Climate reporting in accordance with TCFD

Climate reporting helps to identify possible impacts of climate change on businesses. In order to identify opportunities and risks for its portfolio, KfW is successively expanding its risk management of environmental, social and governance factors (ESG risk management) and reporting in line with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). The fourth consolidated TCFD report presents KfW Group's most recent steps and most important structures for managing climate-related opportunities and risks.

Climate risks primarily affect credit risk at KfW.

As part of "tranSForm": development of the ESG risk profile in 2022, application from 2023.

KfW conducted further internal climate stress tests in 2022.

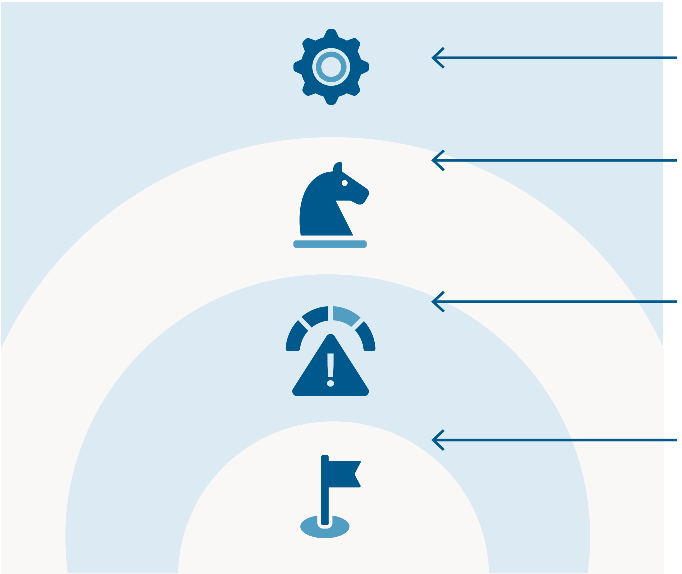
Transparency regarding the risks and opportunities of climate change

The → recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board have now become established as the standard for reporting on the risks and opportunities of climate change for enterprises. They are also increasingly being incorporated into new reporting requirements for companies. KfW Group has also adopted these recommendations and is reporting in line with the TCFD criteria for the fourth time.

As a public-sector institution we are doing this in order to present any risks to our stakeholders – owners, associations, investors and the general public – in a transparent manner, take responsibility for them and thus create trust.

The TCFD recommends reporting based on four building blocks:

Four TCFD recommendations and dimensions for climate reporting



1. **Governance:** Clarity as to who is responsible for climate-related issues in a company's management bodies

2. **Strategy:**
Assessment of actual and possible impacts of climate risks and opportunities (e.g. for business strategy and financial planning)

3. **Risk management:**
Processes for identifying, assessing and managing climate risks

4. **Metrics and targets:**
Metrics and measures for achieving climate risk targets (e.g. reduction of risk exposure)

Implementing the TCFD recommendations in their entirety still poses challenges for many enterprises, as some of the calculations required are fraught with uncertainty. As a result, our TCFD reporting focuses on the aspect of risk for the time being without yet considering possible opportunities, for example with respect to sectors that could gain from particular scenarios. As the TCFD recommendations primarily apply to risks from an investor's perspective, this is also likely to be most closely aligned with the TCFD approach.

Our focus on the topic of risk also means that we look at climate risks primarily from the 'outside-in' perspective in the context of the TCFD report. In other words, we analyse whether and to what extent physical or transitory climate risks could impact KfW Group's risk exposure. Physical climate risks can include damage to buildings or infrastructure, in particular that of our borrowers, caused by the consequences of climate change, such as flooding, storms and drought. Transitory climate risks, on the other hand, result from the transition from the currently prevailing economic systems, which are still largely based on fossil fuels (oil, coal, natural gas), towards a low greenhouse-gas economy. Transitory risks can also affect our borrowers and therefore impact our credit risks (the term 'credit risks' in this report always includes investment risks). As such, neither form of risk primarily reflects the damage caused by climate change, but rather its financial consequences for KfW.

The 'inside-out' perspective – in other words, the question as to how our banking activities affect the climate and how we can reduce greenhouse gas emissions – plays a prominent role for KfW as a promotional bank and applies to a large portion of our financing activities. This is described primarily in the → Banking business, → Corporate governance and → Banking operations chapters of this Sustainability Report. The greenhouse gas accounting system for KfW's new commitments and portfolio to be developed as part of the tranSForm project is another relevant aspect (→ page 23).

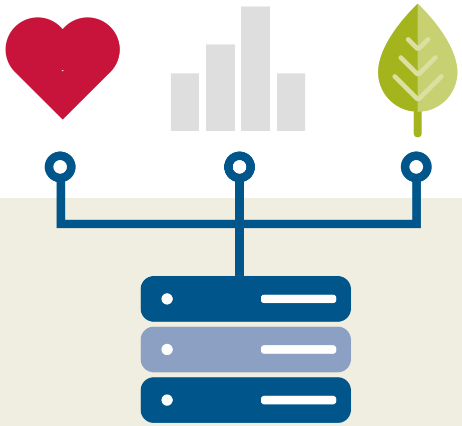
Our climate risk reporting includes the subsidiaries KfW IPEX-Bank, KfW Capital and DEG.

Further development of our reporting approach

The high level of interest our stakeholders have in climate risks is a key incentive for us to establish appropriate transparency both within the company and towards external target groups. As part of the group-wide tranSForm project, for example, a dedicated sub-project has been launched for ESG risks (sub-project 4) to further develop the management of ESG risks in the group in the period leading up to the end of 2024. The aim is also to meet the regulatory requirements on ESG risks that are relevant to KfW.

In the year under review, the progress made by the sub-project included the following:

- The development of the "ESG risk profile" application was completed. This involves assessing all of KfW's risk-relevant business partners with regard to their ESG risks, including physical and transitory climate risks. The IT aspects of the application are currently being finalised and it will be rolled out gradually across KfW Group in 2023. The application will serve as a key information basis and will be able to supply its ESG risk data to other risk tools.
- The most important action areas for allowing us to address all of the regulatory requirements for ESG risks that are relevant to us have been identified. This resulted in 23 "packages of meta-measures". One of these is the aforementioned "ESG risk profile" application. Other meta-measures address, for example, the expansion of ESG stress testing, ESG reporting and ESG portfolio analysis.



To be applied as of 2023: the ESG risk profile

- In particular, further progress was made in ESG stress testing. In addition to developing initial conceptual stress test approaches for particularly relevant ESG risks, the next climate stress test was finalised in the first quarter of 2022: a four-year scenario borrowed from the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), which provides for the immediate introduction of a cross-sectoral carbon tax, was taken as a starting point.
- The scenario affects both the emissions-intensive sectors in KfW Group's corporate portfolio and banks, which are affected primarily via their exposure to these sectors (i.e. via what are known as second-round effects). KfW Group, however, fares well in this scenario from a financial perspective. Although the total capital ratio decreases over the course of the scenario until the end of 2025, it remains well ahead of the expected regulatory capital requirements and within the risk appetite defined by the Executive Board.

1. Governance

KfW Group has been observing and taking into account the risks and opportunities associated with climate change for its business for some time. We take them into account just as we do other drivers of risk in our risk management approach, in our organisation and in our processes.

The Executive Board is responsible for central decisions regarding risk policy. In parallel with the business strategy, we define a risk strategy for each year and thereby determine the framework of our business activities with regard to risk tolerance and risk-bearing capacity. The business and risk strategy were supplemented further in 2022 with regard to the consideration of ESG risk aspects.

Compliance with this risk strategy is monitored continuously. For instance, we analyse the bank's overall risk situation in monthly reports to the Executive Board. The Board of Supervisory Directors is informed at least quarterly.

As soon as climate risks are classed as material, they are presented to the Executive Board for information purposes or decision-making as required. The business or risk strategy can subsequently be adjusted accordingly. Any targets related to substantial climate risks or opportunities can be included in the group's business sector planning and targets can be aligned.

Risk management within the group is exercised by closely interlinked decision-making bodies. Below the Executive Board, three risk committees prepare decisions to be passed by the Executive Board and make independent decisions within their own remits (→ chapter on risk management, page 51).

Climate risks within KfW are coordinated by the Group Credit Risk Management department. This includes, in particular, the management of the group ESG risk project, but also the preparation of this TCFD report. In this task the Credit Risk Management department works closely with the Risk Controlling department, the risk units of the subsidiaries and the Group Development department.

Depending on which department is affected by a climate risk, decision-making chains ensure that an appropriate level of the hierarchy is made aware of the situation or makes any necessary decision. In the case of material risks, for example at sector level in the area of corporate and project financing, the reporting chain is as follows:

Decision-making chain in risk management*

* Depending on the severity of the risk, not all levels of this decision-making chain need to be involved.

Similar mechanisms exist for banking risks, country risks, market price risks. liquidity risks and operational risks. Depending on the materiality of the topic, the necessary committee in the decision-making chain is brought in.

Significant climate risk issues are monitored depending on the impact at various points, for example:
– for individual exposures in the rating process that takes place at least once a year,
– for impacts on an entire portfolio, in the form of studies or analyses or
– as resubmissions in committees.

Climate risks within KfW are coordinated by the Group Credit Risk Management department

2. Strategy

KfW has set itself the goal of playing an active role in shaping the transition to a sustainable economic and financial system. Our strategic plans therefore contain ambitious targets for further expanding KfW's position as a bank with sustainable operations. Our primary objective is the transformation of the economy and society with the aim of improving economic, environmental and social living conditions around the world. This is underscored, among other things, by our sustainability mission statement and the mapping of the portfolio based on the UN Sustainable Development Goals (SDGs). Key strategic decisions in the context of the targeted transformation process include the application of sector guidelines for the financing of greenhouse gas-intensive sectors and a group-wide exclusion list. KfW revised the guidelines already in place regarding the 1.5°C target in 2022 and implemented them at the start of 2023. KfW is guided in this respect by the 1.5°C-compatible "Net Zero by 2050" scenario of the International Energy Agency (IEA). The IEA scenario also represents our baseline scenario.

In recognition of the special importance of climate change, the environmental share of financing has been set at ≥ 38% of total new commitment volume. In order to identify its own sustainability performance, KfW has also set itself the goal of determining its contribution to the Paris climate targets and SDGs, as well as being listed on average among the top five promotional and development banks in global sustainability ratings.

Scenario analysis – objective

In accordance with TCFD recommendations, the aim of scenario analyses is to gain insights into how resilient our business model is to climate risks. The decisive question for KfW is whether an unacceptably high concentration of climate risks could be present in our loan and equity investment portfolio in the medium to long term.

Climate scenario analyses involve simulating a number of parameters across multiple sectors; these parameters are based on various scientifically supported possibilities for how the global climate could develop in future. Reciprocal effects are also considered and factored into the calculations. The result is an internally consistent worldview. It is important to note here that the likelihood of long-term scenarios based on a wide range of assumptions actually occurring can be very low or difficult to estimate. It is not until different scenarios and their results are examined and compared that significant new insights are gained. The results of the analyses carried out by KfW to date can be found under → 4. Metrics and targets.

Climate stress test

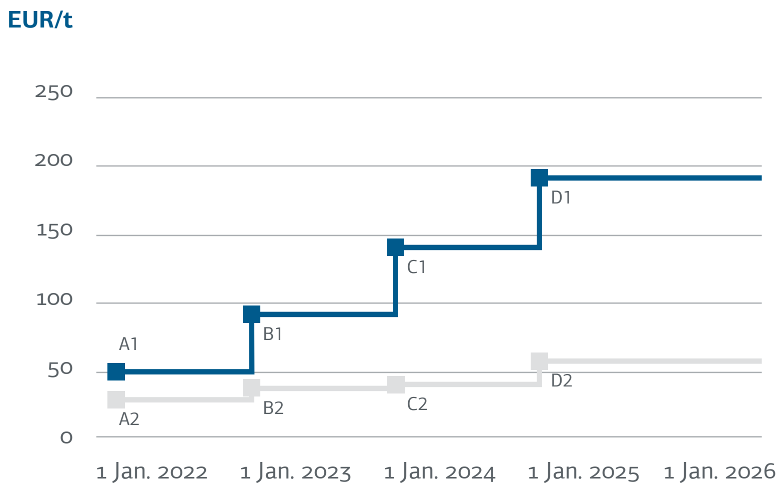
A climate stress test is a scenario analysis in which possible negative effects of the scenario on KfW's own portfolio and, as a result, its financial standing are simulated under what are usually very conservative assumptions. KfW already started to expand its stress-testing capabilities for climate risks in 2020. From the end of 2021, an initial climate risk stress test was performed with KfW's existing stress-testing systems, processes and methods. This test was completed in the first quarter of 2022. As in KfW's first climate stress test, the focus was on credit risks.

It was assumed in the scenario that the coronavirus pandemic would not remain the prevalent political issue.

The climate crisis is once again moving into the spotlight of public discourse. This means that an ambitious global climate programme can be launched with the goal of achieving carbon neutrality by 2050. A tax on greenhouse gases (carbon pricing) is introduced in all sectors and all countries and is increased annually. In absolute terms, the carbon price is higher in industrialised nations than in emerging markets and developing countries. In the EU, the carbon price will rise from EUR 48/metric tonne (t) of CO_2 to EUR 193/t by 2025. (By way of comparison: In the German carbon emissions trading system, there are plans to increase the price from EUR 30/t in 2022 to EUR 55/t by 2025. This fixed price only applies to the transport and buildings/heating sectors as a supplement to the EU emissions trading system for the energy and industrial sectors, which nevertheless does not cover all sectors.)

Second KfW climate stress test conducted in 2022

Carbon price trend per tonne



EU carbon price in the scenario (all sectors)
Actual carbon price in Germany (heating and transport)

A1 = EU carbon price in the scenario: EUR 48/t as of 1 Jan. 2022
A2 = Actual carbon price in Germany: EUR 30/t as of 1 Jan. 2022
B1 = EU carbon price in the scenario: EUR 96/t as of 1 Jan. 2023
B2 = Actual carbon price in Germany: EUR 35/t as of 1 Jan. 2023
C1 = EU carbon price in the scenario: EUR 144/t as of 1 Jan. 2024
C2 = Actual carbon price in Germany: EUR 45/t as of 1 Jan. 2024
D1 = EU carbon price in the scenario: EUR 192/t as of 1 Jan. 2025
D2 = Actual carbon price in Germany: EUR 55/t as of 1 Jan. 2025

Key scenario assumptions and effects:

- **Scenario horizon:** 1 January 2022 to 31 December 2025
- **Corporates:** The carbon price increase affects the cost structure and, as a result, the profitability of emissions-intensive sectors in particular. The extent to which each industry is affected is determined by its emissions intensity (greenhouse gases in tonnes per EUR of revenue) as a starting point. Demand shifts towards low-emission alternatives, meaning that individual sectors such as renewable energy also benefit in this scenario. This means that opposing effects arise in the corporates portfolio that offset each other to a considerable extent.
- **Financial institutions:** In the case of banks, second-round effects are the dominant factor. Institutions with a high exposure to those corporate sectors that are particularly affected come under financial pressure. As no granular data is available on bank portfolios, conservative assumptions were applied regarding rating changes, resulting in significant stress effects in KfW's banking portfolio.

Conclusion and further steps

The climate stress test, conducted for the first time using existing KfW processes, systems and methods, focused on quantifying the impact of rising carbon prices on KfW Group's loan portfolio. The lack of data available (especially regarding carbon emissions, banks' corporate exposure and the adaptability of affected borrowers) and the fact that there are still no best-practice methods in the market pose major challenges to climatestress testing. This is why climate-stress testing is being further developed and expanded as part of the further development of ESG risk management in the tranSForm project (also with a view to simulating physical hazards such as flood risks).

3. Risk management

Climate risks are not classed as an independent category of risk, but act as a risk driver and can affect several categories of risk. For KfW, this relates particularly to

- credit risks,
- reputational risks and
- operational risks, especially physical risks in this case (e.g. property damage caused by the consequences of climate change). OpRisk management already considers these events as ‘climate risks’, albeit using different terms.

Over the short to medium term, the transitory risks are more relevant to our portfolio than the physical risks because the risks arising from climate change have reached national, European and international levels in the legislators’ perception, as illustrated by the debate about reasonable CO_2 prices, for example. The transition to a climate-neutral economy is also increasingly taking the form of concrete action (as with the Green Deal in the EU), and this process could be a challenge for the economy and thus for some of our customers as well.

Climate risks at individual exposure level

If we regard a climate risk as an essential aspect in risk-relevant transactions, we take this into account at two points in the credit process – as we do other risk drivers:

- **Identification of the customer’s probability of default:** Depending on the severity and materiality of the climate risk, this is incorporated into a rating via the quantitative aspect (climate risks have already affected the customer’s business figures) and/or the qualitative aspect (e.g. in the case of regulatory risks or via manual upgrades or downgrades).
- **Evaluation of the transaction structure and its terms and conditions:** The front office and risk management offices perform a credit appraisal in a two-stage process (first and second decision recommendations) that focuses primarily on the structure of the transaction, such the term of the loan. If a climate issue appears to be unfavourable (risk) or particularly positive (opportunity) in its interplay with the structure, this is assessed during the credit appraisal and the results are incorporated into the recommendation for decision. In the case of a risk, this may lead to the loan being denied or subjected to additional conditions.

The approval of a new loan or a loan follow-up decision is then made by the relevant decision-making level (management levels and committees) depending on the severity of the risk (risk exposure).

Climate risks affect credit, reputational and operational risks

Climate risks at portfolio level

A wide range of formats are already in place within KfW Group for dealing with climate risks at portfolio level. We are continuously developing and extending these formats by:

- Examining risks in the context of studies or analyses, particularly if there is a link to entire industries. These are presented and discussed in various committees (e.g. the Group Committee for Sector Risks or the Group Credit Risk Committee). There are separate departments for financial industry risks and country risks; these also submit analyses to the Group Credit Risk Committee.
- Including risks in different 'heat maps', e.g. the general Risk Report Heat Map or the Environment and Climate Risk Heat Map.
- Discussing risks in the Expert Committee for stress tests and, where appropriate, subsequently performing a stress test which is then presented to the Group Credit Risk Committee for information purposes.
- Establishing transparency regarding material risks via the risk reporting system.

If the security evaluation or rating method demonstrate climate risks to be relevant enough to be explicitly included as their own criterion within the methodology, the risks are examined by the security or rating systems working groups set up for this purpose. Measures derived from the analyses performed by the various committees are then discussed and decided upon by the Group Credit Risk Committee. We also addressed climate risks again during our regular risk inventory process in 2022. This confirmed our previous finding that these risks are not a separate category of risk – an opinion shared by BaFin in its → Guidance Notice on Dealing with Sustainability Risks, from December 2019. The Group's procedural rules were amended accordingly in early 2020 to include a definition of climate risks.

In addition to operational and reputational risks, climate risks could have a particularly large impact on KfW's credit risk. In contrast, their influence on other categories of risk (e.g. business or liquidity risks) still appears to be limited at the moment. Climate risk as a factor in the context of credit risk is therefore the main focus of our work.

Climate risks as reputational risks

Climate risks are also linked to reputational risks and therefore regarded as 'non-financial risks'. KfW has an overarching strategy and specific sub-strategies for these forms of risk.

Non-financial risks arise from KfW's primary business activities. They comprise operational risk as well as reputational and project risks. For KfW, the main operational risks are information security risks, compliance risks, business interruption risks and legal risks.

As a public-sector institution with high ethical, governance and compliance standards, KfW Group regards reputational risks as material even though significant adverse effects to its assets, income or liquidity situation as a result of a negative reputation have not yet been observed or measurable. Reputational risks can arise for KfW in a climate context, for example, if KfW has financed borrowers that are criticised for their emissions.

Sub-risk strategies for this topic could limit or prevent the impact created by these risks. For example, KfW focuses particularly on using training courses to raise employee awareness (e.g. in-house events to explain climate risks) so that risks can be identified at an early stage.

4. Metrics and targets

In the area of climate-relevant metrics and targets, the TCFD recommendations apply primarily to both the outside-in and the inside-out perspective. Metrics for the 'outside-in' risk perspective are being continually developed. Over the medium term we aim to generate multiple metrics and, if required, targets for the 'outside-in' risk perspective. The ESG risk profile described above, which is in the process of being developed, is also designed to contribute to this. Metrics in a broader sense include the findings from the scenario analyses and stress tests, which represent findings obtained over the years and are gradually combined to form a single picture.

Results of KfW scenarios and stress tests

Year	Scenario	Climate risk category	Focus	Timescale	Result
2019/2020	IEA 2017 2°C scenario	Transitory risk	Oil and gas sector	2030	No major risks to portfolio business identifiable
2020/2021	IPCC RCP 8.5	Physical risk	US and Germany; automotive, chemicals, electric utilities sectors	2030, 2050	No major risks to portfolio business identifiable
2020/2021	IPCC RCP 8.5	Physical risk	US, China, Vietnam	2050, 2100	No major risks to portfolio business identifiable, to be monitored for new business
2020/2021	2°C stress test/worst case calculation	Transitory risk 'disorderly'; simplified simulation for CO_2 price	Sections on corporates and major banks	2030 and beyond	Considerable risks exist – generally manageable for KfW
2021/2022	Climate litigation scenario	Transitory risk, particularly climate litigation risks	Oil and gas, banking, cruise shipping and automotive sectors	–	No major risks identifiable at present
2022	Climate stress test NGFS net zero scenario	Transitory risk	Corporates and financial institutions in the KfW Group portfolio	2025	Although KfW's total capital ratio decreases over the course of the scenario until the end of 2025, it remains well ahead of the expected regulatory capital requirements and within the risk appetite defined by the Executive Board.

Metrics for the inside-out perspective include KfW Group's own carbon emissions in addition to the carbon footprint of KfW's financing activities (→ chapter on sustainability strategy). They are recorded in accordance with the Greenhouse Gas Protocol for scope 1 and 2 and on a selective basis for scope 3. Scope 3 emissions make up the majority of KfW's carbon emissions and are mainly generated by our business trips. KfW Group's carbon emissions are listed in detail in the → chapter on banking operations.