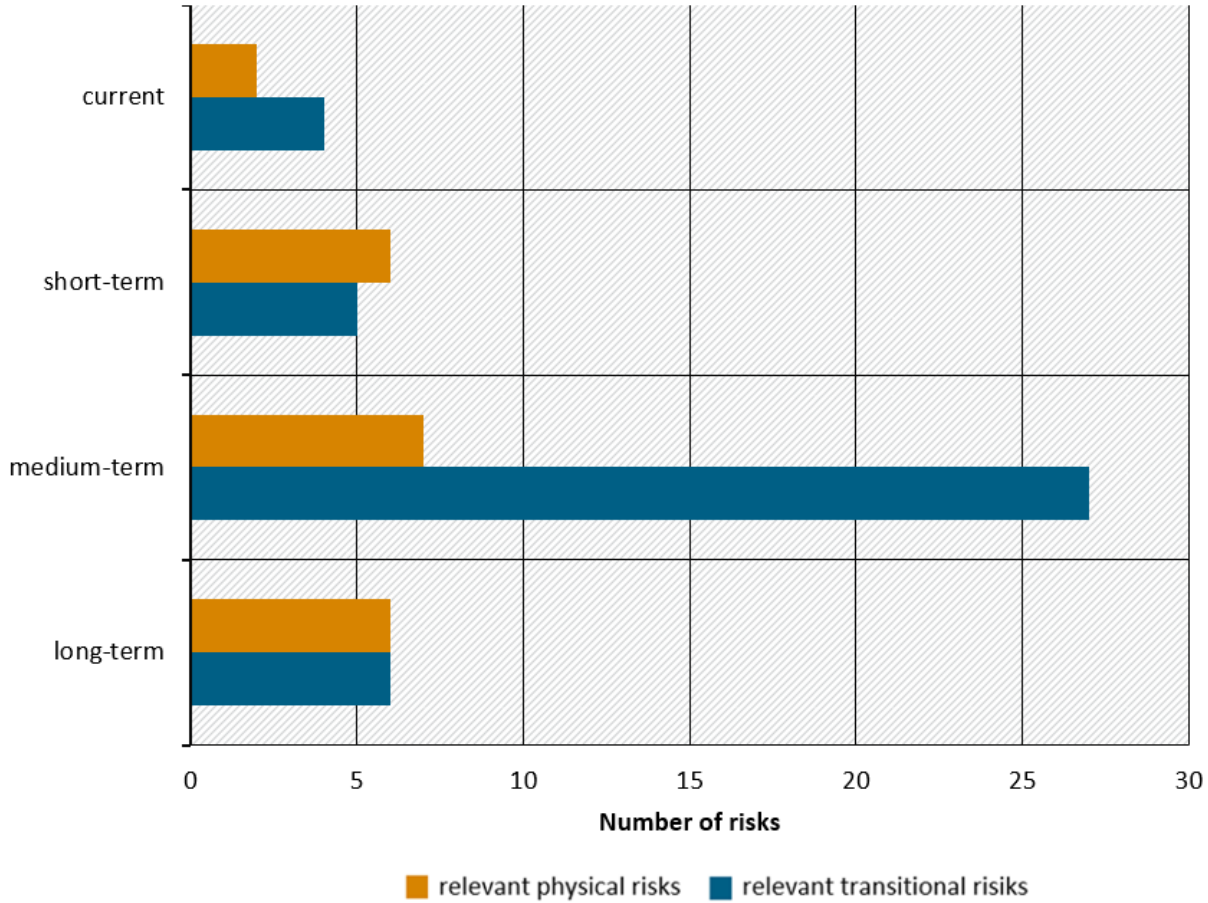
Source: Loew et al. (2021), Data: CDP Climate 2019

Time horizon of risks

MOST TRANSITION RISKS ARE EXPECTED TO MANIFEST IN THE MEDIUM RUN.

The DAX 30 companies analyzed here primarily consider short term to be a period of between zero and one or two years. Medium term is mostly considered to be a period beginning with one or two years and ending with three, four, or five years. Beyond that, periods are classified as long-term.

It is noteworthy that no significant increase in physical risks is expected in the future.



Reporting of DAX-30 companies to CDP Climate, data from 20 companies

Source: Loew et al. (2021), Data: CDP Climate 2019

TCFD recommendations

The TCDF recommendations are internationally adopted in political processes. Various parties are recommending mandatory reporting regarding TCFD, and in two countries legislation is already in preparation (see page 21 onwards). Therefore, it was examined to what extent reporting is already carried out in accordance with the TCFD. For some requirements, measurement is not reliably feasible or does not make sense, so it was omitted. This applies to the gray colored parts of the TCFD recommendations presented here.

Governance	Strategy	Risk Management	Metrics and Targets
a) Describe the board's oversight of climate-related risks and opportunities. b) Describe management's role in assessing and managing climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term. b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning. c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	a) Describe the organization's processes for identifying and assessing climate-related risks. b) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	a) Disclose the metrics used by the organization to assess climate- related risks and opportunities in line with its strategy and risk management process. b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Source: Adapted from TCFD (2017)

Reporting according to TCFD

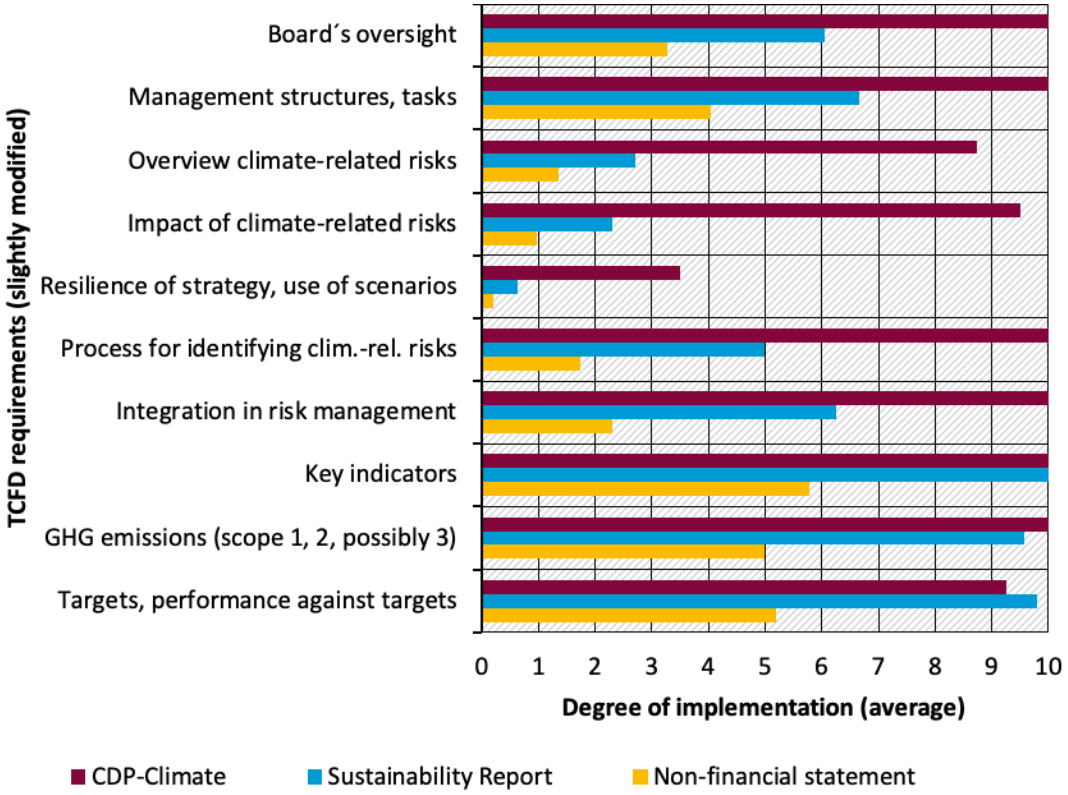
MOST DAX 30 COMPANIES LARGELY COMPLY WITH THE TCFD REQUIREMENTS.

In CDP's reporting platform, the TCFD requirements have been largely met completely. 27 Dax 30 companies report to CDP Climate. However, seven of these companies only release the information for their investors.

THE NON-FINANCIAL STATEMENTS REQUIRED BY LAW (§§ 289b-e OF THE GERMAN COMMERCIAL CODE) ARE LEAST INFORMATIVE

Sustainability reports provide on average more TCFD disclosures than non-financial statements, but also do not reach the level of compliance of CDP Climate.

The main reason for the differences between the reporting formats is the diversity of the applicable requirements. The requirements of the German Commercial Code (HGB) for the non-financial statement are principles-based, while CDP Climate has largely adopted the requirements of TCFD and explicitly requires corresponding disclosures.



Reporting by DAX 30 companies. CDP Climate, N = 20; sustainability reports, N = 24; non-financial statements, N = 26.

Source: Loew et al. (2021)

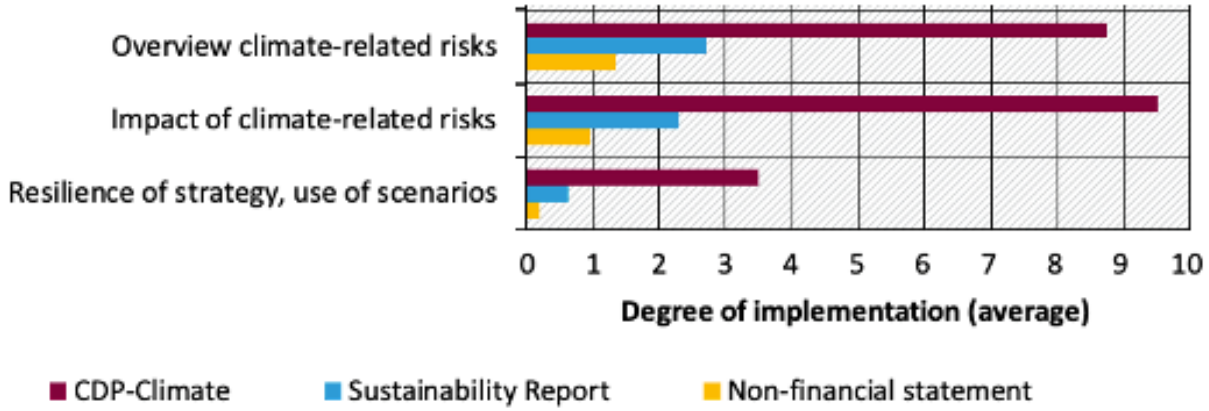
Reporting on the resilience of strategy

NO STATEMENTS ON THE RESILIENCE OF THE CORPORATE STRATEGY WERE FOUND FOR THE DAX 30 COMPANIES NOR FOR THE 100 LARGEST COMPANIES.

TCFD recommends a description of “the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.”

This part of the TCFD recommendations was not picked up in CDP Climate – which is an indication that this reporting requirement is difficult to implement. Nevertheless, the question of whether business models are compatible with both an ambitious climate protection policy and with climate change is of key importance for the company as well as for its creditors and investors.

(see also next page)



Reporting by DAX-30 companies
CDP Climate, N = 20; Sustainability Reports, N = 24; Non-financial Statements, N = 26.

Source: Loew et al. (2021)

Reporting on the use of climate-related scenarios.

SOME COMPANIES REPORT THAT THEY HAVE APPLIED CLIMATE-RELATED SCENARIOS.

This is further topic for which CDP Climate provides the most information. Here, companies are explicitly asked which climate-related scenarios they use.

Of the 20 DAX-30 companies that publicly reported to CDP Climate in 2019, eleven only use transition scenarios, while another four also use climate change scenarios. The remaining five companies state that they either do not or do not yet work with such scenarios.

Scenarios	Mentions
Physical climate change scenarios RCP 2.6, RCP 4.5, RCP 8.5 (all by IPCC)	6
Transition scenarios IEA 2DS, IEA 450, IEA B2DS, IEA SDS, IEA NPS, BNEF, Carbon Pricing Scenario, DDPP, European Commission Decarbonization Scenario, Greenpeace, IHS Scenario, IRENA	25
Scenario alignment unknown Scenarios of the company, scenarios without indication of the name or source	4
Other approaches Environmental profit and loss estimate, NDCs, Science-based Targets	6

Data from 15 DAX-30 companies in CDP Climate 2019 on the use of climate-related scenarios.

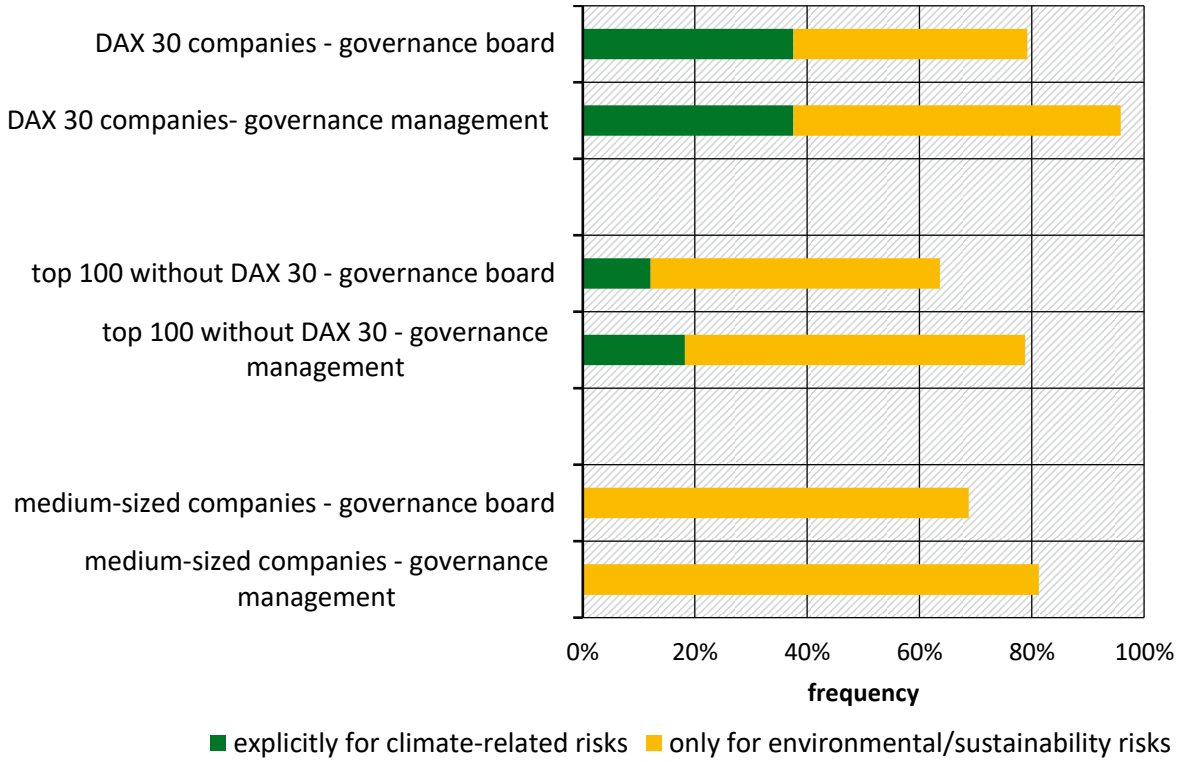
Source: Loew et al. (2021)

Reporting on governance and management structures

SUSTAINABILITY REPORTS USUALLY ONLY PRESENT SUSTAINABILITY MANAGEMENT.

If we look at sustainability reports, we find that the DAX-30 companies most often explicitly state that and how climate-related risks and opportunities are taken into account with the reported governance and management structures.

This is much less frequently the case in the reports of the other top 100 companies, and in the reports from SMEs it is never clearly recognizable whether climate-related risks and opportunities are also managed with these governance structures. However, this does not mean that climate-related risks and opportunities do not play a role for the pioneering SMEs: One in two of the sustainability reports of the medium-sized companies examined contains statements on physical or transition risks.



Sustainability reports
DAX 30 companies, N = 24; top 100 companies excluding DAX-30, N = 33; medium-sized companies, N = 16.

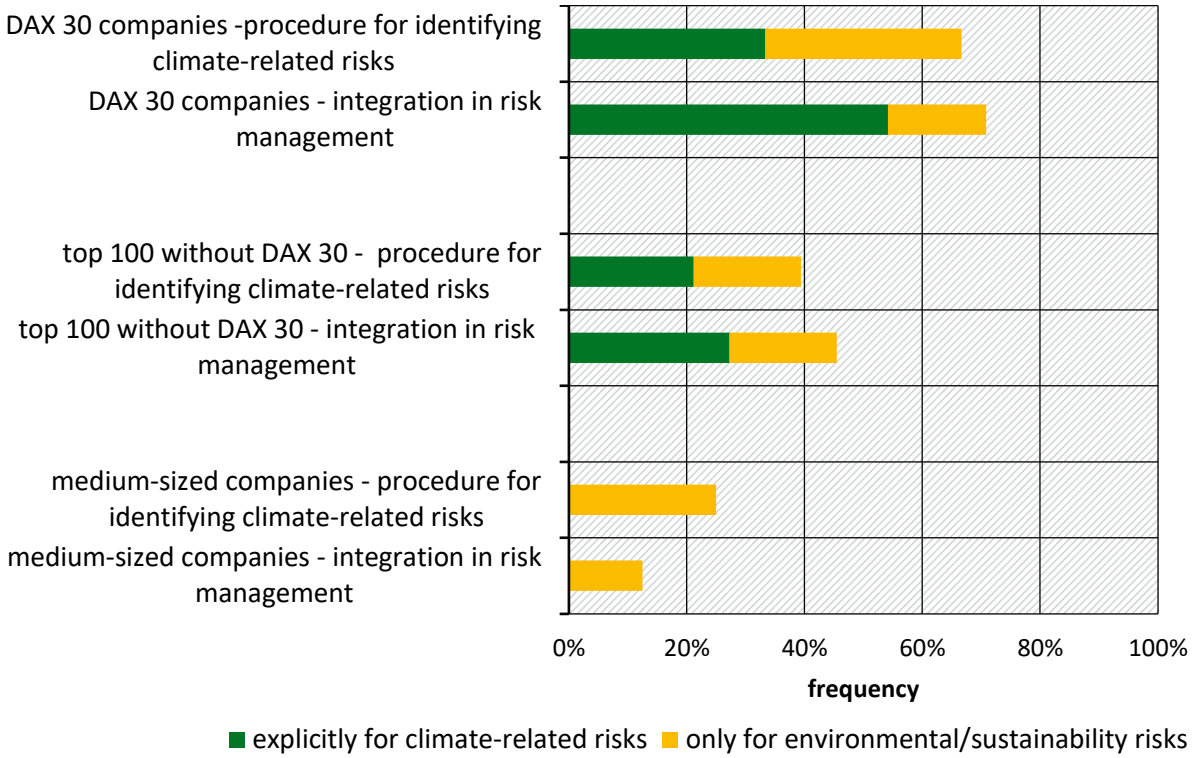
Source: Loew et al. (2021)

Operational approach to climate-related risks

IN THE SUSTAINABILITY REPORTS OF THE DAX 30 COMPANIES, STATEMENTS ON THE MANAGEMENT OF CLIMATE-RELATED RISKS ARE TO BE FOUND MOST OFTEN.

The DAX 30 companies most frequently provide information in sustainability reports on how they identify climate-related risks and how this is integrated into risk management. This is less frequently the case for the other top 100 companies.

In the reports of the medium-sized companies, on the other hand, there is hardly any information on the management of sustainability risks. And if they do report on it, there are no explicit (or only minimal) statements that climate-related risks are also managed with it. There are probably several reasons for this: Firstly, the sustainability reports of SMEs are less often aimed at institutional investors and sustainability-related rating organizations. Secondly, SMEs usually do not have an explicit risk management system.



Sustainability reports
DAX 30 companies, N = 24; top 100 companies excluding DAX-30, N = 33; medium-sized companies, N = 16.

Source: Loew et al. (2021)

Summary of results

Particularly noteworthy is the following:

1. Most DAX 30 companies already have a climate-related governance system and generally report in accordance with the TCFD.

2. In none of the reports examined, the companies provide information on the resilience of their corporate strategy.

3. Non-financial statements (required by law) are the least informative in terms of TCFD recommendations. The clear requirements of CDP Climate ensure the greatest information content.

Relevance of climate-related risks	Governance and management of climate-related risks	Reporting according to TCFD
Physical risks are named, but often have a lower priority. Those companies that systematically address their climate-related risks usually see more and greater risks in the transition to a decarbonised economic system than in climate change. Companies use transition scenarios much more frequently than scenarios on the consequences of climate change.	Most DAX 30 companies already have a climate-related governance system. Companies with sustainability reports can build on existing relevant internal structures. For governance and management of climate-related risks, sustainability management is adapted.	Almost all DAX 30 companies report according to the recommendations of the TCFD - but not all of them publicly. Through sustainability reports, several TCFD recommendations are already fulfilled in part or in full. None of the reporting examined provided information on the resilience of the corporate strategy as recommended by TCFD.

Influencing factors and other aspects
Industry: Industry-specific differences can be identified, particularly in the relevant risks.
Size: The size of the company is an influencing factor in the question of whether and how explicitly climate-related risks are taken into account in the organisation.
Report type: The report type influences the reporting. Non-financial statements are least informative.
TCFD: The recommendations of the TCFD promote reporting on and management of physical climate risks.
CDP-Climate eases the identification of and access to climate-related information of companies.

Source: Loew et al. (2021)

Recommendations for companies and policy makers

Recommendations for companies

COMPANIES SHOULD SYSTEMATICALLY ADDRESS THEIR CLIMATE-RELATED RISKS, LOOKING EQUALLY AT PHYSICAL AND TRANSITION RISKS.

Both climate change and government climate protection policies will almost certainly have an impact on markets and the legal framework. Addressing the resulting risks to their future competitiveness enables companies to take precautions and avoid wrong decisions in fundamental matters, such as investments.

As a first step, it is important to systematically address these risks and, if necessary, take internal adjustment measures. The recommendations of TCFD or CDP Climate can be used as a checklist for this purpose.

Whether, from the company's point of view, it is useful or necessary to report externally on this is another question. Some companies are required to do so by their investors. Others can check what makes sense for them.

Source: Loew et al. (2021), photo from Mattia Avanzi on unsplash.

Recommendations to policy makers

RELEVANT STAKEHOLDERS CALL FOR REPORTING ALONG THE LINES OF THE TCFD RECOMMENDATIONS TO BE REQUIRED BY LAW.

Central banks and financial regulators from the international Network for Greening the Financial System (NGFS) and the German government's Sustainable Finance Advisory Council are among those advocating this (see page 21 onward). Only if a sufficiently large number of companies report on their climate-related risks in a standardized form, institutional investors and banks will be able to systematically take this information into account in their risk management. In addition, reporting leads companies to systematically address their transition and physical risks, especially at the strategic level.

THE TIME PRESSURE IS HUGE.

In order to achieve the existing German and European climate protection targets by 2030, climate protection policy must be significantly tightened. In addition, the EU member states decided in December 2020 to sharply raise the European climate protection targets. It is therefore imperative that companies quickly and constructively address the consequences this will have for them.

A TCFD reporting requirement would at the same time ensure that companies systematically address and consider their physical climate risks. Again, the time pressure is high. The Global Commission on Adaptation (GCA, 2019) indicates that approximately $1.8 trillion should be invested in climate adaptation activities by 2030. This requires that underlying physical risks be identified by stakeholders.

Of course, such mandatory reporting would be only one of several policy instruments and would need to be designed depending on the size of the company.

Source: Loew et al. (2021)

Background 1:

Emergence and international recognition of TCFD

Origin and idea of TCFD

THERE HAS BEEN GROWING CONCERN AMONG G20 FINANCE MINISTERS AND CENTRAL BANKS SINCE THE MID-2010S THAT BOTH, STRONG CLIMATE CHANGE AND EFFECTIVE CLIMATE CHANGE POLICIES HAVE THE POTENTIAL TO TRIGGER FINANCIAL MARKET CRISES.

In 2015, in what is now regarded as a landmark lecture entitled "Breaking the tragedy of the horizon - climate change and financial stability," the Director of the British Central Bank, Mark Carney, demonstrated that the time horizons in the risk management of financial market players are too short to identify climate-related risks at an early stage. That same year, the Financial Stability Board (FSB), an international body of the G20, established the Task Force on Climate-related Financial Disclosures (TCFD).

This task force, made up of experts from the real economy and the financial sector, investigated what information financial market players need from companies in order to carry out climate-related risk assessments. The resulting recommendations were presented in 2017 at the G20 summit in Hamburg. They are intended to simplify both report preparation and the use of the information provided.

The fundamental approach of the TCFD recommendations is to systematically provide and assess information: By having companies in the real economy report their climate-related risks and how they are managed, banks and investors can use this information to identify and manage the risks in their portfolios (for the TCFD recommendations see page 11).

FSB FINANCIAL STABILITY BOARD

G20 GERMANY 2017 HAMBURG

Source: Loew et al. (2021)

Climate-related reporting standards

ORGANIZATIONS RECOMMENDING TO MAKE CLIMATE-RELATED REPORTING A LEGAL REQUIREMENT

High-Level Group on Sustainable Finance (HLEG) of the EU-Commission (2018)

Network for Greening the Financial System (NGFS) (central banks and financial regulators from all continents) (2019)

Global Commission on Adaptation (GCA) (2019)

Sustainable Finance Committee of the German Government (2020)

LEGAL REGULATIONS

New Zealand: Mandatory reporting based on TCFD (draft legislation)

United Kingdom: Mandatory reporting based on TCFD (proposal by competent authority)

Canada: Companies receiving financial aid due to the Corona crisis must report their climate-related risks (in force)

" The German government should introduce a statutory regulation requiring all listed companies in Germany to apply the TCFD recommendations as of 2022."

Sustainable Finance Committee of the German Government (2020)

"The NGFS considers that disclosure of climate-related information and enhanced market discipline cannot emerge rapidly enough without action by policymakers or supervisory authorities."

Network for Greening the Financial System (2019)

"The Government plans to make climate-related financial disclosures mandatory for some organisations. The requirement would apply to publicly listed companies and large insurers, banks and investment managers."

New Zealand Ministry for the Environment Manatū Mō Te Taiao (2020)

Reference to TCFD

REQUIREMENTS OF COMPANIES AND ORGANIZATIONS TO REPORT IN ACCORDANCE WITH TCFD

The investment company BlackRock requires the companies in which it is invested to "report on climate-related risks in accordance with the recommendations of the TCFD."

Signatories to the Principles for Responsible Investment (PRI), some 3,000 institutional investors, have been required to report in accordance with TCFD since 2020.

REFERENCE TO TCFD IN OTHER DOCUMENTS AND PROCESSES

The EU Guidelines on non-financial reporting: Supplement on reporting climate-related information (2019/C 209/01) contain essential parts of the TCFD recommendations.

The German Financial Supervisory Authority BaFin published a fact sheet on dealing with sustainability risks. This fact sheet is largely based on the basic ideas of the TCFD recommendations. This is clearly evident, even though the TCFD Recommendations are only explicitly addressed in two passages.

„This year, we are asking the companies that we invest in on behalf of our clients to […] disclose climate-related risks in line with the TCFD's recommendations, if you have not already done so. This should include your plan for operating under a scenario where the Paris Agreement's goal of limiting global warming to less than two degrees is fully realized, as expressed by the TCFD guidelines."

Larry Fink, Chairman and Chief Executive Officer, BlackRock (2020)

"TCFD-based reporting to become mandatory for PRI signatories in 2020."

PRI Association (2019)

" In the worst-case scenario, extreme climate-related damage resulting from a long-delayed energy transition eventually forces a sudden and radical shift in the economy."

BaFin - German Financial Supervisory Authority (2020)

Background 2:

Impact of climate change and growing economic challenges

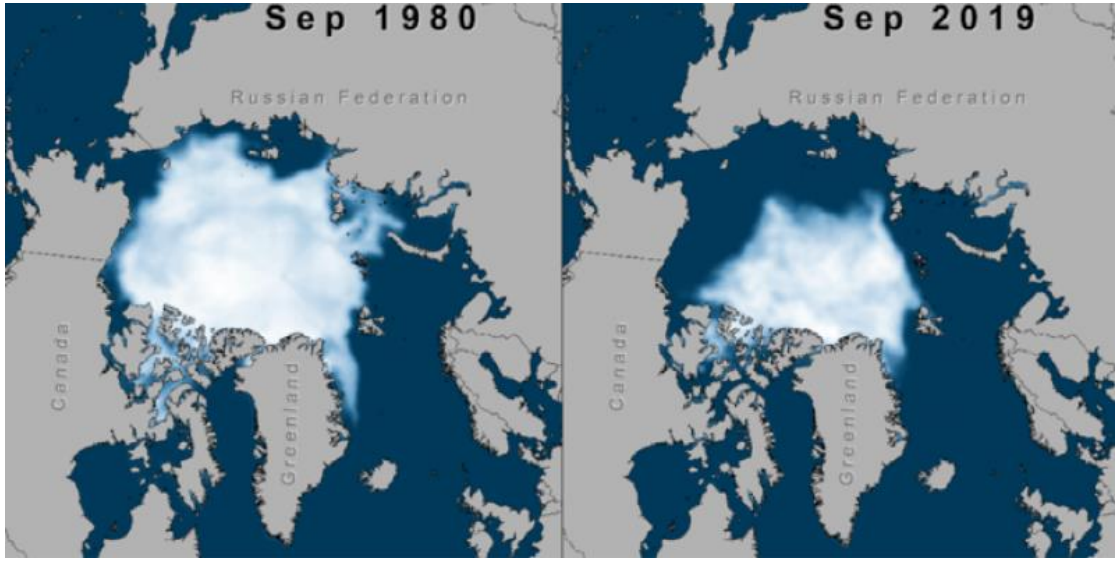
Effects of climate change using the Arctic as an example

A TEMPERATURE LEVEL HAS BEEN REACHED THAT HAS IN HIGH PROBABILITY NOT BEEN SEEN SINCE THE ADVENT OF HUMAN CIVILIZATION.

At the Earth's surface, the air has already warmed by an average of one degree compared to pre-industrial times. Compared to earlier geological temperature changes, the rise in temperature is extremely rapid. The effects can already be clearly seen (IPCC, 2018).

One consequence of global warming is glacier retreat on Greenland, which represents about 280 billion tons of ice loss each year. Meanwhile, ice loss contributes to more than 7 millimeters of sea level rise in a decade (IPCC, 2019a). There are concerns that this trend may now be irreversible because a tipping point has been passed, such that the ice on Greenland would melt entirely (King et al., 2020).

The strong decrease in ice on the northern polar cap does not lead to a rise in sea level, but - because less sunlight is reflected - it contributes further to warming.



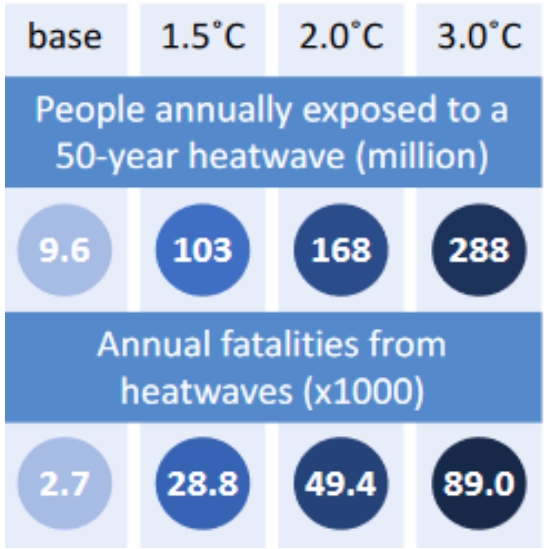
Comparison of monthly mean ice cover in September 1980 and 2019. Sea ice in the Arctic Ocean reaches its annual minimum in September.

Source: Roesseler, Team Polar and Cold Regions (DLR-EOC), retrieved from DKK (2020)

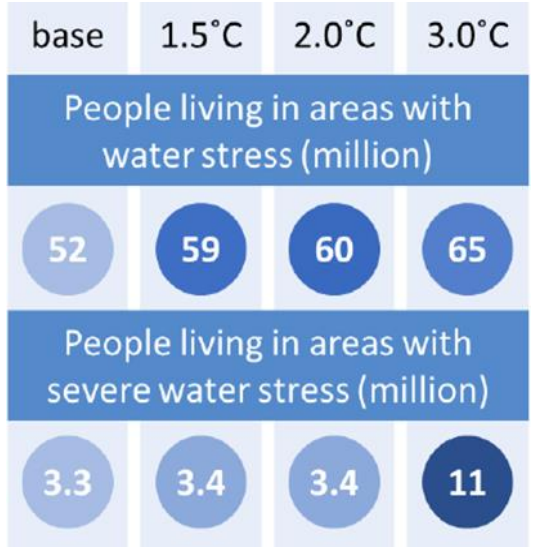
Effects of climate change based on the example of heat waves and droughts

ONLY 1.5 DEGREES OF WARMING WILL RESULT IN TEN TIMES MORE DEATHS IN EUROPE DUE TO HEATWAVES THAN PREVIOUSLY.

As global warming increases, more people will be exposed to severe heat waves. With a warming of 1.5 degrees, deaths in Europe will increase 10-fold, and with a warming of 3 degrees, deaths will increase 30-fold. Likewise, the number of people who will be affected by water shortages will increase. As can be expected, the southern European countries will be disproportionately affected.



Human exposure to and fatalities from heatwaves in Europe compared to baseline climate conditions (1981-2010)



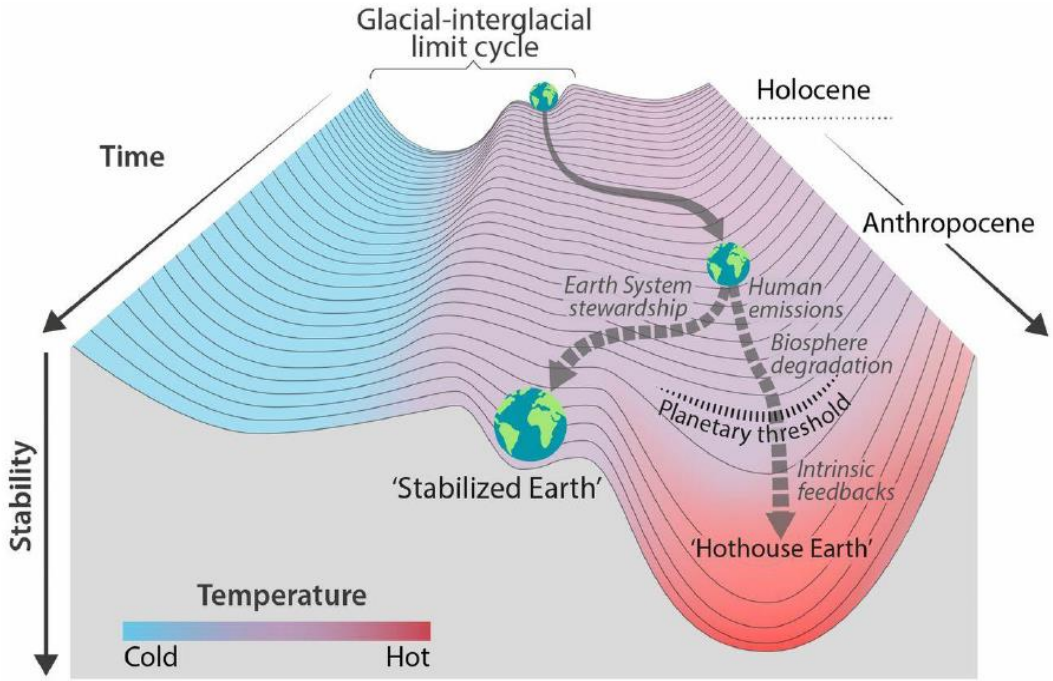
Population in EU and UK living in areas with water stress (WEI+ > 0.2) and severe (WEI+ > 0.4) water stress for different levels of global warming compared to baseline climate conditions (1981-2010)

Source: Feyen et al. (2020)

Significance of the "well below two degrees" target

For a long time, a maximum warming of two degrees was considered the target in international climate protection negotiations. In the meantime, it has become clear that such warming would be too dangerous and that the average temperature increase must therefore be limited even more (BMU, 2020).

Therefore, the goal of the Paris Climate Agreement is to limit the temperature increase to well below two degrees, if possible to 1.5 degrees. These target thresholds are related to tipping points. When these tipping points are crossed, mechanisms kick in that make the change irreversible and amplify climate change. Examples include ice cover in Greenland (see page 26) or permafrost thaw in Siberia, which releases large amounts of methane (e.g., Knoblauch et al., 2018). If too many tipping points are reached, a domino effect will be triggered and the climate will heat up strongly.



The path of the Earth system from the Holocene to the Anthropocene and the crossroads to a stabilized or a 'Hothouse Earth'.

Source: Steffen et al. (2018)

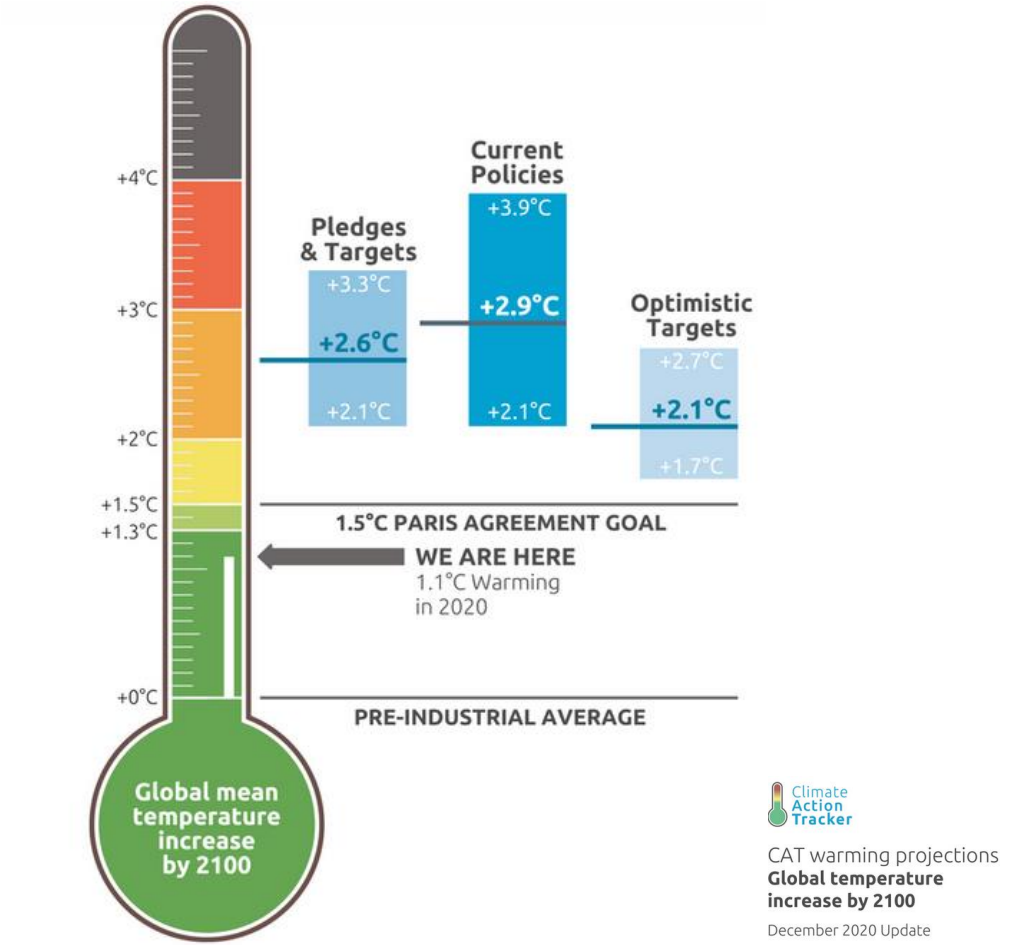
Status of climate targets and climate policies

With the climate policies currently in place, the world is at risk of experiencing a warming of 2.9 degrees, or even 3.9 degrees in the worst case. If the existing global climate protection targets of the states (pledges & targets) are taken as a reference, there is likewise no chance of limiting warming to 1.5 degrees.

Chinese President Xi Jinping announced to the United Nations in September 2020 that China wants to achieve carbon neutrality before 2060. U.S. President Biden suggests the U.S. should be carbon neutral by 2050. In addition, South Africa, Japan, South Korea and Canada have announced net-zero targets in 2020.

EU member states agreed at the end of 2020 to reduce CO_2 emissions in the EU not just by 40 percent but by 55 percent by 2030 (reference year 1990). The EU Parliament is even aiming for a tightening to minus 60 percent.

As a result the prospects at the end of 2020 have improved significantly (optimistic targets) compared to mid 2020.



Source: Climate Action Tracker (2020)

German Climate Protection Act

To achieve Germany's climate protection targets by 2030, annual reduction targets have been set for six sectors (including energy, industry and transport). If targets are missed in a sector, the federal ministry responsible for that sector must submit an immediate program to ensure compliance with the emission levels for the following years (§ 8 (1) KSG).

The targets set out in the Climate Protection Act imply at least a doubling of the reduction rate for all sectors (see table). This means a tougher climate protection policy and more transition risks for companies.

The law includes the tightening mechanism of the Paris Climate Agreement: "Should higher national climate protection targets become necessary to meet European or international climate protection targets, the Federal Government shall initiate the steps necessary to increase the target values [...]. Climate protection targets may be increased but not lowered" (§ 3 (2) KSG).

This regulation will become relevant when the EU raises its climate protection targets from 40 to 55 percent by 2030 in 2021.

	annual reduction 1990-2019 (actual values)	annual reduction 2020-2030 (Climate Protection Law)
energy sector	-1,6%	-3,8%
Industrial sector	-1,2%	-2,5%
buildings	-1,4%	-4,1%
transportation	0,0%	-3,7%
agriculture	-0,8%	-1,7%
waste management and other	-2,6%	-4,4%

Germany has a Climate Protection Law (KSG) since 2019. The targets and other regulations it contains serve, among other things, to implement the commitments made under the Paris Climate Agreement and to comply with the obligations under EU agreements.

Source: Loew et al. (2021) based on UBA (2020b), German Climate Protection Act (KSG)

Background 3:

Drawing a uniform structure for climate-related risk management from international guidelines

Guidelines for companies

To develop a uniform structure for climate-related risk management, a synopsis of international guidelines for companies was compiled. The oldest identified guide comes from the Australian Greenhouse Office (2006) and focuses on conducting a workshop. The guide published by the German Federal Ministry of Economics (2014) describes a management process that is closely aligned with risk management. A tool based on spreadsheet software is available for this guide. Similar and more up-to-date is the guide "Climate Risk Management 2050" by co2nceptplus (2020).

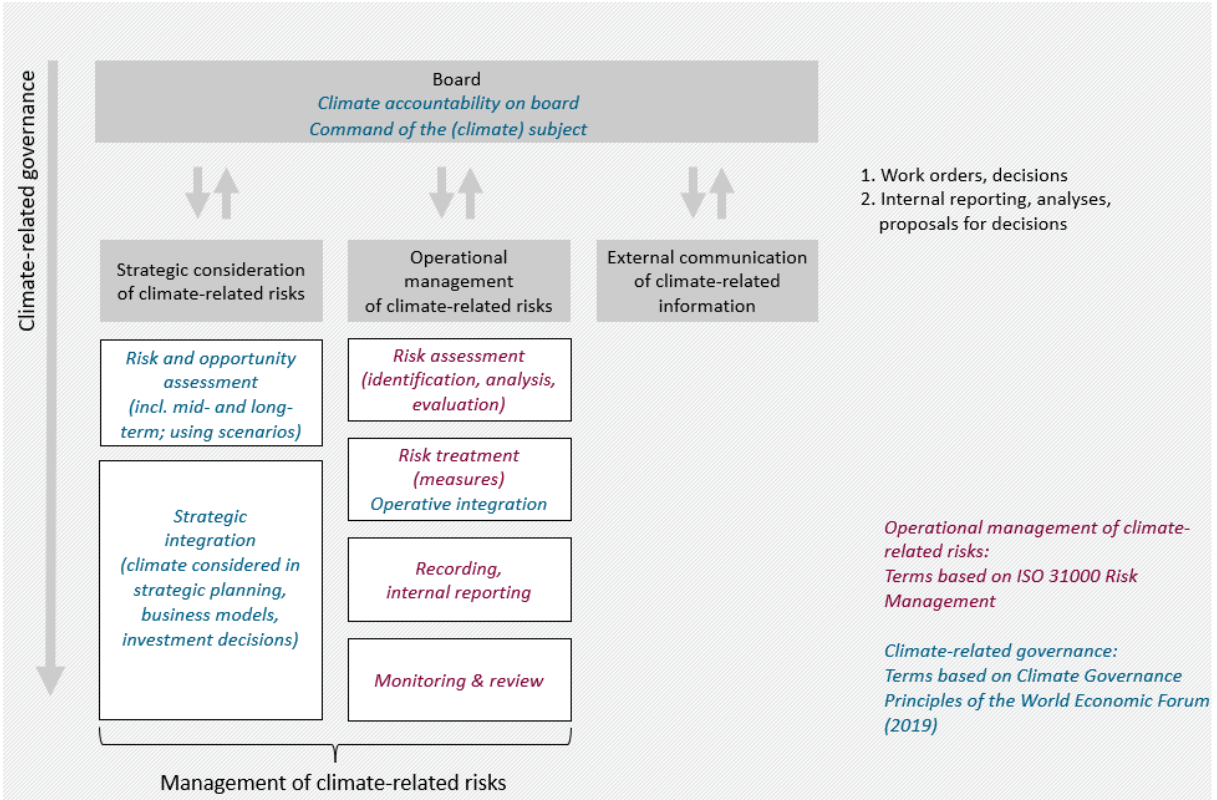
Publications aimed at boards have a significantly different focus. Under the title "How to Set Up Effective Climate Governance on Corporate Boards," the World Economic Forum (2019) describes eight principles that corporate management should take into account in order to fulfill their governance responsibilities.

Source: Loew et al. (2021)

Components of climate-related risk management

The synopsis of the guidelines was used to derive the interaction of components of climate-related risk management outlined in the figure on the right.

The management of climate-related risks thus encompasses both operational management and the strategic consideration of climate-related risks. The term "operational" management of climate-related risks is based on the fact that statutory risk management deals with operational risks and that the guidelines for managing climate-related risks, which are based on the international ISO 31000 standard, are also primarily operational in nature.



Components of climate-related risk management

Source: Loew et al. (2021)

Appendix

Guidelines and other assistance for companies

Climate Change Impacts & Risk Management. A Guide for Business and Government (Australian Greenhouse Office; 2006)

Klimacheck. Leitfaden zum Management von Klimarisiken im industriellen Mittelstand (Bundesministerium für Wirtschaft und Energie; 2014)

*Les entreprises et l'adaptation au changement climatique (*Entreprises pour l'Environnement (EpE), Observatoire national sur les effets du réchauffement climatique (ONERC); 2014)

Integración de la adaptación al cambio climático en la estrategia empresarial. Guía metodológica para la evaluación de los impactos y la vulnerabilidad en el sector privado. (Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente (MAPAMA); 2014)

Climate Change Adaptation Guidelines (Water Services Association of Australia; 2016)

Adapting to Climate Change. A Risk Management Guide for Utilities (Canadian Electricitiy Association; 2017)

Managing the impacts of climate change: risk management responses (Zurich; 2018)

Bewertung von Klimarisiken in Unternehmen. Szenario-Analyse nach den Empfehlungen der Task Force on Climate-related Financial Disclosures (Deutsches Global Compact Netzwerk; 2019)

Anpassung an die Folgen des Klimawandels - Grundsätze, Anforderungen und Leitlinien ISO 14090:2019
(zugehörig: ISO 14091:2021 Adaptation to climate change — Guidelines on vulnerability, impacts and risk assessment)

Managing Climate Change Risk. Guideance for Board Members and Executives of Water Corporations and Catchment Management Authorities (The State of Victoria Department of Environment, Land, Water and Planning; 2019)

How to Set Up Effective Climate Governance on Corporate Boards (World Economic Forum; 2019)

*Leitfaden Klimarisikomanagement 2050 – Betriebliche Klimarisikostrategie Step-by-Step entwickeln (*co2nceptplus; 2020)

For all other sources please refer to bibliography in the study.