DEUTSCHE BUNDESBANK
EUROSYSTEM

Climate-related disclosures by the Deutsche Bundesbank 2026

Part of the Eurosystem-wide climate-related disclosures

Table of Contents

Foreword

Dear Readers,

Climate change and its consequences are becoming increasingly noticeable worldwide. Germany and Europe are no exception. More frequent extreme weather events, rising temperatures and the mounting associated strains on our economies are laying bare the challenges facing societies, businesses and governments. Transitioning to a net zero economy remains of central importance. The energy crises of recent years have made it clear just how dependent on fossil fuels many economies still are.

At the same time, risks arising from nature and biodiversity loss are becoming increasingly prominent. The loss of biodiversity and degradation of ecosystems, which are closely related to climate change, can have significant economic and financial consequences.

These developments drive home the importance of joint action. The scientific consensus is clear: Further action and international cooperation are needed to contain the risks arising from climate change, nature loss and biodiversity degradation. Central banks play their part in these efforts by analysing the impact on the economy and the financial system and by taking greater account of climate-related and nature-related risks in their actions.

The Bundesbank is involved at national, European and global levels. For example, it contributes its expertise to the Network for Greening the Financial System (NGFS). At the Eurosystem level, too, we are committed to taking into account, and reporting on, consistent with our mandate, climate- and, increasingly, nature-related risks.

With its fifth set of climate-related disclosures, the Bundesbank is continuing its journey towards greater transparency. The report provides information on recent Bundesbank analyses and research and on climate- and nature-related aspects of our financial investments. And we are moving in the right direction: The greenhouse gas metrics of our euro-denominated own portfolio and of our sovereign investments have been declining, on the whole, since climate-related reporting began.

My special thanks go to all my colleagues at the Bundesbank who, with great commitment and a high level of specialist expertise, are helping to forge a better understanding of the impacts of climate change and the loss of nature on the economy and the financial system. Their work goes a long way towards addressing one of the major challenges of our time and strengthens the basis for a stable and resilient financial system.

Dr Sabine Mauderer
First Deputy Governor of the Deutsche Bundesbank

Summary

The German economy and financial system continue to face the consequences of climate change, nature and biodiversity degradation as well as fossil fuel dependency. Climate change and the loss of natural habitats and biodiversity, as well as the transition to a net zero economy, continue to affect the long-term stability of the economy and financial system. At the same time, dependencies on fossil fuels are having an increasingly adverse economic impact. [1)] A transition to renewable energy sources would therefore make the German and European economy not only more climate-friendly and nature-friendly, but also more resilient and less vulnerable to fossil fuel supply shocks. If the global concentration of greenhouse gases in the atmosphere continues to rise, limiting global warming to 1.5 degrees Celsius will become increasingly unlikely. The Bundesbank remains committed to its mandate to analyse the resulting risks to the financial system and to take measures to ensure price stability, to protect its own balance sheet and to contribute to financial stability.

The Bundesbank further expanded its climate-related and nature-related work in 2025. The most important developments include the introduction of AI-based data analysis tools, the lead management of a Eurosystem-wide ESG data procurement project and conducting a range of analyses, such as on **nature-related risks and the current challenges of** transformation financing in the German banking sector (see Section 1.1). At the national level, the Bundesbank promotes exchange of information on sustainability and the impact of climate change and nature and biodiversity degradation on the financial system. In 2025, the Bundesbank's First Deputy Governor, Sabine Mauderer, continued to chair the Network for Greening the Financial System (NGFS). In addition, the Bundesbank, together with the Federal Ministry of Finance (BMF), represented Germany in the G20 Sustainable Finance Working Group (SFWG) and in the newly established Sustainable Finance Working Party (SFWP) of the Organisation for Economic Co-operation and Development (OECD). The Bundesbank also contributes to knowledge transfer in national and international formats, including the Eurosystem, the NGFS and the G7, through the exchange of experiences in modelling climate-related risks and by publishing its own analytical tools.

1 See, for example, First Deputy Governor Mauderer (2026) on the economic and financial impact of external dependencies in the energy sector: Preserving Stability in a Fragmented and Uncertain World.

One focus is on analysing climate-related risks and the resilience of the German financial system. The Bundesbank has developed a macroprudential analytical framework that examines physical and transition climate-related risks in the financial system (see Focus chapter). The analyses show that the German financial system is resilient to transition risks overall, but some financial institutions may be more affected. Stress tests with short-term shocks, such as a sudden carbon price increase, confirm that a gradual transition to a net zero economy, broad data availability, and improved market disclosure and enhanced transparency about climate-related risks could be beneficial in terms of financial stability. Physical risks, such as extreme weather events, are increasingly being taken into account in the Bundesbank's analysis, particularly in view of international linkages via supply chains and insurance markets.

The Bundesbank pursues sustainable investment strategies for its own non-monetary policy portfolios/investments (euro portfolio and foreign exchange share of reserve assets). These include a four-stage strategy for covered bonds and sustainability scores for bonds issued by promotional and development banks and by sub-sovereigns (e.g. federal states and provinces) (see Section 3.1). These strategies take climate-related risks into account and promote the transition to a net zero economy within the scope of the Bundesbank's statutory mandate.

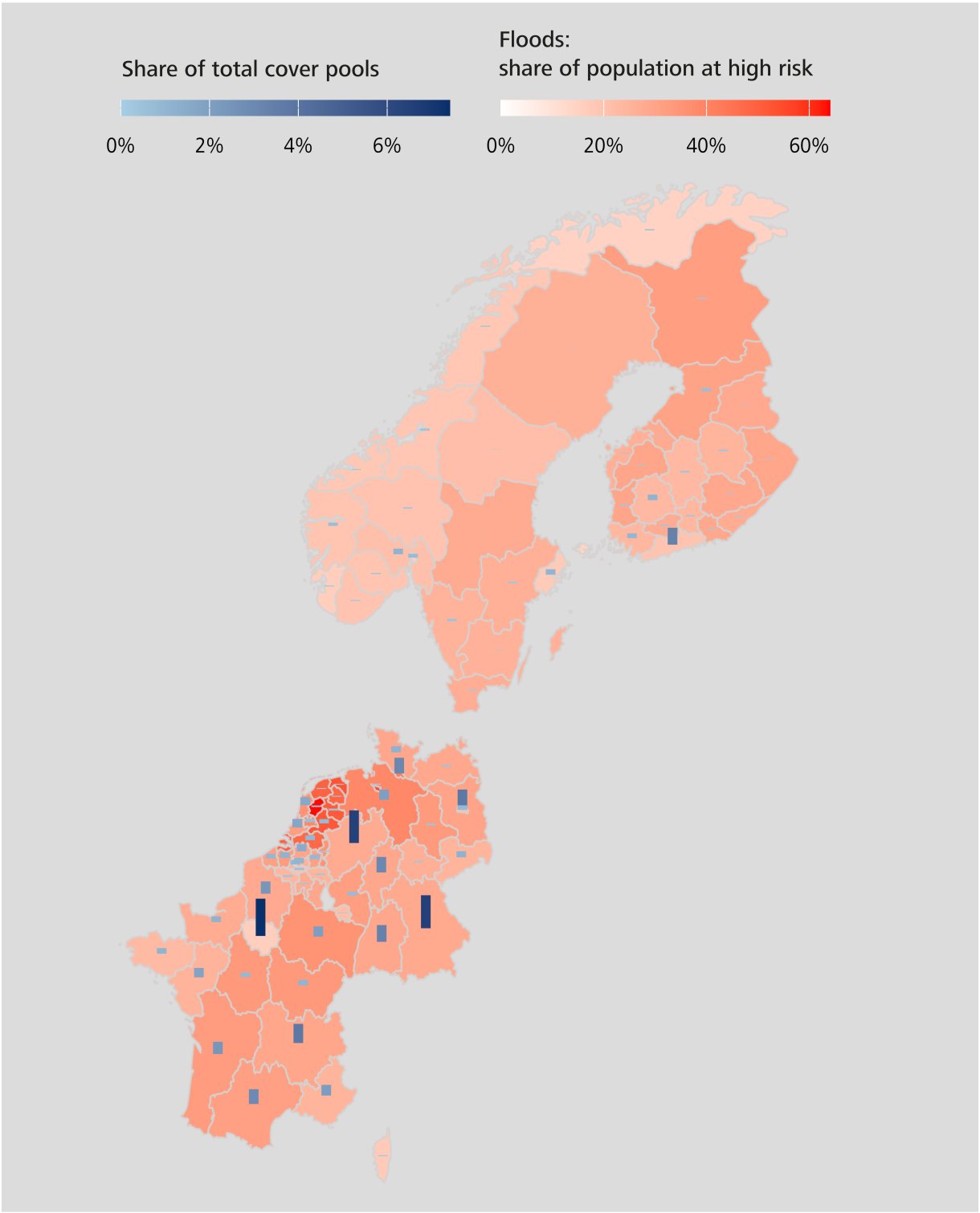
2 At the time of reporting, GHG data for 2025 are not yet available. The GHG metrics for 2025 are provisionally based on banks' GHG data for 2024; the informative value of developments in GHG metrics between 2024 and 2025 is therefore only limited.

The greenhouse gas (GHG) metrics of the euro portfolio show some slight increases compared with previous years, but are on a downwards trajectory over the long term. In 2025, the euro portfolio consisted mainly of covered bonds issued by commercial banks and bonds issued by promotional and development banks. For covered bonds, an improved data situation means that metrics on scope 3 emissions can be reported for the first time (see Section 5.1.1.1). These show that the GHG balance sheet of covered bonds is almost entirely determined by the emissions financed by commercial banks. Scope 1 and 2 metrics increased slightly between 2023 and 2024.[2)] This is also related to the fact that some banks changed their approaches to accounting for GHG emissions under the new European Sustainability Reporting Standards (ESRS). Over a longer period starting in 2021, however, the scope 1 and 2 metrics of covered bonds declined.

The covered bonds are secured by cover pools, composed mostly of residential real estate loans. Their physical climate-related risks were investigated for the first time, with the analysis based on the regions where the underlying assets are located (see Section 5.1.1.3). In these regions, a relatively large amount of property is exposed to flood risks, whereas risks from rising sea levels, forest fires and hurricanes are less prevalent (see Figure 1).

Distribution of cover pools to regions potentially at risk from floods

Figure 1



Sources: Moody's and Bundesbank data and calculations.
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A considerable share of the financing activities of promotional and development banks is classified as “green” (beneficial to the environment). This is channelled to renewable energy sources and public transport infrastructure, amongst other things (see Section 5.1.1.2). Adding promotional and development bank bonds to the euro portfolio has therefore had a positive impact on its sustainability performance.

For reserve assets, the climate-related metrics of sovereign investments in particular have improved. The GHG intensities of sovereigns have been falling almost continuously since 2015 (see Section 5.1.2.1). For the first time, the report includes not only climate aspects but also a dedicated analysis of the nature-related aspects of sovereigns (see Section 5.1.2.3). This shows, amongst other things, that there are still considerable gaps internationally with the UN Biodiversity Framework objective of conserving 30 % of the world’s land and ocean area. In addition to investments in sovereigns, the Bundesbank’s reserve assets include gold holdings (see Section 5.1.3), receivables from the International Monetary Fund (IMF) (see Section 5.1.1.1) and (as with the euro portfolio) bonds issued by promotional and development banks (see Section 5.1.1.2). This report also contains climate-related metrics for these investments.

The Bundesbank will continue to deepen its analyses of climate and nature-related risks and expand its sustainable investment policies. It is committed to improving the availability and quality of sustainability data and supports consistent disclosure requirements. Within its mandate, the Bundesbank strives to incorporate climate and sustainability-related aspects into its investment decisions in order to contribute to reaching the goals of the Paris Climate Agreement and the climate neutrality goals of the EU and Germany (see Chapter 6). The annual climate-related disclosures remain an important tool for documenting progress and creating transparency.

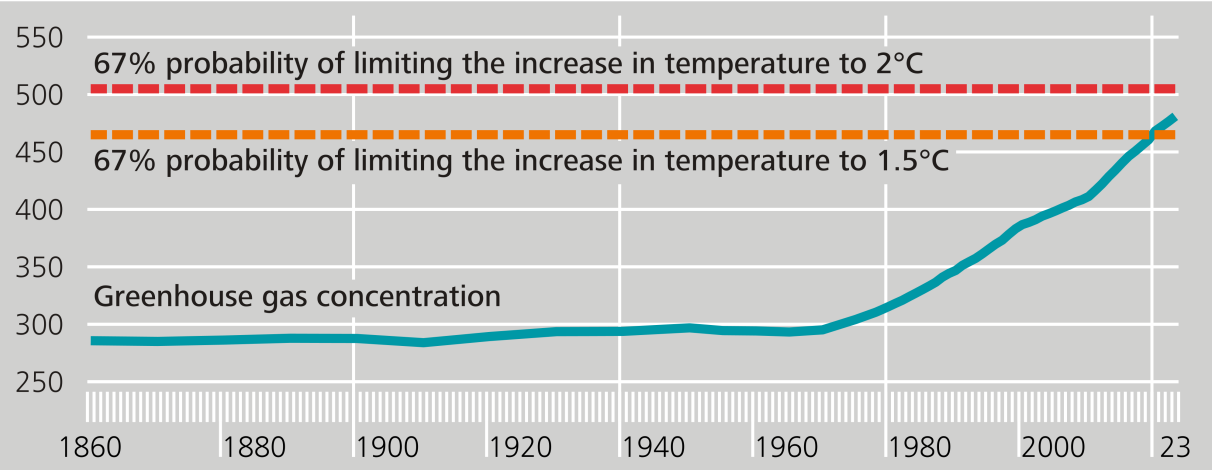
1 Introduction

Climate change and the loss of natural habitats and biodiversity, as well as the transition to a net zero economy, continue to pose key challenges to the stability of the economy and financial system. Fossil fuel dependency has an increasingly adverse economic impact. However, amidst geopolitical tensions and economic uncertainty, climate and nature protection have recently been "put on the back burner" in many countries and institutions. The concentration of greenhouse gases in the atmosphere is rising continuously, making it increasingly unlikely that global warming will be limited to 1.5 degrees Celsius – the main objective of the Paris Agreement (see Figure 2 [1)]). This shows the urgency of reducing greenhouse gas emissions in order to achieve national and international climate targets. These global developments directly affect the Bundesbank's core business areas.

Atmospheric greenhouse gas concentration*

Figure 2

Parts per million in CO_2 equivalents



Source: European Environment Agency (EEA). ***** Including Kyoto Protocol gases, Montreal Protocol gases and other forcing agents, such as ozone and aerosols.

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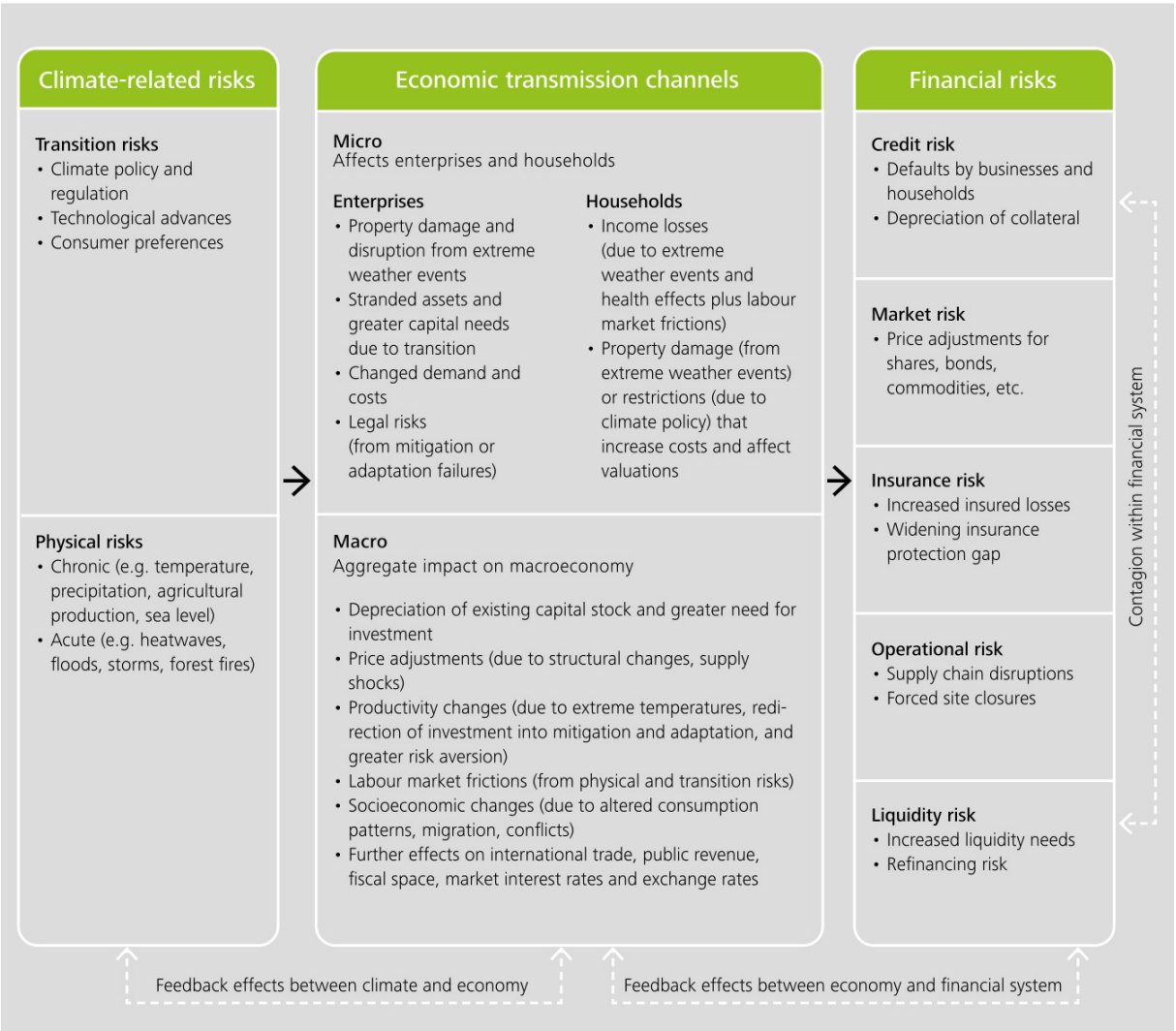
1 Further information in chart form on the development of green finance in Germany is provided by the Green Finance dashboard at Green finance dashboard.

On the one hand, the concentration of greenhouse gases results in “acute” and “chronic” **physical climate risks,** such as floods, droughts and long term increases in temperature and sea levels. These risks will continue to increase as the concentration of greenhouse gases rises. On the other hand, climate policy measures to achieve a net zero economy, technological innovation and changes in consumer behaviour can lead to what are known as **transition risks or opportunities**.[2] It has recently become clear just how dependent on fossil fuels the German and European economies have become and what economic uncertainties and risks this entails. The extent to which transition risks and opportunities arise depends on various factors, some of which are political. It is therefore often hard to quantify. Figure 3 shows that physical and transition risks can have economic implications. At the micro level, these could include, for instance, the destruction of assets or productivity losses on the part of firms.[3] In addition, the solvency and collateral value of (public or private) borrowers could be adversely affected. At the macro level, public revenue and fiscal space[4] can be impaired, as can price stability and the transmission of monetary policy,[5] spilling over to other core business areas of the Bundesbank. Via these **economic transmission channels**, physical and transition climate-related risks affect the financial system as drivers of existing **financial risks**. The Focus Chapter in Section 1.2 looks at the extent to which climate-related risks and the long-term sustainability of fossil fuel-based business models are putting the stability of the German financial system at risk.

2 See Eickmeier et al. (2024) and Meinerding et al. (2024).
3 See NGFS (2026).
4 See Avgousti et al. (2023).
5 See NGFS (2024).

How climate change leads to financial risks

Figure 3



Source: NGFS (2020).

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In this challenging context, the Bundesbank remains committed to analysing the impacts of climate change and nature and biodiversity degradation on the economic and financial system and to addressing the implications for its own balance sheet by taking the appropriate risk management measures. In 2021, the Eurosystem central banks agreed on a common framework to make non-monetary policy portfolios more sustainable and increase transparency on their own climate performance.[6)] In subsequent years, the Eurosystem adopted further measures to integrate climate-related risks more closely into monetary policy operations within its mandate and to take them into consideration in the future design of the operational framework for implementing monetary policy.[7)] As part of the 2025 strategy assessment, the ECB's Governing Council committed to taking into account, within the monetary policy mandate and general activities, the implications of climate change and the loss of nature and biodiversity for monetary policy and central banking.[8)]

With this fifth annual report, which is part of the Eurosystem-wide climate-related disclosures, the Bundesbank wishes to underscore once more the importance of the climate-related risk management of financial assets as well as transparency and disclosure. In times when short-term risks are the prime focus, it is all the more important not to lose sight of long-term developments and to set the course for a sustainable future – not only in view of the Federal Climate Action Act (*Klimaschutzgesetz*), but also to safeguard economic and financial stability.

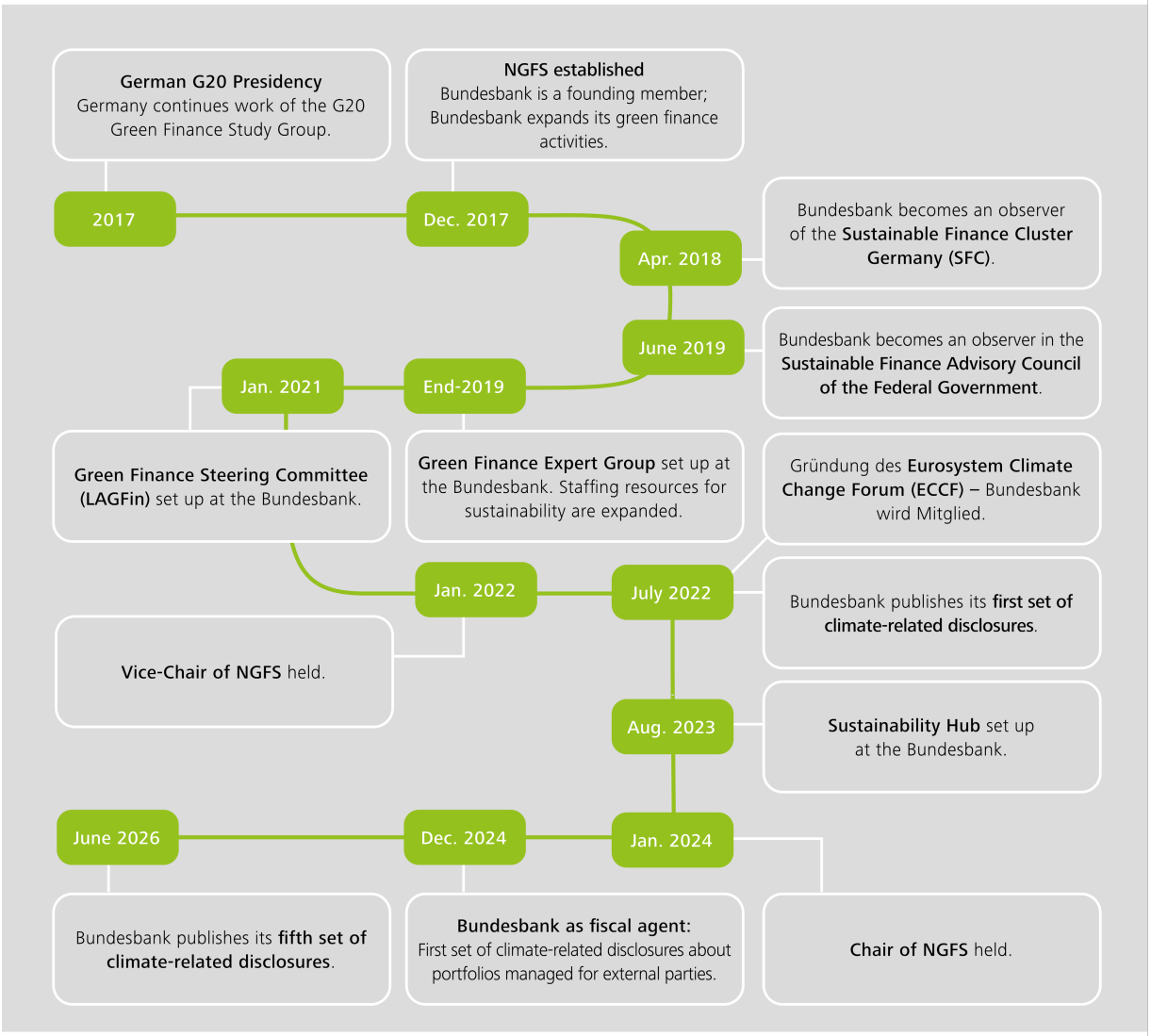
6 See ECB (2021).
7 See ECB (2022).
8 See ECB (2025).

1.1 Milestones and highlights in 2025

The Bundesbank has been comprehensively addressing climate change and the impact on its mandate and business areas for several years. It began with a particular focus on climate-related risks and has increasingly extended it to include nature-related risks. In addition, the Bundesbank advocates for a more sustainable economic and financial system. Figure 4 provides an overview of the key milestones of recent years.

Milestones in the Bundesbank's work towards a sustainable economic and financial system

Figure 4



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National and international cooperation with a broad range of stakeholders to gain a better understanding of the economic and financial risks arising from climate change and climate policy remained an important aspect of the Bundesbank's climate-related work in 2025. At the national level, the Bundesbank has been an observer on the Standing Committee of the Sustainable Finance Cluster (SFC) since April 2018. This body is a central point of contact for questions relating to sustainable finance in Germany. It thus contributes to the standing dialogue with key financial players on sustainability issues and, in particular, the impact of climate change and nature and biodiversity degradation on the financial system. For example, in October 2025, the Bundesbank, together with the SFC, organised a talk on sustainable finance for its clients in the public sector asset management sector.[9)] Topics included developments in the area of sustainable finance, the regulatory framework and public investors' practical experience with the issue of sustainability. In addition, in December 2025, the Bundesbank hosted the quarterly meeting of the Standing Committee of the SFC.

In the global context, the Bundesbank has a key influence on the activities of the NGFS. Bundesbank First Deputy Governor Dr Sabine Mauderer will continue in her role as Chair of the Network until June 2026. In addition, various Bundesbank core services and functions actively contribute to the work of several NGFS working groups, such as on the macroeconomic impact of climate action or by co-chairing the Expert Network on Data. The key NGFS publications in 2025 included innovative short-term climate scenarios examining the direct effects of climate change and climate policy on the economy and the financial system[10)] and also, for the first time, an input paper for the G20.[11)] This paper presents a practice-oriented framework for anchoring climate adaptation into transition planning and guidelines for developing adaptation goals and metrics.

9 See Section 3.2.
10 See NGFS (2025a).
11 See NGFS (2025b).

Together with the BMF, the Bundesbank also represents Germany in the G20 Sustainable Finance Working Group (SFWG). One of the issues the SFWG explored in 2025 was how firms could integrate investment to adapt to climate change into their transition plans and how to improve data standardisation in global trade in carbon offset certificates. The Bundesbank and the BMF are likewise both members of the OECD's Sustainable Finance Working Party (SFWP), established in 2025. The SFWP brings together central banks, supervisory authorities and finance ministries from 39 jurisdictions to facilitate efficient, open and sound financial markets that also take sustainability aspects into account. In addition, the Bundesbank promotes knowledge transfer, including in the Eurosystem, the NGFS and the G7, for example by exchanging best practices in modelling climate-related risks and by publishing its own analytical tools and thus making them available to interested users. [12)]

Risks from nature and biodiversity loss are a growing area of interest. In the 2025 monetary policy strategy assessment, the ECB's Governing Council committed to fully taking into account, within its mandate, the implications of climate change and nature degradation for monetary policy and central banking. [13)] For the first time, a Bundesbank study has shown that banks in Germany are highly dependent on ecosystem services through their lending to enterprises. [14)] Ecosystem services provide inputs for economic activities. If these are no longer available, or their availability is limited, due to nature and biodiversity degradation, the supply of goods and services from various economic sectors may be at risk. These risks can spill over to banks by loans to affected enterprises. In addition, the Bundesbank conducts internal analyses to examine the extent to which its own financial assets are exposed to nature-related risks.

12 See Hinterlang et al. (2023) and Burgert et al. (2025).
13 See ECB (2025).
14 See Deutsche Bundesbank (2026).

Climate-related risks remain an area of interest for financial and banking supervision. Physical climate-related risks such as extreme weather events are becoming increasingly important.[15)] The Bundesbank is involved in implementing the prudential regulation created by the so-called "EU banking package" and addressing sustainability risks. This includes assisting the European Banking Authority (EBA) in the preparation of guidelines and technical standards on environmental, social and governance (ESG) risks, including risk management, scenario analysis, stress testing and disclosure. In the area of financial stability, too, the Bundesbank is continuously investigating potential vulnerabilities that can arise in the financial system as a result of climate-related risks (see also Focus chapter).

At the same time, the Bundesbank's analyses show that the banking sector is, in principle, well placed to finance the transition to a net zero economy. In a comprehensive analysis, the Bundesbank examines the investment and financing required to transition to a net zero economy in Germany by 2045 and the role of the German banking system in providing the necessary funds.[16)] The results show that banks' capital adequacy is sufficient to provide the additional investment, even under conservative assumptions. At the same time, however, it is clear that structural barriers and a lack of incentives have, up until now, dampened the willingness to invest in decarbonisation measures in key sectors. This is also suggested by the results of Bundesbank surveys. The study thus provides valuable impetus for the current debate and for the design of an effective framework for financing the transition.

On behalf of the European System of Central Banks (ESCB), the Bundesbank once again successfully procured climate and other sustainability data and concluded contracts with two data providers. It thus continues to safeguarding the common dataset of the national central banks in the ESCB in this area. This is an important prerequisite for comparable climate metrics in portfolio management and reporting (see Chapter **5**) as well as for the implementation of the monetary policy use cases decided by the ECB Governing Council.[17)]

15 In the field of banking supervision, the Basel Committee on Banking Supervision (BCBS) agreed to conduct further analyses on the financial implications of extreme weather events for banks.

16 See Baccianti et al. (2026).

17 See ECB (2022).

The Bundesbank uses innovative technologies to tap new data sources in the field of sustainable finance. For example, in cooperation with the Ludwig Maximilians University of Munich, the Greenhouse Gas Insights and Sustainability Tracking (GIST) project uses artificial intelligence (GenAI) to extract sustainability information from unstructured public sources, such as sustainability and annual reports, and to make it usable for central bank and statistical purposes. A key objective is to improve the transparency and consistency of greenhouse gas emissions data reported by companies and, in some cases, provided by commercial vendors, and of other environmental metrics. The Bundesbank is thus making an important contribution to enhancing the data basis for research and analysis and to accessing new data sources and methods in statistics.

Focus chapter

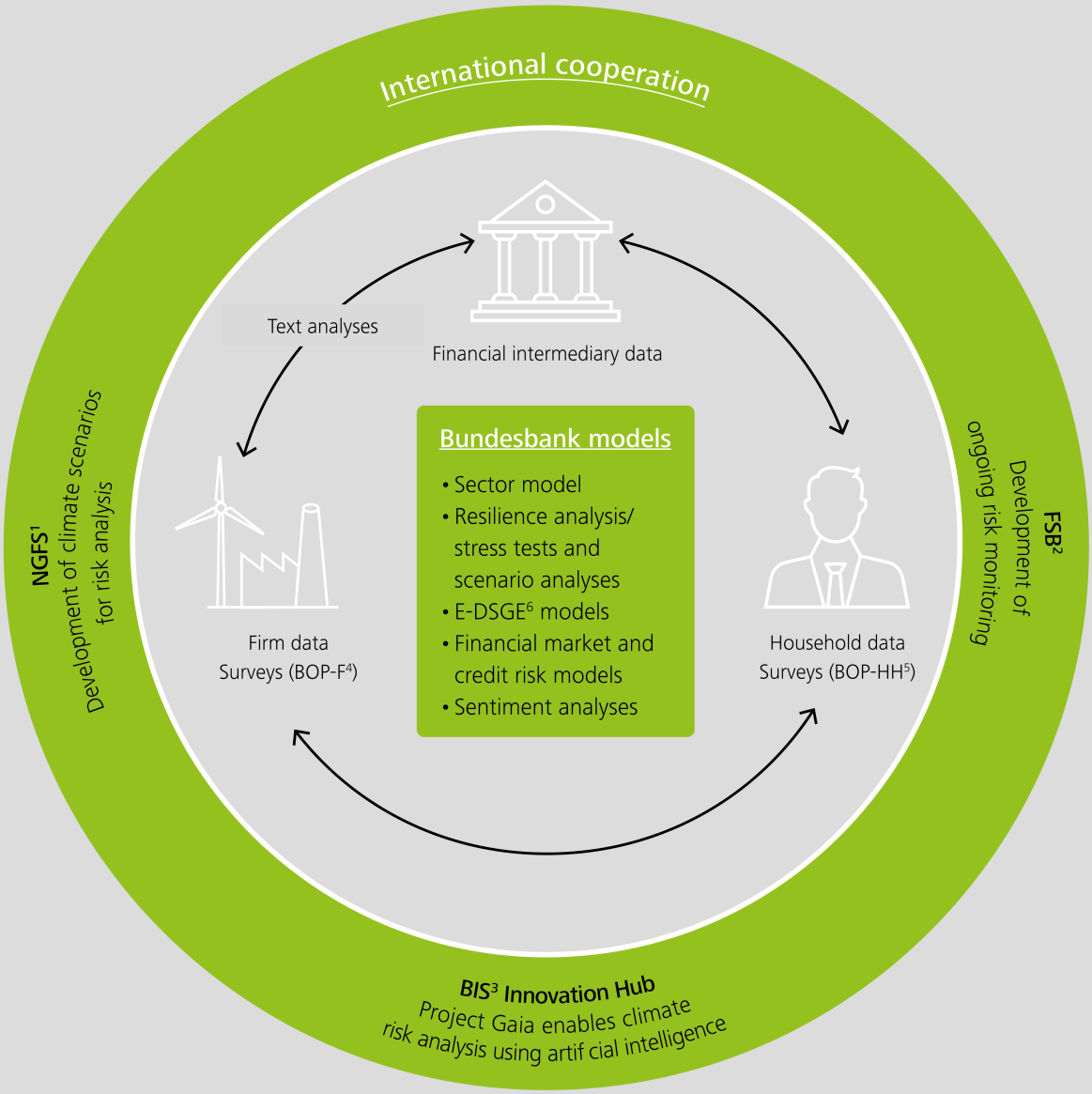
Monitoring the financial system vulnerabilities arising from climate-related risks

The Deutsche Bundesbank is committed, within its mandate, to contributing to the stability of the German financial system, and is therefore also intensively involved in analysing climate-related risks. It fulfils this task through its own independent analyses and through close international cooperation with institutions such as the Financial Stability Board (FSB) and the NGFS, as shown in Figure 5. The aim is to understand the potential impact of climate change and climate policy on the financial system and to identify systemic vulnerabilities at an early stage. The Bundesbank is investigating how physical risks from climate change and transition risks – i.e. risks arising from the transition to a net zero economy – affect the financial system via credit, market, liquidity and insurance risk.[1)] To this end, the Bundesbank has developed a macroprudential analytical framework that builds on the NGFS's global scenario framework and the FSB's internationally coordinated climate risk analyses and is tailored specifically to the German financial system. In several Financial Stability Reviews and one-off publications, the Bundesbank has already examined the possible consequences of climate change and climate policy on the German financial system in detail. Various models show that, overall, it is resilient to the transition risks analysed so far.

1 See Figure 3: How climate change leads to financial risks.

Sustainability-related financial stability analysis at the Bundesbank

Figure 5



1 Network for Greening the Financial System. **2** Financial Stability Board. **3** Bank for International Settlements. **4** Bundesbank Online Panel – Firms. **5** Bundesbank Online Panel – Households. **6** Environmental dynamic stochastic general equilibrium.

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Germany is a highly industrialised country, and its exposure to natural hazards is relatively low compared with other regions of the world. The focus of previous analyses has therefore been on transition risks that can arise from climate policy, technological change and changes in preferences. These risks can affect banks, insurers and other financial intermediaries' balance sheets via the real economy, in particular through portfolios concentrated in high-emissions sectors. At the same time, physical risks, such as extreme weather events, continue to rise. The Bundesbank recognises the potential consequences, and analyses whether physical and transition risks can accumulate and be amplified in the financial system, for example through herd behaviour in financial markets or concentrations in particularly vulnerable economic sectors.

The Bundesbank is investigating how various climate policies could affect the economy as well as banks, funds and insurers. To this end, the Bundesbank uses its own climate scenarios and NGFS climate scenarios, which show how emissions, carbon prices and temperatures could evolve depending on the policy stance – from "business as usual" to more ambitious climate targets. Economic models are used to calculate the potential implications for Germany for key outcomes such as economic growth, inflation, interest rates and financial stability. A dedicated sectoral Bundesbank model also looks at how individual sectors are affected. [2)] Particularly energy-intensive sectors, such as parts of industry, transport and fossil energy production, could suffer especially large losses in relation to their economic output. Services sectors are usually less affected.

2 See Deutsche Bundesbank (2021).

Analyses to date show that the German financial system is well equipped to cope with the consequences of climate change, [3] **but that, in isolated cases, banks and insurers could be affected more severely.** Studies show that, in the event of a gradual transition to more climate protection – as in the "Net Zero 2050" scenario – the impact on inflation and economic growth in Germany will remain fairly moderate and the financial system will be able to cope with the burdens. Financial institutions that are highly invested in carbon-intensive sectors or investments with very long maturities should take full account of the resulting risks. The larger losses on securities and (moderately) rising credit losses following sudden climate policy changes, such as a rapid increase in the carbon price, are an argument in favour of a slow and orderly "green" transition. Long-run analyses suggest that physical climate-related risks tend to be moderate for Germany, but they could increase in the future. [4] The Bundesbank is therefore working to gain an even clearer picture of these risks.

The Bundesbank plays an active role in international cooperation to assess climate-related risks. It is helping to develop and modify climate scenarios within the framework of the NGFS. In addition, the Bundesbank contributes to analyses of increasing physical risks from extreme weather events and their impact on German financial market participants within the framework of the G7. Work on an FSB monitoring toolkit that captures indicators on climate-related risks and vulnerabilities is another area of the Bundesbank's work. The toolkit includes proxies for climate-related risks and political framework conditions, exposure metrics to measure a financial system's exposure to these risk drivers and risk metrics that quantify potential losses. Work on this toolkit is scheduled for completion in the course of 2026 and integrated into regular risk monitoring.

3 See Deutsche Bundesbank (2021, 2023, 2024a), Shala et al. (2022) and Arlt et al. (2026).
4 See Deutsche Bundesbank (2021), Shala et al. (2022) and Arlt et al. (2026).

At the same time, it is clear that the analysis of climate-related risks continues to present significant challenges. Important data gaps exist, in particular, for granular emissions data and transition information at the firm level, as well as for georeferenced data to track the precise location of real assets with an elevated exposure to physical climate-related risks. In addition, consistent, internationally comparable disclosures about climate-related risks and strategies are lacking. Broad data availability and/or market transparency and disclosure of climate-related risks are therefore highly relevant. The Bundesbank is addressing these gaps through business and household surveys, the use of AI-based methods to analyse unstructured data from corporate reports,[5)] its own data procurement projects and participation in international initiatives to harmonise disclosure standards and climate data.

The results so far show that climate-related risks affect the financial system via traditional financial channels, but place new demands on financial stability analysis. In particular, due to the timeline, inherent model uncertainties and potentially complex non-linearities a continuous review of the analytical methods is needed. Overall, the German financial system appears resilient to climate-related risks, even though long-term challenges persist. The Bundesbank will further deepen its analyses in order to keep an eye on the stability of the financial system, also amidst increasing climate-related risks.

5 See Section 1.1 Previous milestones and highlights in 2025.

2 Governance

As part of its “Strategy 2027”, the Bundesbank realigned its strategy and steering process. The Bank implements its legal mandate and has a direct external impact through its outward core services, which comprise the areas of “Monetary Policy”, “Money”, “Financial Supervision and Stability”, and “Financial Market Services and Statistics”. Sustainability plays a key role in this context, as it permeates all of the Bundesbank’s core services and is relevant to all areas. Thus, for several years now, the Bundesbank has been closely examining the impact of climate-related risks and, increasingly, nature-related risks on its core services (see Figure 6).

Sustainability in the context of the Bundesbank’s new organisational structure

Figure 6

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Since 2021, the **Green Finance Steering Committee** (**LAGFin**) has acted as the central steering and advisory body for interdisciplinary sustainability topics and projects at the Bundesbank. It is headed by First Deputy Governor Sabine Mauderer. President Joachim Nagel and other Executive Board members regularly attend meetings. The Committee's permanent members comprise management-level staff representing the core services Monetary Policy, Financial Supervision and Stability, Financial Market Services and Statistics, Infrastructure and Services and the functions Communications, Policy Advice and Research, Legal Services, Risk Control, and Sustainability. The Committee can use working groups to handle interdisciplinary sustainability-related projects.[1)] The working group leaders report to the participating members of the Executive Board regularly, during committee meetings, thus ensuring continuous project monitoring. In this way, the Committee ensures that the Executive Board and the relevant core services and functions build strong networks and are always informed about sustainability topics and projects in the Bank. At the same time, this allows Executive Board members to steer interdisciplinary analyses and projects in a targeted way.

The Green Finance Steering Committee is flanked by the **Green Finance Expert Group**, a forum for regular expert-level interaction and dialogue. In 2025, a range of specialist lectures provided new impetus and further promoted capacity building within the Bundesbank. Alongside this institutionalised monthly dialogue, staff are supported by an interactive internal knowledge platform on climate-related and nature-related work inside and outside the Bundesbank.

1 In 2025, dedicated working groups dealt with topics such as the "Analysis of nature-related risks for banks in Germany" and "Innovative generation of granular climate data in cooperation with academics" (see Section 1.1).

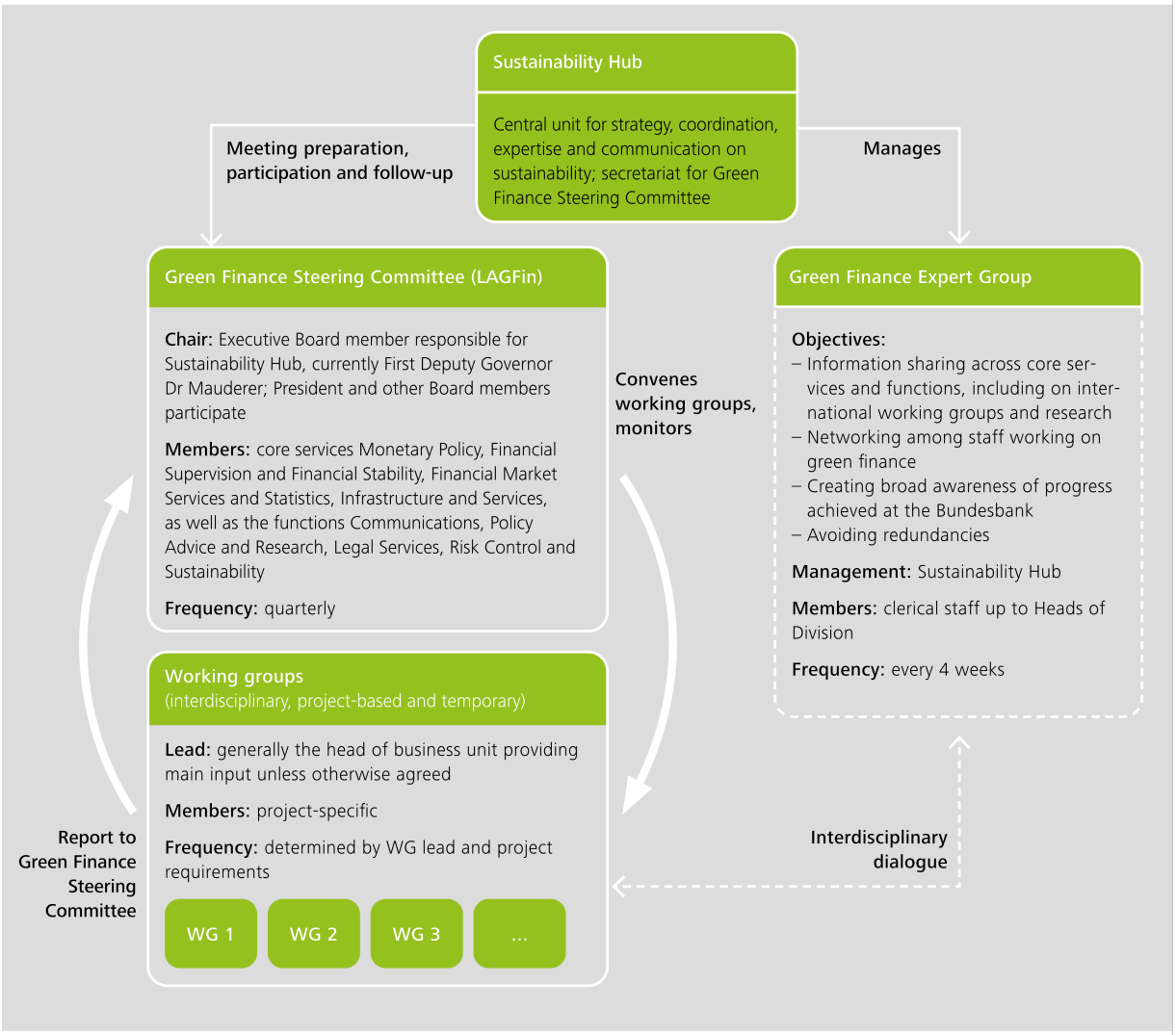
The **Sustainability Hub** was set up in August 2023 and reports directly to First Deputy Governor Sabine Mauderer. The Hub's tasks are strategy, coordination, specialist work and communications. It advises the Executive Board on strategic issues, including climate change, the transition of the economy and sustainability. As part of its **strategy work**, the Hub provides impetus and sets overarching sustainability objectives in consultation with the core services and functions. It is then at the discretion of the core services and functions to translate these into objectives and tasks of their own. The Hub also acts as the secretariat and agenda setter for the Green Finance Steering Committee and **coordinates** specialist information sharing within the Green Finance Expert Group and in interdisciplinary projects. Through all of the above, the Bundesbank is further strengthening its sustainability credentials. As a **specialist unit**, the Hub plays a part in setting the agenda for projects and analytical work and, through its own expert work, acts as an incubator for the Bank as a whole.

The Hub's analytical work focuses on three major topics: the transition to a net zero economy, nature-related risks, and physical risks and adaptation to climate change. It also has a process for systematically identifying and analysing new developments and trends in the field of sustainability, provides key impetus and supports the Bundesbank in responding to new developments relating to sustainability strategically and at an early stage. It provides targeted **communication** on the topic of sustainability both within the Bank and externally. By offering training courses, including in the area of climate education, it supports the work of core services and functions and raises employees' awareness of the topic. The Hub acts as the central point of contact for the public and external stakeholders in overarching matters. It explains the relevance of sustainability for central banks to a wide audience through informative channels such as "Forum Bundesbank", "Euro20+" and "Finance Flash". In addition, it represents the Bank together with experts from the core services and functions in national and international cross-sectional committees (see Section 1.1).

Figure 7 gives a simplified overview of the organisational structure of green finance at the Bundesbank. Sustainability – above all, the impact of climate change, of nature and biodiversity loss and of climate policy on the economic and financial system – has an influence on almost all of the Bundesbank's core services and functions.

Organisational structure of green finance at the Bundesbank

Figure 7



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3 Strategy

3.1 Sustainable investment strategies for the Bundesbank's own non-monetary policy portfolios/ investments

Climate and sustainability risks can threaten the financial viability of particularly affected businesses and states. To limit potential financial risks, the Bundesbank therefore considers sustainability aspects when choosing what assets to invest in. Through its investment activities, the Bundesbank also aims to promote climate protection and sustainability within its statutory mandate. For this reason, the Bundesbank has implemented sustainable investment strategies for its own non-monetary policy portfolios/investments (euro portfolio and the foreign currency portion of its reserve assets).

3.1.1 Euro portfolio

The Bundesbank manages a non-monetary policy euro-denominated securities portfolio (euro portfolio) as an asset-side counterpart to its long-term provisions for civil servant pensions and healthcare assistance, capital and reserves. As a result, the maximum volume of the euro portfolio is predefined and its proportional share in the Bundesbank's balance sheet can be regarded as low.

The euro portfolio currently contains euro-denominated covered bonds from the jurisdictions of Germany, France, Finland, Belgium, the Netherlands, Norway, Sweden and Australia. It also contains euro-denominated unsecured bonds issued by selected non-euro area institutions, including supranational development banks, national promotional banks and other institutions with a public mandate. Unsecured bonds in the portfolio have a significantly lower weighting than covered bonds. In principle, the debt securities are held to maturity.

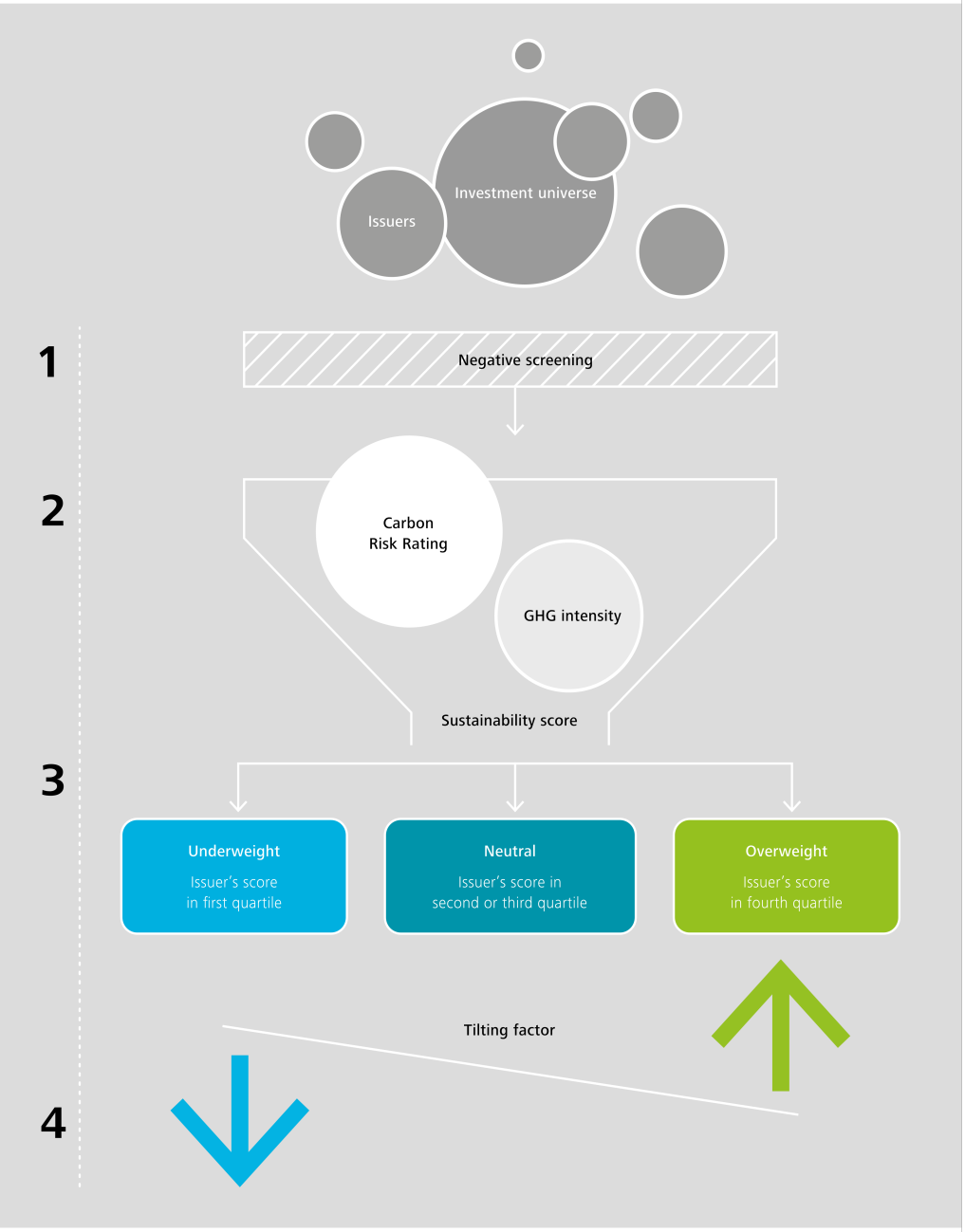
Within its statutory mandate, the Bundesbank's target criteria include not only return, safety and liquidity but also sustainability considerations. The focus of these sustainability aspects is on climate change and the transition to a net zero economy.

Covered bonds:

A four-step sustainable investment strategy has been established for covered bonds in the euro portfolio (see Figure 8):

Sustainable investment strategy for covered bonds in the euro portfolio

Figure 8



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1. Negative screening: Issuers are screened for proven and serious breaches of globally recognised minimum standards. These include the United Nations (UN) Global Compact, the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, the International Labour Organization (ILO) core labour standards and international treaties on prohibited weapons. If such standards are breached – for example, because of human rights violations – the issuer's securities are excluded from the pool of possible investments.
2. Definition of sustainability indicators: Issuer-related indicators create a sustainability score consistent with the Bundesbank's definition of sustainability. The indicators used currently are the "Carbon Risk Rating" developed by the ESG data provider ISS ESG and the issuers' GHG intensity.
3. Classification and steering: Issuers are classified into three groups based on their sustainability score, which determines whether they are overweighted, underweighted or declared neutral compared to the benchmark.
4. Tilting: A tilting factor is applied to determine the degree to which issuers are over- and underweighted within the benchmark portfolio.

Unsecured bonds

Unsecured bonds, which have been newly approved in 2025, are rated according to a climate-focused sustainability score. This is based on three pillars (footprint, ambition, transparency) and serves as a framework for approval, ongoing management and review. It is aligned with the concept used for the foreign currency reserves (see Section 3.1.2).

The sustainable investment strategy for the euro portfolio is continuously refined and reviewed in light of new data and evolving market practices. Through the described methodologies, the Bundesbank takes account of climate-related risks and opportunities in managing the euro portfolio.

3.1.2 Reserve assets

The Bundesbank's reserve assets comprise gold holdings, receivables from the IMF and foreign currency reserves. It makes its foreign currency investment in US dollars, Japanese yen, Australian dollars, Canadian dollars, Chinese yuan (renminbi) and, since 2024, pound sterling. Most of this investment is in sovereign bonds. Holdings also include bonds issued by sub-sovereigns (e.g. federal states and provinces) and national

or supranational promotional and development banks (belonging to the supranationals and agencies issuer group).

In 2023, the Bundesbank introduced a sustainable investment strategy for the foreign currency portion of its reserve assets. This was designed to take greater account of climate-related financial risks and – where this is possible given its primary currency and monetary policy tasks – to combat climate change.

The strategy focuses on the eligibility of issuers. Since restrictions on sovereign bonds (United States, Japan, Australia, Canada, China and the United Kingdom) are virtually impossible given the overarching requirements of currency policy, the Bundesbank has developed suitable approaches for the remaining relevant issuer groups (sub-sovereigns and promotional and development banks).

For the Bundesbank to purchase securities issued by sub-sovereigns, the sub-sovereign must have a better climate profile than the corresponding sovereign. The climate profile is determined by the total GHG emissions and the volumes of fossil fuels produced in the sub-sovereign region, each relative to the size of its economy. This means that, in its foreign currency investment, the Bundesbank avoids sub-sovereigns with a worse climate profile than the corresponding sovereign. If a sub-sovereign has a significantly worse climate profile than the corresponding sovereign, the Bundesbank would consider actively selling those securities holdings.

For the Bundesbank to purchase bonds issued by promotional and development banks, they must meet minimum requirements for a climate-focused sustainability score. Sustainability scoring for issuers is based on three pillars: 1) green and/or brown shares of business activities; 2) ambition, e.g. concerning GHG reduction targets or the exclusion of fossil energy financing; 3) transparency and/or the quality of climate-related disclosures. The results of these three pillars are weighted and merged to form an overall score, with pillar 1 being the main focus of the overall score. In its foreign currency investment, the Bundesbank will therefore not invest, in particular, in promotional and development banks which provide substantial funding to sectors that harm the climate and the environment, such as the fossil fuel sector. The sustainability scoring is also in line with the Bundesbank's aim of creating an incentive for issuers to set themselves climate goals and disclose climate-related information. If an issuer falls significantly short of the sustainability requirements, a sale is considered. In addition, as for the euro portfolio, ongoing negative screening for proven and serious breaches of globally recognised minimum standards is carried out for promotional and development banks.

3.2 The Bundesbank as fiscal agent

Based on its legal mandate (Section 20 of the Bundesbank Act read in conjunction with Section 19 of the Bundesbank Act), the Bundesbank acts as a fiscal agent for central government, federal state governments and other public administrations. Its main activities in this context include passive portfolio management, trading and settlement as well as independent risk control and reporting. It provides passive or rules-based portfolio management for equities and bonds based on the specifications of individual clients.

In recent years, the consideration of sustainability and climate action objectives has become an established investment criterion for clients' financial investments. In this context, the Bundesbank provides its clients with operational and analytical support in implementing customised sustainability objectives. Depending on the client's specifications, measures such as exclusion criteria (for example, breaches of globally recognised minimum standards), positive lists, climate and sustainability-related scoring and tilting methods are implemented.

For equity investments, many clients now use indices that are tailored to their intended sustainability objectives. Here, the sustainability benchmarks defined by the EU (the EU climate transition benchmark (CTB) and the EU Paris-aligned benchmark (PAB)) are playing an increasingly important role. These benchmarks embed GHG reduction targets through clear decarbonisation paths (for example, significant reductions in GHG intensity compared with the baseline and annual decarbonisation) as well as binding minimum standards. Clients are also increasingly integrating bonds into their sustainable investment strategies, applying sustainability criteria in their fixed income investments, including covered bonds or investments in green or social bonds.

The Bundesbank produces reports on sustainability aspects of the managed portfolios at the request of clients (for example, for the central government special fund and the social security funds) thus to ensuring transparency. The reports cover climate-related and sustainability-related metrics and their development over time. These include the GHG profile of the assets, the green and brown shares of the business activities of the invested securities' issuers, energy-related metrics as well as shares of green, social and sustainability bonds in fixed income portfolios. On this basis, clients can track the target achievement and progress of their investments and further develop their strategies. The Bundesbank checks the availability and quality of the underlying data, continuously develops the methodology and systems, and ensures robust, comparable sustainability-related reporting.

4 Risk management

The Bundesbank works to take climate-related risks into account over the entire risk management cycle, i.e. when identifying, analysing, measuring, communicating and managing risks. In organisational terms, it uses the existing risk management structure. Risk Control takes responsibility for the Bundesbank's financial business risks. It is segregated from risk-taking market operations units up to and including the Executive Board level.

The risk management perspective focuses on how climate policy and climate change may affect the value of the Bundesbank's balance sheet assets. It also considers how the balance sheet can be protected from potential climate-related financial risks. These risks may be transition risks associated with climate change mitigation measures, such as a carbon tax, or with changed consumer preferences, such as a shift towards electric vehicles. There are also physical risks stemming from climate change. These include acute risks from extreme weather events such as floods and droughts, and chronic risks such as rising sea levels. Growing attention is also being paid to investigating financial risks arising from nature and biodiversity loss. This is especially the case for financial assets in economic sectors that are particularly dependent on ecosystem services such as water.

Alongside this financial risk perspective, a second perspective looks at how the Bundesbank's own business activities impact the climate. Within its mandate, the Bundesbank must take account of climate impacts and, as appropriate, climate protection aspects when planning and making decisions. At the same time, this angle helps to avoid reputational risks: if the Bundesbank significantly neglected climate considerations in its own business activities, or indeed acted in conflict with them, it could be viewed negatively by the public.

In practice, these two perspectives often produce coinciding assessments, as climate-incompatible investments are generally linked to high transition risks. The GHG metrics outlined in the following section therefore indicate both the climate-related financial risks and the climate impact associated with financial assets. The sustainable investment strategies presented in this report for the euro portfolio and foreign currency reserves held as reserve assets also combine both perspectives.

The ability to expand risk management in respect of climate-related financial risks hinges on the quality and availability of relevant data. Standardisation of measurement concepts is also key. The progress seen here so far is being helped along by regulatory requirements, e.g. in sustainability reporting, gradually becoming more widespread. To continue enhancing and refining the Bundesbank's methodological concepts, it is useful to foster in-depth expert dialogue with colleagues working in core services such as financial supervision and financial stability, who also take a risk perspective. This applies within the Bank itself and, in particular, in partnership with other central banks, financial institutions and the academic community. Cooperation with other Eurosystem central banks in the relevant forums is essential. That goes for areas involving analysis of climate-related risks in monetary policy operations and portfolios as well as risk management options to protect the balance sheet.

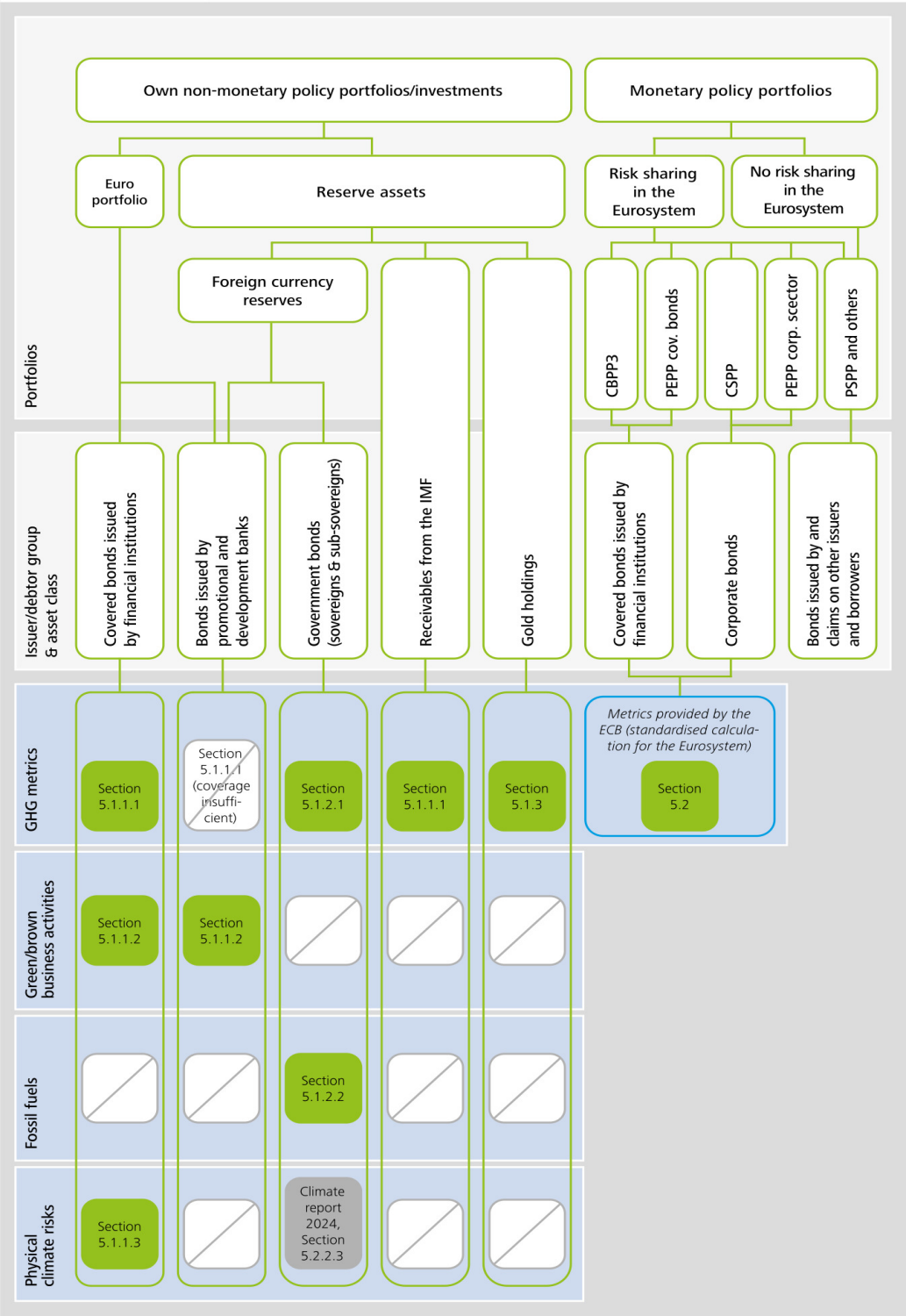
5 Metrics

In today's financial world, giving consideration to climate and sustainability-related information is increasingly becoming a strategic necessity and often a prudential requirement (see Section 1.1). Like all the other Eurosystem central banks, the Bundesbank discloses relevant metrics to help improve transparency about climate-related risks and impacts in the financial sector. This type of reporting also allows the Bundesbank to continuously analyse relevant aspects of its financial investments. This helps it identify and manage risks at an early stage.

Figure 9 provides an overview of the portfolios, asset classes and metrics covered in this section. Reporting focuses on GHG metrics such as weighted average carbon intensity (**WACI**), **total carbon emissions** and the **carbon footprint**. Since 2023, the calculation methods have been based on a disclosure framework that the Eurosystem central banks have jointly agreed to apply. Revised and updated annually, this framework is aligned with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) and the Partnership for Carbon Accounting Financials (PCAF). The calculation methods are explained in detail in the Annex.

Overview of the metrics covered in this section
(portfolio reporting date: 31 December 2025)

Figure 9



Box sizes are not indicative of portfolio volumes.

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Since the previous reporting date, the euro portfolio has been expanded to include bonds issued by promotional and development banks (and by other institutions with a public mandate). Covered bonds were already included in the euro portfolio beforehand. This report examines the physical climate-related risks of these assets for the first time. Metrics on the Bundesbank's receivables from the IMF are another new component of this year's report. These cover the emissions for the IMF's physical operations.

5.1 Own non-monetary policy portfolios/investments

5.1.1 Investments in financial institutions (euro portfolio and reserve assets)

As at the reporting date of 31 December 2025, the **euro portfolio** was fully invested in bonds issued by banks. The **reserve assets** were partly invested in the same. The euro portfolio mostly consists of covered bonds: bank debt securities mainly backed by real estate mortgages. Bonds issued by promotional and development banks or by other institutions with a public mandate [1)] were added to the euro portfolio as a new asset class in the 2025 reporting year. Such bonds had already been part of the reserve assets.

The following metrics are based on securities issuers' GHG data. Therefore, the metrics are calculated on the basis of the climate and sustainability performance of the financial institutions that issued the securities held in the Bundesbank's portfolios. Under the new European Sustainability Reporting Standards (ESRS), [2)] European commercial banks, which account for the bulk of covered bond issuers in the euro portfolio, have significantly expanded their scope 3 disclosures. Thanks to the improved data situation, the Bundesbank is now able to report on scope 3 metrics for its covered bond holdings for the first time. [3)]

5.1.1.1 GHG metrics

The main GHG emissions from investments in banks are the emissions financed by those banks, which form part of the scope 3 emissions. That is also the case for the

1 This report mostly uses the name "promotional and development banks" to refer to these institutions. That name should be read as including certain institutions with a public mandate that are not promotional banks.

2 Sustainability disclosures conforming with the ESRS were first published in 2025. These standards aim to provide a more comprehensive and comparable pool of data.

3 Dedicated GHG data on the cover pools of the covered bonds are not available. They are, however, partly reflected in the GHG metrics under scope 3.

covered bond holdings in the **euro portfolio**. As at 31 December 2025, the **scope 3 WACI** was **3,297.6 tonnes** and the **scope 1 and 2 WACI** was **1.2 tonnes of CO_2e/€mn of gross income** (see Table 1). These results are provisionally based on the most recent GHG data for 2024. Those data were also used to retroactively update the scope 1 and 2 metrics as at the 31 December 2024 reporting date.

Table 1: GHG metrics for the covered bond holdings in the euro portfolio

		Portfolio as at:				
		31.12.2021	31.12.2022	31.12.2023	31.12.2024	31.12.2025
Portfolio holdings (by nominal value)		**€10.0bn**	**€8.9bn**	**€7.3bn**	**€5.2bn**	**€5.4bn**
WACI (tCO_2e/€mn of gross income)	**Scope 1 & 2**	**1.49** *(86.4 %)*	**0.89** *(92.3 %)*	**0.45** *(94.1 %)*	**1.17** *(83.8 %)*	**1.20** *(80.6 %)*
	Scope 3	-	-	-	**3,291.9** *(91.2 %)*	**3,297.6** *(86.7 %)*
Total carbon emissions (tCO_2e)	**Scope 1 & 2**	**1,445** *(80.0 %)*	**1,037** *(87.0 %)*	**646** *(80.2 %)*	**984** *(78.3 %)*	**672** *(80.6 %)*
	Scope 3	-	-	-	**3,336,976** *(91.2 %)*	**2,691,548** *(86.7 %)*
Carbon footprint (tCO_2e/€mn of investment)	**Scope 1 & 2**	**0.18** *(80.0 %)*	**0.13** *(87.0 %)*	**0.11** *(80.2 %)*	**0.24** *(78.3 %)*	**0.16** *(80.6 %)*
	Scope 3	-	-	-	**741.9** *(91.2 %)*	**632.5** *(86.7 %)*

Coverage (by portfolio volume) in italics and parentheses.
Sources: ISS ESG, Bundesbank data and calculations.

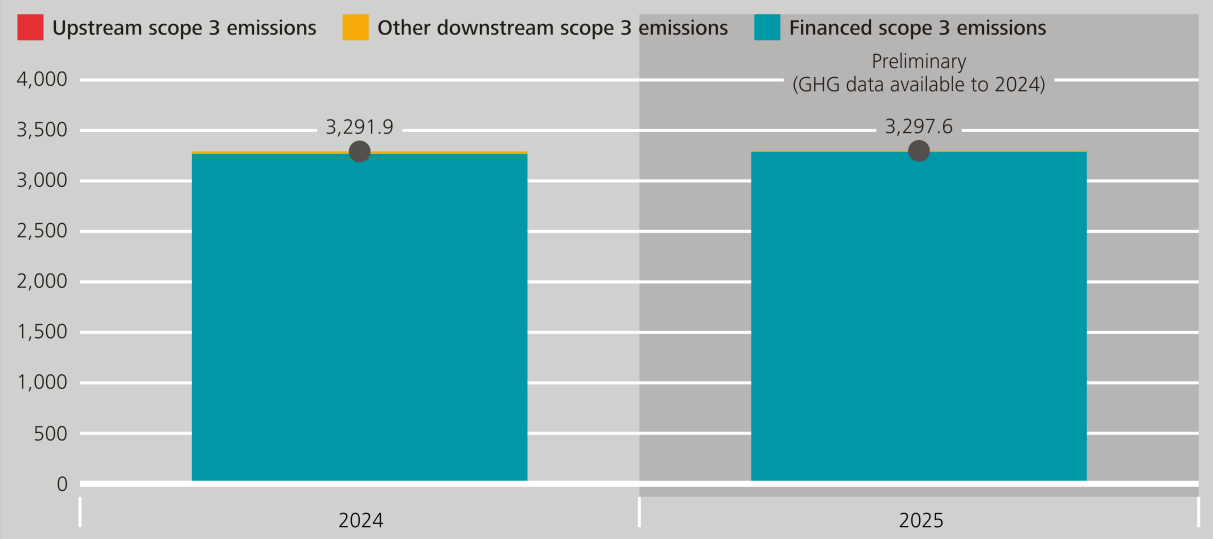
Figure 10 shows that the scope 3 emissions are almost entirely bank-financed emissions. These relate, for example, to the corporate or real estate loans granted by banks and thus to the emissions of those particular firms and properties. [4)] Banks' further downstream scope 3 emissions are usually comparatively small, as are their scope 1, scope 2 and upstream scope 3 emissions.

4 Data on bank-financed scope 3 emissions are still highly uncertain, however, and are probably still significantly understated. This is because banks' initial disclosures on financed emissions have, for the most part, only covered assets for which the methods used to account for GHG emissions are already fairly well established (such as loans to large firms). Gradually adding more asset classes to the scope of GHG coverage will lead to higher emissions disclosures. This means they are of limited value for comparisons over time. There is also the risk that the EU's decision to narrow the scope of mandatory sustainability reporting will worsen the GHG data situation again, particularly for banks' scope 3 emissions (above all their financed emissions).

Covered bonds (euro portfolio): scope 3 WACI

Figure 10

tCO_2e/€mn gross income



Sources: ISS ESG and Bundesbank data and calculations.
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The small increase in scope 1 and 2 metrics between 2023 and 2024 is also related to ESRS requirements for sustainability disclosures. This led some banks to adopt different GHG accounting standards. As a result, they have been reporting higher emissions since 2024 than they had in previous years. This explains why there have been some structural breaks in the available GHG data between 2023 and 2024.

Compared with European commercial banks, non-European promotional and development banks, in particular, disclose their operational and financed emissions only in isolated cases. This is why it has not yet been possible to calculate GHG metrics that cover a sizeable percentage of the bonds issued by promotional and development banks for either the **euro portfolio** or the **reserve assets**. For that reason, this report does not include metrics for those holdings.

The reserve assets also include the **Bundesbank's receivables from the IMF**. These exist because of the Federal Republic of Germany's membership of the IMF and the associated provision of currencies, special drawing rights and gold based on a Federal act.[5)] The IMF can choose to access the resources provided by all its member countries when providing financial assistance to member countries under economic policy adjustment programmes. It finances its own activities out of charges and interest receipts as well as income from its own financial assets. The amount of the Bundesbank's receivables from the IMF is not therefore subject to the Bundesbank's investment decisions.

Like some of the financial institutions examined above, the IMF partially discloses its emissions. Based on those disclosures, it is possible to calculate the IMF's GHG intensity and, from that, assign a hypothetical WACI to the receivables from the IMF (see Table 2). The data cover the scope 3 emissions for the IMF's physical operations, but not the ones it finances. The latter probably depend significantly on the emissions of the IMF's member countries and thus on international progress towards decarbonisation.

Table 2: WACI of receivables from the IMF based on emissions from the IMF's physical operations

		31.12.2025
WACI (tCO_2e/€mn of operational income)	**Scope 1 & 2**	**1.08**
	Scope 3 (from physical operations only)	**3.92**

Calculations based on data disclosed by the IMF in the IMF Annual Report 2025 on its emissions from physical operations in calendar year 2024 and its operational income in the financial year from May 2024 to April 2025.
Sources: IMF and Bundesbank calculations.

5.1.1.2 Green and brown shares of business activities

How much of a portfolio is **"green" or "brown"** depends on what percentage of the revenues generated by the firms financed by that portfolio come from green or brown business activities. This is based on a classification system created by the data provider ISS ESG, which classes business activities as **beneficial ("green")** or **harmful ("brown")**

5 See International Monetary Fund (IMF)

to the environment in alignment with the UN Sustainable Development Goals (SDGs).[6] If the firms in question are banks, shares of business volume (including lending and investment) are counted, rather than shares of revenues. Based on these shares, a weighted average is calculated for the portfolio along similar lines to the WACI methodology.[7]

The **covered bond holdings in the euro portfolio** had a **green share** of 1.4 % as at the end-2025 reporting date (see Figure 11). That share largely concerns bank loans that are used to finance renewable energies, energy efficiency measures and real estate certified as sustainable and/or energy-efficient. Year on year, the green share has declined by 0.4 percentage point. This is mainly because the metrics calculation now assigns some of the covered bonds to a different issuer, after one bank with a particularly high green share was acquired by a bank whose green share was lower. The **brown share**, meanwhile, is largely unchanged on the year, at 0.5 %. This category mainly includes loans for the purchase of internal combustion engine vehicles, one bank's involvement in financing an airport, and loans that a small number of northern European banks granted to the shipping industry.

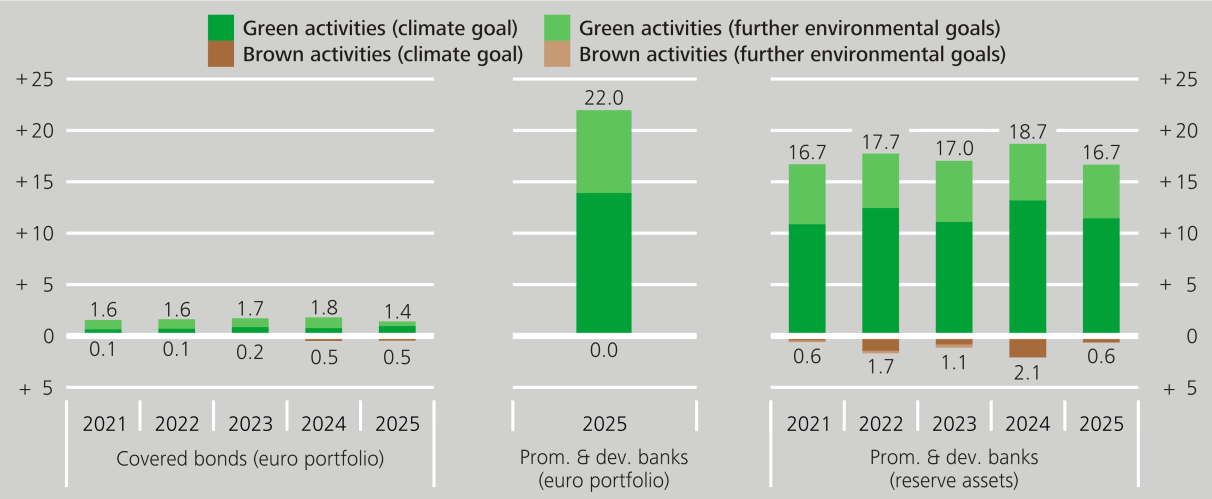
6 For most banks, the vast majority of loans are classified by ISS ESG as not being beneficial or harmful.

7 To avoid multiple counting, the Bundesbank counts business activities that ISS ESG assigns to multiple environmental goals only once for the green or brown share.

Bonds issued by financial institutions: green and brown shares of business activities

Figure 11

Green/brown shares of business activities in %



Sources: ISS ESG and Bundesbank data and calculations.
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Euro-denominated **bonds issued by promotional and development banks** were first incorporated into the **euro portfolio** in 2025, thus improving the portfolio's sustainability performance. The green share of these banks' business activities is at a high level, at 22.0 %. It even exceeds the already high green share of foreign currency-denominated bonds issued by promotional and development banks in the **reserve assets**. That **green share** is down somewhat on the year. This is mainly because the reserve assets were expanded to include bonds issued by promotional banks that have less of an environmental focus than the promotional and development bank-issued bonds already contained in the portfolio.

In both portfolios, the green shares that count towards the SDGs' climate goals come from loans granted by the promotional and development banks to finance, amongst other things, renewable energies, energy efficiency measures and public transport infrastructure. Green shares that primarily count towards further environmental goals are mainly due to the financing of water treatment facilities. In addition, smaller shares of financing activities are assigned primarily to nature and biodiversity-related environmental goals, such as projects to protect land and water-based ecosystems.

In the reserve assets, the **brown share** fell from 2.1 % to 0.6 %. In part, this was because promotional and development banks reduced the volume of financing for the fossil energy sector. As regards the promotional and development banks in the euro portfolio, no brown business activities were observed to any discernible extent.

5.1.1.3 Physical risks of covered bonds (euro portfolio)

By virtue of its covered bond holdings, the Bundesbank holds claims for repayment. These claims are exercised primarily against the banks that issued the covered bonds and, secondly, against the cover pools that serve as collateral for the covered bonds. The cover pools mainly comprise residential real estate mortgages. The probability of borrowers defaulting on those mortgages depends, in part, on physical climate-related risks at the locations of the real estate.

Address data for those properties were not available for the following assessment. However, European covered bond issuers, in particular, use Harmonised Transparency Templates (HTTs) provided by the European Covered Bond Council to voluntarily disclose regional breakdowns of cover pools by country and by region. These allow for an approximate geographical assessment of the physical risks of the cover pools. As at 31 December 2025, the relevant data are available for around 79 % (by nominal volume) of the **covered bond holdings in the euro portfolio**.

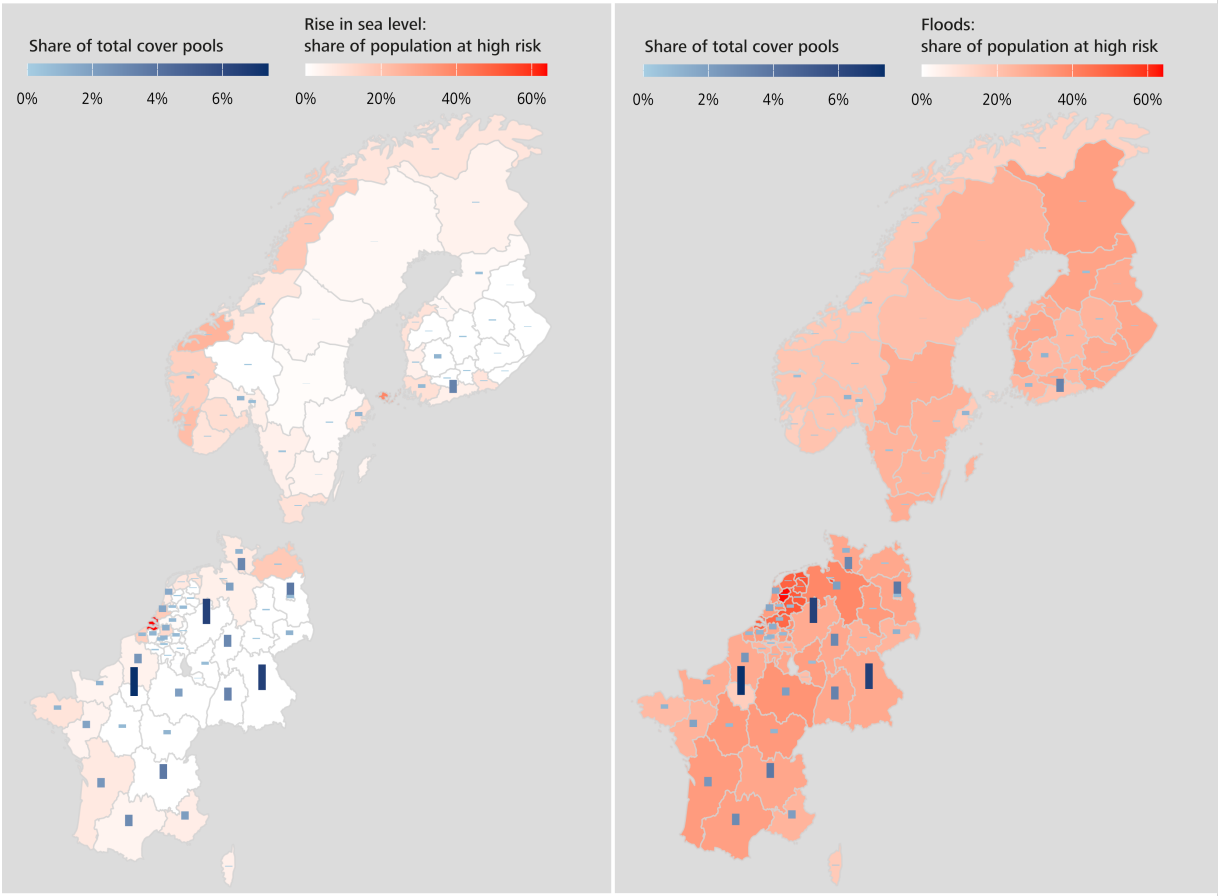
As part of this assessment, data on the distribution by region were linked to sub-sovereign data from Moody's on physical climate-related risks. The data by Moody's show, by region, what shares of the population are living in locations that are highly exposed to physical risks. The assessment conducted assumes, as an approximation, that these residential locations are representative of the addresses of the real estate mortgages contained in the cover pools. This exercise thus gives an indication of whether the cover pools are focused on regions where an especially large number of properties are exposed to physical risks such as a rise in the sea level, floods or wildfires. [8)]

8 The available data do not, however, contain any information on existing and future local climate change adaptation measures such as flood defences. Thus, no inference about how resilient the cover pools are to physical risks can be made.

As at 31 December 2025, the covered bonds in the euro portfolio originated from the following jurisdictions: Australia,[9] Belgium, Finland, France, Germany, the Netherlands, Norway and Sweden (see Figure 12). The bulk of the securities are Pfandbriefe issued in Germany. The cover pools of these instruments are mainly real estate mortgages in Germany. Viewed as a whole, the cover pools of the covered bond holdings are concentrated on richly populated regions such as North Rhine-Westphalia, Bavaria, the Paris region (Île-de-France) and the Helsinki region.

Distribution of cover pools by regions potentially at risk from a rise in the sea level (left-hand panel) and floods (right-hand panel)

Figure 12



Sources: Moody's and Bundesbank data and caculations.

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9 For reasons of scale, only the jurisdictions in continental Europe are shown on the following maps. Covered bonds from Australia make up a very small share of the covered bond holdings in the euro portfolio.

The assessment indicates that regions particularly at risk from a **rise in the sea level** make up only a fairly small share of the cover pools, when compared with inland regions (see Figure 12, left-hand panel). By contrast, **flood risks** are moderately to widely prevalent across all the regions relevant to the cover pools (see Figure 12, right-hand side). These affect particularly large shares of the population in water-adjacent regions such as Flevoland (Netherlands), Bremen and Hamburg. Moody's sees a high risk of **forest and wildfires** in the overseas territories of France [10)] and in parts of southern France. Overall, these risks are far less prevalent in the relevant regions for the cover pools than in some parts of southern Europe, for example. Concerning risks arising from **hurricanes**, Moody's reports that, among the cover pool regions, only French overseas territories are high risk areas. These make up a small share of the cover pool.

5.1.1.4 Other sustainability matters

The euro portfolio and the reserve assets contain fairly low to moderate shares of green bonds and comparable types of debt instruments, though the sustainable investment policies for those portfolios do not include any targeted purchases. The following shares of asset volumes are shown as intervals (Table 3). These account for whether green bonds or comparable types of debt instruments labelled as such by their issuers (end of interval) have also been verified in a second-party opinion as being compliant with ICMA standards (start of interval). [11)]

10 For simplicity, overseas territories are not shown on the maps used in this section.

11 Bonds are classified as non-verified if the Bundesbank has no information on their verification.

Table 3: Shares of green, social, sustainability and sustainability-linked bonds in the holdings of bonds issued by financial institutions (by nominal value)

	Green	Social	Sustainability	Sustainability-linked
Covered bonds (euro portfolio)	**6.7 %-7.0 %**	**0.0 %**	**0.0 %**	**0.0 %**
Bonds issued by promotional and development banks (euro portfolio)	**0.0 %**	**0.0 %**	**0.0 %-5.0 %**	**0.0 %**
Bonds issued by promotional and development banks (reserve assets)	**3.0 %-3.3 %**	**0.0 %-3.0 %**	**1.5 %-22.8 %**	**0.0 %**

Sources: Eurosystem Centralised Securities Database and Bundesbank data and calculations.

5.1.2 Investments in sovereigns (reserve assets)

The **investments in sovereigns** included in the **reserve assets** are based on the sovereigns of the reserve currencies held by the Bundesbank. They mainly consist of bonds issued by central governments, mostly the United States. In addition, they include deposits with the central banks of those sovereigns [12)] and bonds of sub-sovereigns (regions of a country, such as federal states).

5.1.2.1 GHG metrics

GHG data for sovereigns have particularly long lead times. Concerning **investments in sovereigns**, the most recent available data when this report was prepared extend to 2024. The preliminary GHG metrics for 2025 are therefore based on GHG data from previous years. GHG metrics are calculated both with and without the land use, land-use change, and forestry sector (LULUCF). As at 31 December 2025, the **WACI** (GHG intensity) of investments in sovereigns was in steady decline, standing at 212 tonnes of

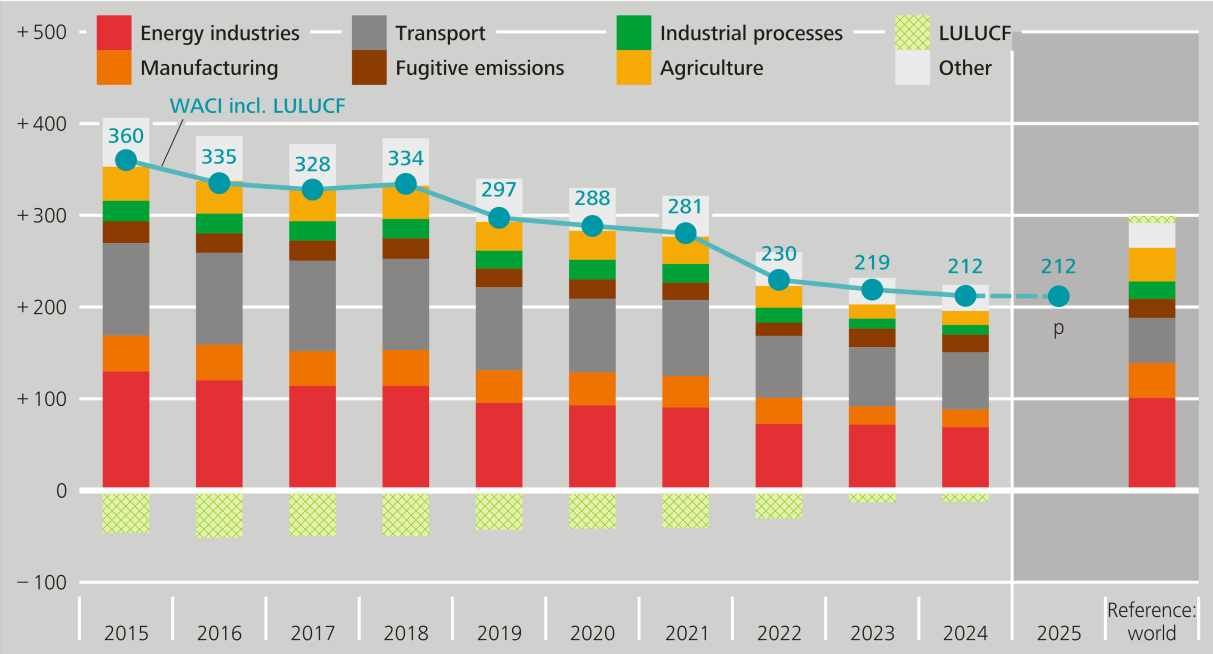
12 To calculate GHG and climate metrics, deposits with central banks are treated in the same way as, and added to, sovereign bonds. As a result, data on sovereigns are applied to both.

CO_2e/€mn of PPP-adjusted GDP (see Figure 13).

Sovereigns (reserve assets): WACI breakdown by sector

Figure 13

tCO_2e/€mn PPP-adjusted GDP



Sources: UNFCCC, Climate Watch, World Bank, Australian Government, Australian Bureau of Statistics and Bundesbank data and calculations. **p** Preliminary (sector data available to 2024).

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The calculations here are based on the net sovereign emissions, taking into account LULUCF. In the sovereigns whose bonds are held as reserve assets, LULUCF usually capture or prevent larger volumes of GHG than they emit, while the opposite is the case globally.

Other reasons for the lower WACI of the assets held compared with the global GHG intensity (based on data for 2023) are emissions from the energy sector, which mainly arise from the generation of electricity and heat, and agriculture. Relative to the size of the sovereigns' economies, these are smaller than the global average. By contrast, relative emissions from the transport sector are higher than the global average.

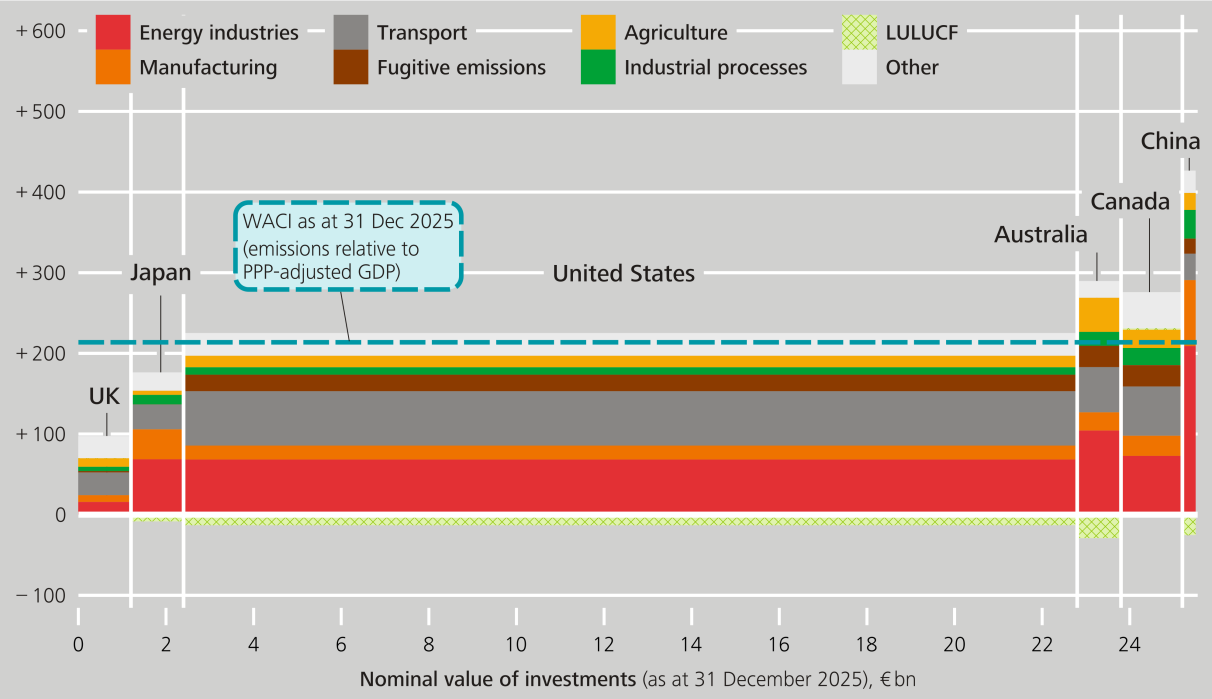
Viewed over time, the WACI of the sovereign bond holdings has been in almost steady decline since 2015, the year of the Paris Climate Agreement. Reductions have been particularly evident in the energy industries and transport sectors, even if these still generate the most emissions of all sectors. As signatories to the Paris Climate Agreement, Canada, Japan, Australia, China and the United Kingdom have pledged to achieve carbon neutrality in the long term. The United States' withdrawal from the Paris Climate Agreement entered into force in January 2026. This was followed, in February 2026, by the United States announcing its withdrawal from the entire United Nations Framework Convention on Climate Change (UNFCCC). As a result, the United States has stopped submitting information on its GHG emissions for publication by the UNFCCC. That means, as far as portfolio holdings of US sovereign bonds are concerned, that only emissions data estimated by third parties can be used for the period starting in 2023.

However, as Figure 14 indicates, **the current WACI** depends primarily on US sovereign bonds because these make up the majority of investments in sovereigns, with a nominal value of almost €20 billion (total nominal value: €25.4 billion).

Sovereigns (reserve assets): WACI breakdown by country and sector

Figure 14

GHG intensity (tCO_2e/€mn PPP-adjusted GDP) as at end-2025



Sources: UNFCCC, Climate Watch, World Bank, Australian Government, Australian Bureau of Statistics and Bundesbank data and calculations.

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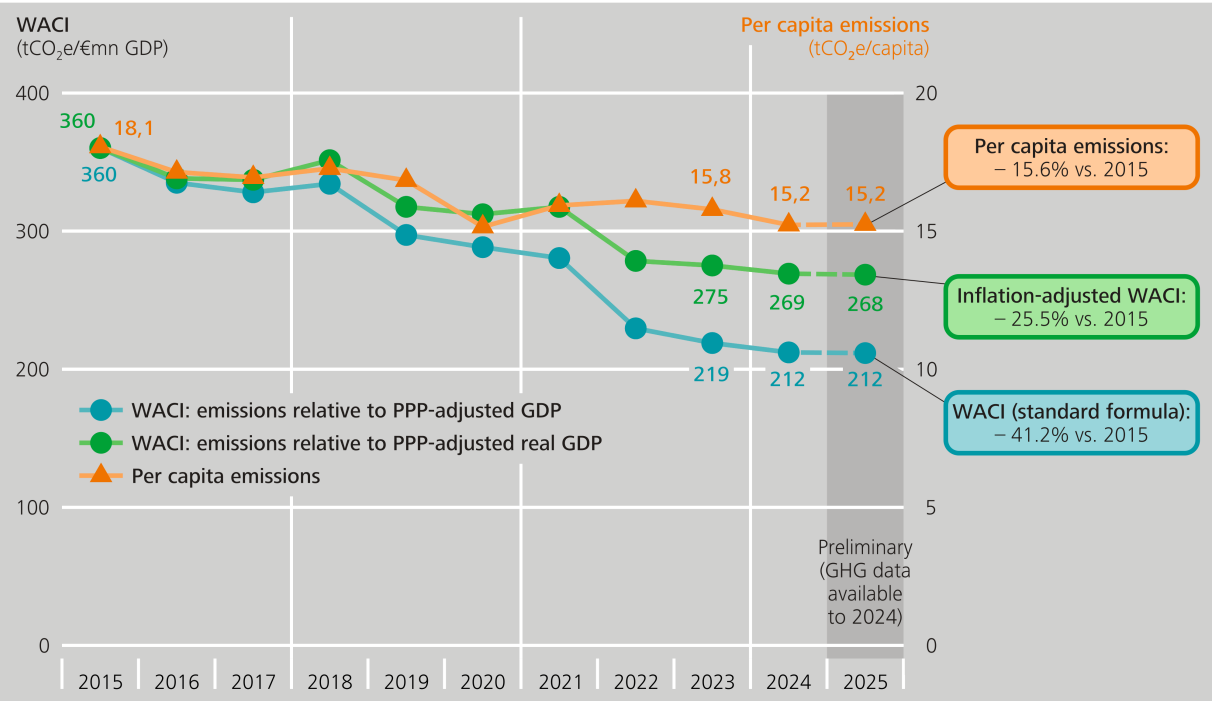
When interpreting the reduction in the WACI so far, it is important to bear in mind that the WACI – like other GHG metrics – may be biased downward by inflation. As a case in point, an inflation-driven increase in GDP would reduce the WACI even though the GHG emissions themselves remain unchanged. [13)]

13 The distortionary effects examined below also affect other asset classes. With regard to sovereigns, however, they can be identified relatively clearly based on macroeconomic data.

The method used so far to calculate the sovereign WACI uses GDP adjusted by PPP as a financial reference variable. PPP only reflects relative changes in purchasing power between sovereigns, however. Calculating the **WACI using real GDP adjusted by PPP** as well means that inflation in the sovereigns can be taken into account, too. Using 2015 as the base year, if GDP is adjusted for inflation for all subsequent years, the WACI reduction up to 2025 comes to just 26.0 % in real terms, rather than a nominal 40.7 % (see Figure 15). Much of the reduction could therefore be explained by inflation. From 2022 onwards, in particular, the sharp rise in inflation rates has led to a stronger divergence in the metrics.

Sovereigns (reserve assets):
WACI reduction since 2015 only partly due to lower emissions

Figure 15



Sources: UNFCCC, Climate Watch, World Bank, Australian Government, Australian Bureau of Statistics and Bundesbank data and calculations.

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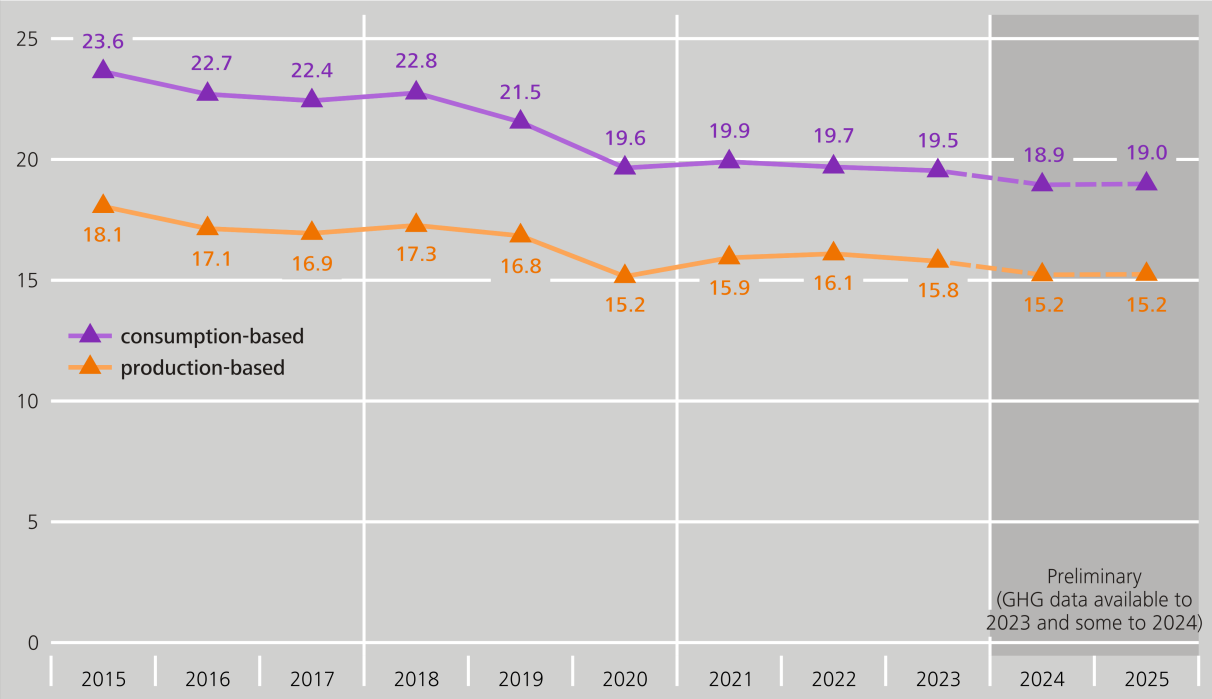
Per capita emissions allow GHG emissions to be viewed from another angle. If the size of the population, rather than GDP, is used as the reference variable, the WACI reduction is significantly smaller still (15.6 % between 2015 and 2025). Divergence increased, especially from 2021 onwards. Per capita emissions are broadly stable compared with the WACI. This indicates that the WACI reduction in recent years is due mainly to nominal economic growth, but also to real economic growth. Sovereigns' actual GHG emissions, by contrast, have fallen only marginally since 2021.

In addition to the GHG data examined so far, which were obtained using the production-based accounting approach, it is also possible to calculate GHG metrics using **GHG data based on the consumption-based approach**. Comparing per capita emissions based on production-based and consumption-based GHG data reveals that the latter are considerably higher (Figure 16). This is because, with the exception of China, the sovereign bonds included in the reserve assets were issued by advanced economies that import more GHG-intensive goods than they export.

Figure 16

Sovereigns (reserve assets): consumption-based per capita emissions higher than production-based ones

Per capita emissions (tCO_2e/capita)



Sources: MSCI, UNFCCC, Climate Watch, World Bank, Australian Government, Australian Bureau of Statistics and Bundesbank data and calculations.

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See Table 7 in the Annex for more GHG metrics on investments in sovereigns.

5.1.2.2 Production volumes of fossil fuels

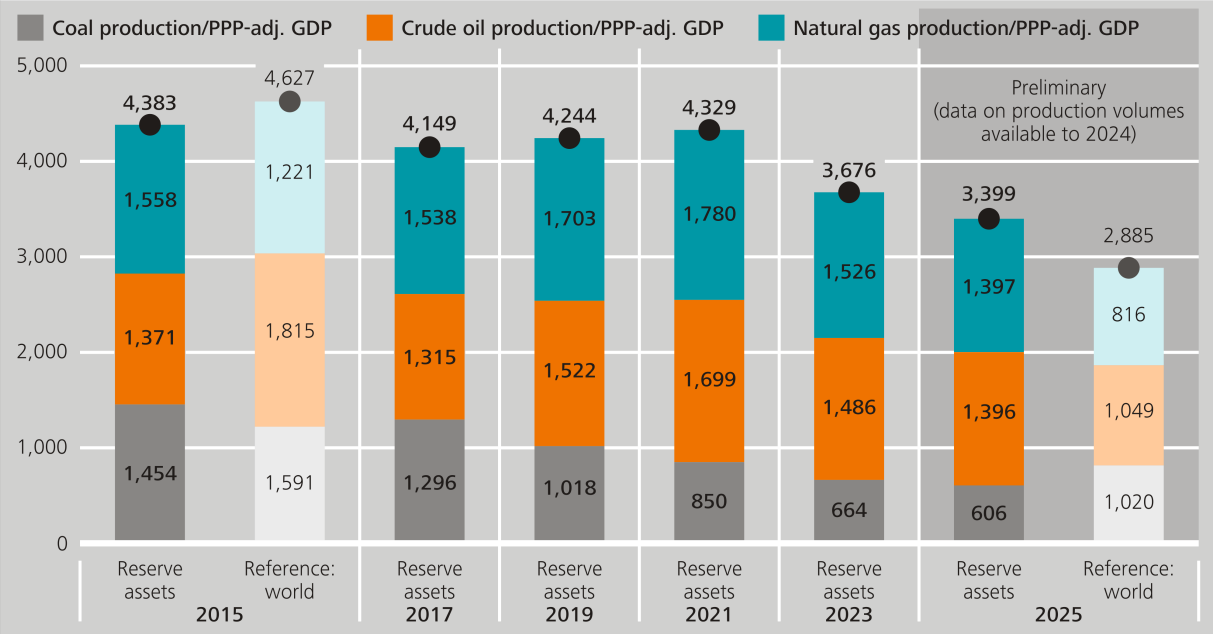
Analysing production volumes of fossil fuels provides additional insights into the climate performance of sovereign investments. For one thing, exports of fossil fuels by these sovereigns involve indirect emissions that are not included in the available GHG data. For another, the economic dependencies that coal, crude oil and natural gas-producing countries and regions might have on exports of those commodities can create financial risks. Those risks can arise if demand falls over the medium term because, for example, users transition away from coal-fired power generation and internal combustion engine vehicles, but also if geopolitical conflicts hinder exports.

Concerning the sovereign bond holdings, the **production volume of coal relative to the size of the economy** was significantly lower than the global average as at 31 December 2025 (see Figure 17). By contrast, both the **production volume of crude oil** and the **production volume of natural gas relative to the size of the economy** are higher than the global level.

Sovereigns (reserve assets): production volumes of fossil fuels (relative to size of the economy)

Figure 17

Terajoules/€bn PPP-adjusted GDP



Sources: IEA, World Bank, Australian Government, Australian Bureau of Statistics and Bundesbank data and calculations.
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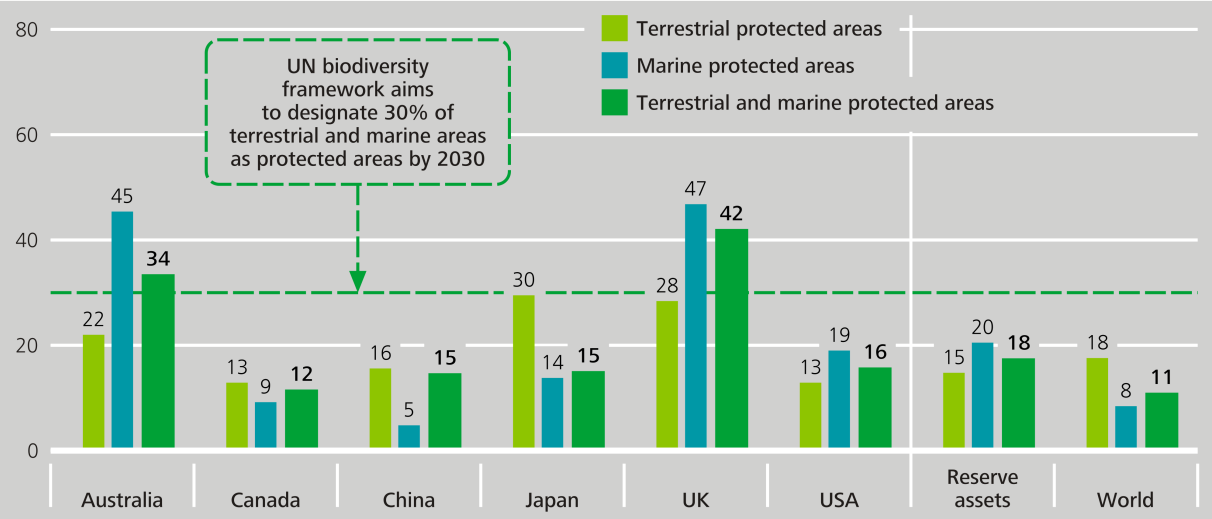
5.1.2.3 Nature-related aspects

Damage to natural areas leads to what is often an irreversible loss of biodiversity. At the same time, it weakens nature's ability to absorb carbon, which is a key prerequisite for meeting many climate targets globally and nationally (see Section 5.1.2.1 and LULUCF). For these reasons and others, protecting natural terrestrial and marine areas is a key objective of the **UN's Kunming-Montreal Global Biodiversity Framework**, which the global community adopted in 2022. One target of this framework is to designate at least 30 % of the world's terrestrial and marine areas as protected areas by 2030. Figure 18 shows that most of the sovereigns relevant to the reserve assets are still a very long way off meeting this target. The same finding applies to the global aggregate.

Sovereigns (reserve assets): terrestrial and marine protected areas* Figure 18

%



Sources: World Bank, Protected Planet Report 2024 and Bundesbank data and calculations. * The figures on protected marine areas are based on national marine areas for sovereigns and on national and international marine areas for the world.

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5.1.2.4 Other sustainability matters

The reserve assets contain fairly low to moderate shares of green bonds and comparable types of debt instruments, though the sustainable investment policies for those portfolios do not include any targeted purchases. The following shares of asset volumes are shown as intervals (Table 4). These account for whether green bonds or comparable types of debt instruments labelled as such by their issuers (end of interval) have also been verified by means of a second-party opinion as being compliant with ICMA standards (start of interval). [14)]

14 Bonds are classified as non-verified if the Bundesbank has no information on their verification.

Table 4: Shares of green, social, sustainability and sustainability-linked bonds in the holdings of bonds issued by sovereigns (by nominal value)

	Green	Social	Sustainability	Sustainability-linked
Sovereign bonds (reserve assets)	**0.5 %-3.7 %**	**0.0 %**	**0.0 %**	**0.0 %**

Sources: Eurosystem Centralised Securities Database and Bundesbank data and calculations.

5.1.3 Gold holdings

A hypothetical approach is applied to the GHG metrics shown below.[15)] This assumes an amount of gold that is equal to the Bundesbank's current gold holdings and that was obtained in line with the global mix of today's gold production. This exercise was based on study findings and financial market reports on the GHG performance of gold production from the present day or recent past. In order to reflect the range of findings made in the literature on the GHG profile of gold production, the following metrics are shown in intervals.

As at the reporting date of 31 December 2025, the Bundesbank's gold holdings amounted to 3,350 tonnes. For this amount of gold, the **absolute GHG footprint** computed according to the hypothetical approach would be between 52.7 and 90.7mn tCO_2e. Expressed relative to the market value of the gold holdings as at 31 December 2025 (€395.2bn), this would equate to a **carbon footprint** of between 133 and 230 tCO_2e/€mn of investment. Distributed across the average holding period of the Bundesbank's gold (currently around 64 years), the annual carbon footprint would amount to around 3 to 5 tCO_2e/€mn of investment.

Compared with the previous year, this "annualised" carbon footprint of gold holdings has declined significantly. In small part, this is due to the lengthening holding period. Mostly, though, it is because of the considerable increase in the price of gold: the carbon footprint thus attributes a higher degree of GHG efficiency to the gold holdings relative to their value as an asset.

15 See Deutsche Bundesbank (2024b). Section 5.2.3 describes the calculation factors and sources in greater detail and also conducts a general sustainability assessment of gold as an asset class.

5.2 Monetary policy financial assets

As regards the Eurosystem's monetary policy holdings of covered bonds and corporate bonds, the Bundesbank reports below on GHG metrics calculated centrally for the Eurosystem by the ECB (Table 5 and Table 6). These metrics are also being published in the climate-related financial disclosures of Eurosystem assets held for monetary policy purposes.

Income and risks arising from these holdings are shared among Eurosystem national central banks according to their shares in the ECB's capital key. Accordingly, the Eurosystem has agreed to allocate the total carbon emissions by Eurosystem national central banks based on their respective capital keys. Relative GHG metrics, such as WACI and the carbon footprint, are independent of portfolio size, and are therefore identical for all Eurosystem central banks.

Table 5: Covered bonds in monetary policy CBPP3 and PEPP portfolios as at 31 December 2025

Eurosystem holdings (by nominal value, €bn)		**215.4**
Bundesbank capital key		**26.63 %**
WACI (tCO_2e/€mn of gross income)	**Scope 1 & 2**	**1.3**
	Scope 3	**2,567**
Total carbon emissions of Bundesbank share (tCO_2e)	**Scope 1 & 2**	**15,496**
	Scope 3	**28.0 mn**
Carbon footprint (tCO_2e/€mn of investment)	**Scope 1 & 2**	**0.32**
	Scope 3	**575.6**

NB: The ECB notes in its climate-related disclosures that the year-on-year increase in GHG metrics is largely due to a single outlier that is likely to be revised in the ECB's climate-related disclosures next year.
Sources: ISS ESG and ECB data and calculations.

Table 6: Corporate bonds in monetary policy CSPP and PEPP portfolios as at 31 December 2025

Eurosystem holdings (by nominal value, €bn)		**287.9**
Bundesbank capital key		**26.63 %**
WACI (tCO_2e/€mn of gross income)	**Scope 1 & 2**	**160.6**
	Scope 3	**1,179**
Total carbon emissions of Bundesbank share (tCO_2e)	**Scope 1 & 2**	**7.0 mn**
	Scope 3	**62.1 mn**
Carbon footprint (tCO_2e/€mn of investment)	**Scope 1 & 2**	**94.0**
	Scope 3	**830.1**

Sources: ISS ESG and ECB data and calculations.

6 Targets and outlook

Climate change, and nature and biodiversity loss have an impact on economic variables such as growth, price stability and fiscal space. Bundesbank analyses show that these developments pose new challenges for the financial system (see Focus chapter). The Bundesbank will therefore continue to integrate climate, nature and biodiversity-related aspects into its analyses. Moreover, it will further refine its own sustainability strategy and derive objectives from this for the individual core services and functions. In addition, it will build out its training and outreach activities regarding climate and nature-related risks. The Bundesbank continues to advocate for a sustainable economic and financial system on national and international committees like the SFC and the NGFS.

All Eurosystem members strive to ensure that the non-monetary policy portfolios under their management are on a path that supports the goals of the Paris Agreement and the EU's climate neutrality objectives as set out in the European Climate Law. This consists in setting at least one broadly defined long-term target covering all NMPPs under management control of the central bank, that is aligned with the goals of the Paris Agreement and the EU's climate neutrality objectives.

Within the scope of its statutory mandate, the Bundesbank strives to incorporate climate and sustainability-related aspects into its own investment decisions as part of the efforts towards achieving the goals of the Paris Climate Agreement as well as the climate neutrality goals of the Federal Republic of Germany and the EU. Such aims must consistently align with the essential objectives of the Bundesbank's financial investments, which may be associated with certain restrictions. For instance, it lies in the nature of foreign currency portfolios, as part of the reserve assets, that they are concentrated on specific currencies as well as secure and liquid forms of investment. Owing to its existing composition and design, the euro portfolio offers only limited scope for directly managing or reducing the associated emissions. However, a possible realignment of the investment strategy [1)] could – subject to the primary objective of the portfolios – create opportunities for greater quantitative consideration of climate and sustainability objectives.

1 See Section 3.1 for information on the current design of the sustainable investment strategy.

The Bundesbank considers market transparency through climate-related and nature-related disclosures to be essential for analysing and managing the relevant risks to both the financial system as a whole and its own balance sheet. Over the short to medium term, the Bundesbank advocates for improvements in the availability and quality of sustainability data, particularly data on the scope 3 emissions of financial institutions and nature-related data. By taking the lead in various climate and other sustainability data procurement projects for the ESCB, the Bundesbank makes a vital contribution towards ensuring that ESCB members have access to sustainability data that meet the highest quality standards and are as comprehensive and granular as possible. This is another reason why the Bundesbank closely monitors developments in the quality and availability of data. As part of its committee work, the Bundesbank advocates to ensure consistency of disclosure requirements and focus on decision-relevant data.

Against this backdrop, the Bundesbank strives to refine its analytical activities as well as the sustainable investment strategies for the euro portfolio and the foreign currency portion of the reserve assets. In this context, the Bundesbank's annual climate-related disclosures play an important role in monitoring and documenting its progress.

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Annex

I. GHG and climate metrics: background information and methods

“Carbon” as a synonym for GHG

In this report, “carbon” is used as a synonym for GHG emissions, in line with widespread use in the area of GHG metrics. However, the term “carbon” is inaccurate, as the GHG metrics do not cover carbon dioxide (CO_2) alone but also other GHG within the meaning of the Kyoto Protocol, such as methane (CH_4) and nitrous oxide (N_2O).

GHG	**Share of global emissions** (expressed as CO_2e) [1)]	**Examples of key sources**
Carbon dioxide (CO_2)	72.3 %	• Burning of fossil fuels • Manufacture of cement
Methane (CH_4)	19.4 %	• Agriculture: cattle farming • Natural gas: leaks during extraction, transport
Nitrous oxide (N_2O)	5.6 %	• Agriculture: use of fertilisers
Other	2.8 %	

CO_2e as a unit for GHG

The various GHGs are measured by their GHG or warming effects in CO_2e or tCO_2e.

1 World Resources Institute (WRI) data on global GHG emissions in 2023.

Quantities of GHG emissions worldwide and in Germany

Annual global GHG emissions are around 51 billion tCO_2e.[2] In Germany, they amount to around 741 million tCO_2e. This means that average per capita emissions in Germany are just under 9 tCO_2e.

2 World Resources Institute (WRI) data on global GHG emissions in 2023.

II. GHG and climate metrics on the euro portfolio and bonds issued by promotional and development banks

Source of GHG data

To calculate GHG metrics for Bundesbank investments in banks, GHG data derived from the banks' disclosures (e.g. sustainability reports) are used. The Bundesbank obtains relevant data from the ESG data provider ISS ESG. When calculating GHG metrics, the Bundesbank does not use data on GHG emissions modelled or estimated by data providers.[3)]

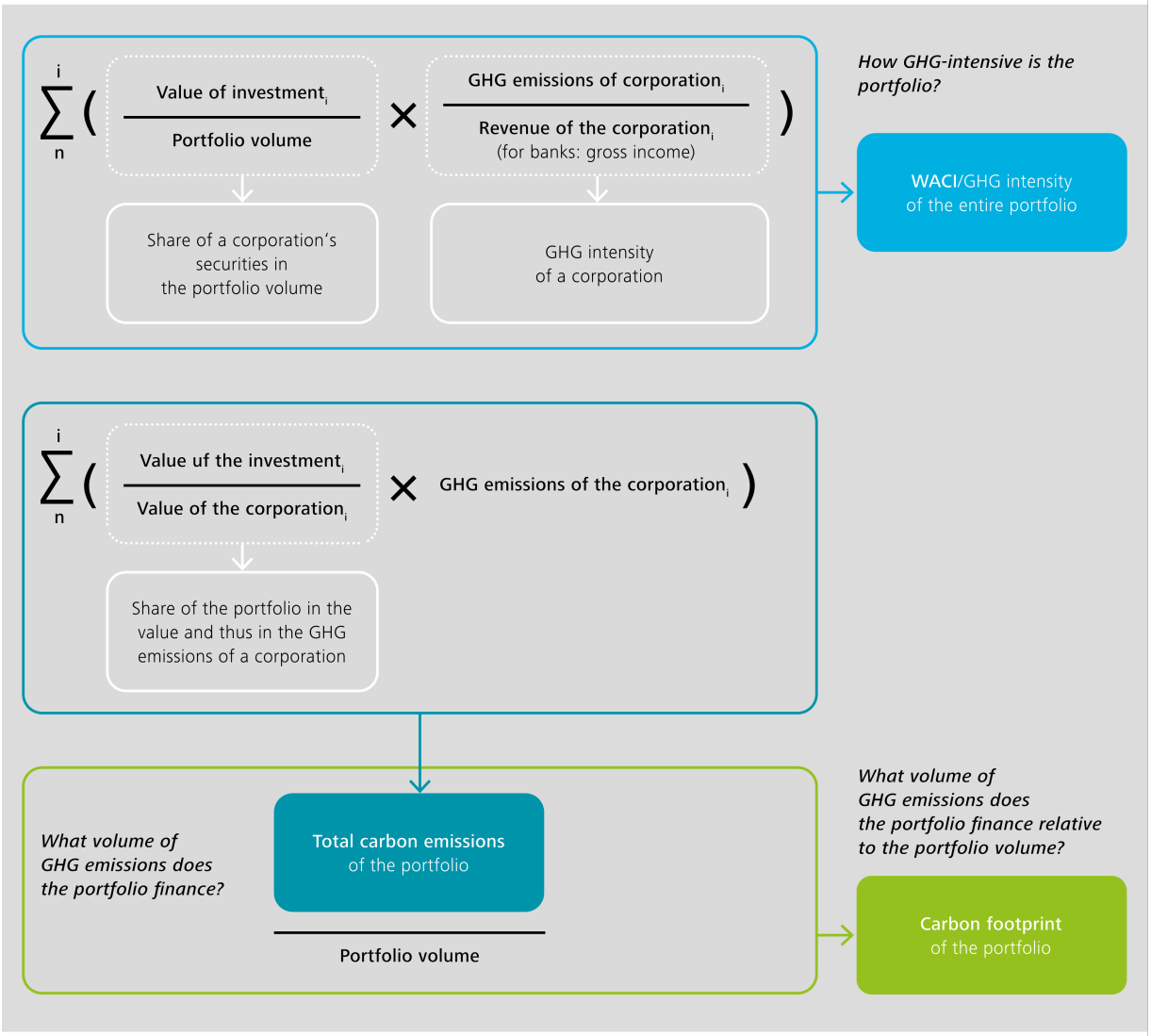
Lead times for GHG data and retroactive updates of GHG metrics from previous portfolio reference dates

In principle, the aim is to ensure that portfolio holdings and GHG data refer to the same year, data availability permitting. However, for the reporting dates of both 31 December 2024 and 31 December 2025, the GHG metrics are based on data on banks' GHG emissions in 2024. These were the latest available GHG data when this report was prepared, which is why they were also used for the portfolio reference date of 31 December 2024. For next year's climate-related disclosures, the plan is to retroactively adjust these calculations using GHG data for 2025. Following the same principle, the calculations as at 31 December 2024 reported in this document have been adjusted to reflect the GHG data for 2024 (with last year's disclosures based on the 2023 data).

3 This results in lower data coverage than would be the case if data providers' modelled GHG data were included. However, depending on the methodology used by the data providers, such data may deviate further from each other and from actual GHG emissions, especially for banks. Data uncertainty is significantly greater here than, say, for modelled GHG data on sovereigns for which macroeconomic data can be used as a modelling basis.

Scope 1, 2 and 3 GHG emissions			
Category		**Comprises**	**Examples of sectors with comparatively high emissions**
Scope 1		Direct GHG emissions	• Electricity producers • Producers of cement, steel • Airlines
Scope 2		Indirect GHG emissions from the production of purchased energy (primarily electricity)	• Heavy industry • Chemical companies
Scope 3	**Upstream**	Indirect GHG emissions along the value chain (except scope 2)	• Retail • Food companies
	Downstream		• Oil and gas producers • Manufacturers of cars, aircraft • Banks

Formulas for GHG metrics



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III. GHG and climate metrics for sovereign investments

Sources and measurement approaches for GHG data

The GHG data on sovereigns used in this report are mostly obtained from the United Nations Framework Convention on Climate Change (UNFCCC) data interface, where the UNFCCC lists GHG data recorded by sovereigns and reported to the UNFCCC. In cases where no recent GHG data are available for a given sovereign in the UNFCCC data interface, GHG data from the World Resources Institute (WRI) modelled for this report are used. The data are obtained using the production-based, or territorial, measurement approach: sovereigns are assigned those GHG emissions that occur within their borders or in their jurisdiction.

Production-based/territorial GHG emissions are also used for sub-sovereigns or federation members/regions. The respective national authorities (e.g. statistical offices) serve as data sources.

In addition, this report also considers certain GHG data based on the consumption-based measurement approach. This approach draws on foreign trade data. Unlike in the production-based approach, sovereigns are not allocated GHG emissions from exported goods but are additionally allocated GHG emissions from imported goods. However, various consumption-based methods have sometimes led to large discrepancies so far, leading to comparatively high data uncertainty.

Lead times for GHG data and retroactive updates of GHG metrics from previous portfolio reference dates

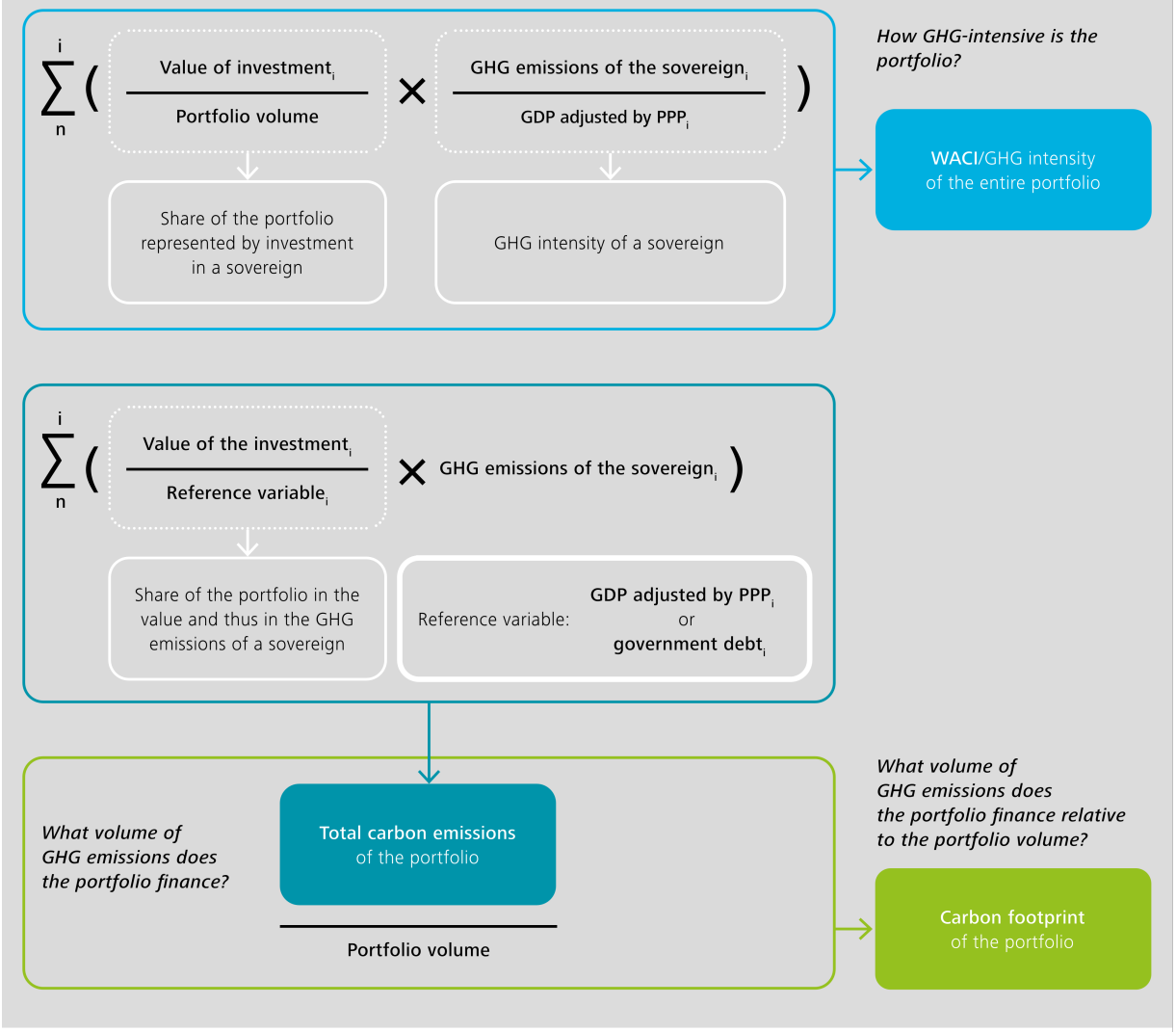
In principle, the aim is to ensure that portfolio holdings and GHG data relate to the same year provided that the relevant data are available. However, GHG data on sovereigns have longer lead times than GHG data on companies. At the time of reporting, the latest available GHG data refer to 2024. In most cases, then, the GHG data are merely a provisional basis for the GHG metrics as at the portfolio reference

date of 31 December 2025. To nonetheless provide a meaningful picture of developments in sovereigns' GHG profiles over time, longer periods are considered for the GHG metrics (WACI, total carbon emissions and carbon footprint) than for amounts not invested in sovereigns.

LULUCF as a GHG sector

Measurements of sovereign GHG emissions often differ in whether they include the land use, land use change, and forestry (LULUCF) sector. For example, LULUCF activities can be a major – and sometimes the largest – source of GHG in densely wooded regions given deforestation. By contrast, reforestation may lead to negative emissions, improving the GHG profile. LULUCF activities then constitute GHG sinks. LULUCF activities thus play an important role in many national and international climate objectives. However, given the complicated accounting of LULUCF factors, climate researchers still have reservations about the quality and comparability of such data. The GHG metrics in this report are shown both with and without LULUCF.

Formulas for GHG metrics



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Methodological caveats concerning the total carbon emissions and carbon footprint of sovereign investments

The methods for calculating the total carbon emissions and carbon footprint are not as well established for investments in sovereigns as they are for investments in companies. Adequately capturing which sovereign shares and thus which GHG

emissions are financed by investments in the portfolio are the main methodological challenges.

Early climate-related disclosures often took sovereign debt as the reference variable. Government bonds (held in a portfolio) do indeed form part of sovereign debt. However, sovereigns and their GHG emissions are not financed through sovereign debt alone. Under this approach, the financed emissions would therefore be overstated.

The PCAF recommends using GDP adjusted by PPP as the reference variable instead. Unlike sovereign debt, GDP adjusted by PPP is clearly related to a sovereign's GHG emissions. However, the relationship between government bonds (held in a portfolio) and GDP adjusted by PPP is unclear.

Both approaches therefore have substantial downsides. Despite these reservations, this report includes the total carbon emissions and carbon footprint based on both approaches to contribute to the discussion of methodological developments and identify differences in results.

Production volumes of fossil fuels: methodology for the indicators

Production volumes of coal, crude oil and natural gas are measured by energy content in terajoules (TJ),[4)] and are set in relation to the size of the economy (GDP adjusted by PPP), analogously to the WACI methodology. Weighted averages of the intensity of coal, crude oil and natural gas production volumes are calculated for sovereign investments on this basis.

4 In accordance with the International Energy Agency (IEA)'s standard for countries' energy balances.

Table 7: Supplementary GHG metrics on investments in sovereigns (reserve assets)

			Portfolio as at:			
			31.12.2019	31.12.2021	31.12.2023	31.12.2025
Portfolio holdings (by nominal value)			**€24.4 billion**	**€25.1 billion**	**€25.6 billion**	**€25.4 billion**
Total carbon emissions (mn tCO_2e)	**With GDP adjusted by PPP as reference variable**	**With LULUCF**	**7.27** *(100 %)*	**7.05** *(100 %)*	**5.61** *(100 %)*	**5.17*** *(100 %)*
		Excluding LULUCF	**8.31** *(100 %)*	**8.08** *(100 %)*	**6.35** *(100 %)*	**5.83*** *(100 %)*
Carbon footprint (tCO_2e/€mn of investment)		**With LULUCF**	**297.3** *(100 %)*	**280.5** *(100 %)*	**219.0** *(100 %)*	**203.0*** *(100 %)*
		Excluding LULUCF	**340.0** *(100 %)*	**321.3** *(100 %)*	**247.7** *(100 %)*	**229.0*** *(100 %)*
Total carbon emissions (mn tCO_2e)	**Methodology: Government debt as reference variable**	**With LULUCF**	**5.47** *(100 %)*	**5.19** *(100 %)*	**4.86** *(100 %)*	**4.28*** *(100 %)*
		Excluding LULUCF	**6.26** *(100 %)*	**5.92** *(100 %)*	**5.45** *(100 %)*	**4.79*** *(100 %)*
Carbon footprint (tCO_2e/€mn of investment)		**With LULUCF**	**223.6** *(100 %)*	**206.3** *(100 %)*	**189.6** *(100 %)*	**168.3*** *(100 %)*
		Excluding LULUCF	**255.9** *(100 %)*	**235.3** *(100 %)*	**212.5** *(100 %)*	**188.1*** *(100 %)*

** Preliminary metrics based on the latest available GHG data (mostly for 2024).*
Total carbon emissions and carbon footprint with coverage (according to portfolio volume) in italics and in brackets.
Sources: ISS ESG, Bundesbank data and calculations.