EUROPEAN CENTRAL BANK

EUROSYSTEM

# Climate-related financial disclosures of Eurosystem assets held for monetary policy purposes and of the ECB's foreign reserves

June 2025

# Contents

# Foreword

Europe is facing mounting challenges as global uncertainty and shifting geopolitics reshape the world. These challenges demand attention – but they must not distract us from another pressing and growing crisis: climate change and the degradation of nature. These environmental threats are accelerating rapidly, and their impacts are deeply intertwined. Scientists warn that we have already crossed six of the nine "planetary boundaries" that keep our planet stable.[1] Building strategic resilience and tackling climate change go hand in hand – and the future of Europe and the rest of the world crucially hinges on the success of our collective effort to reduce carbon emissions.

At the ECB, we take climate change into account when pursuing our mandate. To meet our primary objective of keeping prices stable, we need to understand how climate change, nature degradation and the green transition affect the economy, and to manage the accompanying risks. Beyond that, and without prejudice to our primary objective, we are also continuing to support the European Union's general economic policies, which include protecting the environment.

This report aims to provide a clear picture of the exposures to climate-related risks in the Eurosystem's monetary policy portfolios and in the ECB's foreign reserves. It covers over 99% of the assets we hold for monetary policy purposes, which currently amount to over €4 trillion. The data show that carbon emissions from these portfolios continued to decline in 2023, both in absolute and – for most asset classes – in relative terms. Our updated climate stress test of the Eurosystem balance sheet identified corporate bonds as the asset class most exposed to climate risk, underscoring the relevance of tilting our reinvestments in corporate bonds towards issuers with better climate performance.

Since mid-2023 the reinvestments in our purchase programmes have slowed down. This has steadily reduced the overall size of our portfolios and, in turn, helped to lower their total carbon emissions. At the same time, it has also limited our ability to shift reinvestments in our corporate bond portfolios towards companies that perform better in climate terms. Even so, the report shows that the tilting framework was responsible for around one-quarter of total emission reductions between 2021 and the end of 2024. We will continue to monitor the emissions of our corporate portfolios. If the trajectory of lowering emissions deviates from a path that supports the goals of the Paris Agreement, we will consider remedial action within the limits of our mandate.

Recognising the strong connection between nature loss and climate change, this year's report also introduces a new indicator to measure how exposed our corporate bond holdings are to sectors that materially depend on or have an impact on nature. Nature degradation not only poses direct risks to our economy but also intensifies

[1] These include, among others, climate change and biodiversity loss. See Richardson, K. et al., "Earth beyond six of nine planetary boundaries", *Science Advances*, Vol. 9, No 37, September 2023.

the impact of climate change. When natural assets that help regulate the climate – such as forests, wetlands and coastal areas – are damaged or destroyed, their ability to store carbon or to act as a buffer against floods, droughts and heatwaves is diminished, making extreme weather events even more severe. Our new indicator shows that the overall exposure of our corporate portfolios to the three sectors with the most material potential dependencies or impacts on nature amounts to 30%. This is an initial approximation which will help us better understand the nature and biodiversity risks in Eurosystem portfolios, and we shall continue to work on improving our understanding of the potential financial implications.

In today's uncertain world, we remain committed to supporting the green transition within the limits of our mandate. Let us move forward on this path together.

Frankfurt am Main, June 2025
Christine Lagarde
President

# 1 Introduction

This is the third report on the climate-related financial disclosures of Eurosystem assets held for monetary policy purposes and of the ECB's foreign reserves.[2]

The primary objective of the ESCB is to maintain price stability in the euro area, targeting an inflation rate of 2% over the medium term. Macroeconomic and financial market effects linked to climate change and transition policies can affect the outlook for price stability because of their impact on our economy. Climate change and transition policies also affect the value of the assets held on the Eurosystem's balance sheet, potentially leading to undesirable climate-related financial risks building up.

In addition, and without prejudice to the primary objective of price stability, the ESCB shall support the general economic policies in the European Union with the aim of contributing to the achievement of the Union's objectives as laid down in Article 3 of the Treaty on European Union.

The ECB's climate work focuses on three main objectives: (i) managing climate-related risks, (ii) supporting the green transition using measures within the limits of the ECB's mandate, and (iii) sharing experiences to foster wider action.[3] The Eurosystem's climate-related financial disclosures bring greater transparency regarding its exposure to climate risks and its carbon footprint, and contribute to the availability of climate-related data.

This report specifically contains climate-related financial disclosures of (i) the Eurosystem's public sector, corporate and covered bond holdings under the asset purchase programme (APP) and the pandemic emergency purchase programme (PEPP), and (ii) the ECB's foreign reserves (Figure 1). Altogether, it covers 99.8% of the financial assets held for monetary policy purposes under the APP and PEPP with an aggregate nominal value of €4,075 billion.[4]

The reporting on the APP and PEPP shows that the emissions of the corporate sector bond holdings, for which the Eurosystem targets a path that supports the goals of the Paris Agreement and the EU's climate neutrality objectives, continued to fall in 2023. This reduction was driven both by efforts at issuer level and by the Eurosystem's tilting of reinvestments initiated in October 2022 towards issuers with a better climate performance. With regard to the other portfolios (public sector and covered bonds), for which the Eurosystem has not set targets, euro area sovereign

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2 See the first and second report on climate-related financial disclosures for assets held for monetary policy purposes and of the ECB's foreign reserves. The first report dated March 2023 focused exclusively on the disclosures of the corporate sector holdings for monetary policy purposes. The ECB and the Eurosystem national central banks also published annual climate-related financial disclosures for their euro-denominated non-monetary policy portfolios in dedicated reports.

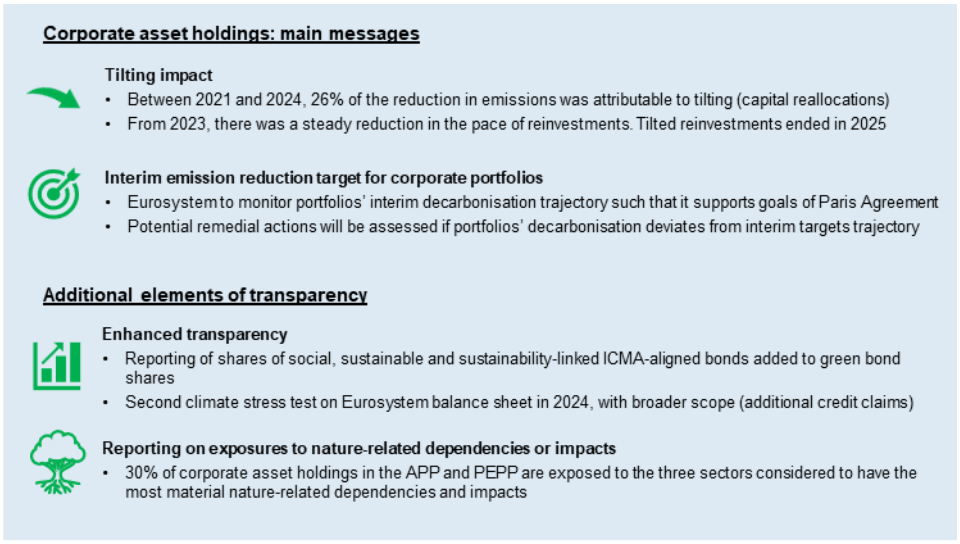
3 See "Climate change and the ECB" on the ECB's website.

4 The following are excluded from the scope of this report owing to insufficient climate data availability and a lack of methodological guidance: (i) holdings of asset-backed securities under the asset-backed securities purchase programme (ABSPP), and (ii) holdings of physical gold, special drawing rights, and cash and cash equivalents under the ECB's foreign reserves.

bond holdings continued to gradually reduce their relative or normalised emissions between 2021 and 2022, following efforts by euro area governments to decarbonise their economies in pursuit of the goals of the Paris Agreement and the European Climate Law. Relative and absolute scope 1 and 2 emissions also declined between 2022 and 2023 for covered bond holdings. The reporting on the ECB's foreign reserves, which represent a nominal amount of €40 billion equivalent in financial assets invested in the United States dollar, Japanese yen and Chinese yuan renminbi, shows that these sovereign bond holdings, as well as the holdings of agency and supranational issuers in the portfolios, are also on an emissions reduction path.

**Figure 1**

Summary of key developments and the expanded scope of the Eurosystem's climate-related financial reporting




**Main emission metrics:**

| | Eurosystem's monetary policy portfolios | | | | ECB's foreign reserves | |
|---|---|---|---|---|---|---|
| | Sovereign bonds | Corporate bonds | Supranational & agency bonds | Covered bonds | Sovereign bonds | Supranational & agency bonds |
| Change in WACI since 2021* | -22% [2022] | - 37% [2023] | - 68% [2023] | -58% [2023] | -19% [2022] | -84% [2023] |
| Green bond share [latest]: | 2.26% | 11.20% | 7.94% | 3.36% | 0.12% | 0.23% |

Source: ECB.
*For the latest full year of data (indicated in square brackets).

The disclosures follow the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures and its supplementary guidance for

asset owners.[5] Disclosures in the "Metrics and targets" category adhere on a best-effort basis to the Eurosystem's common disclosure principles, which were originally developed for non-monetary policy portfolios. For its disclosures in the "Metrics and targets" category, the Eurosystem also considers the recommendations of the Partnership for Carbon Accounting Financials (PCAF) and the Network of central banks and supervisors for Greening the Financial System (NGFS).

The Eurosystem continues to refine its disclosures, reflecting improvements in climate-related data availability and quality, disclosure methodologies and practices, and available expertise on the handling of risks related to climate change and nature degradation, as well as on wider aspects of sustainability. This report is the first to provide information about the exposure of the corporate portfolios under the APP and PEPP to sectors that are considered to have material nature-related dependencies or impacts. This is a core disclosure metric recommended for financial institutions and asset owners by the Taskforce on Nature-related Financial Disclosures.[6] The report also includes a new indicator showing aggregate holdings of sustainability, sustainability-linked and social bonds aligned with the relevant but voluntary International Capital Market Association (ICMA) principles for all asset categories. The indicator complements already reported information on green bond holdings.

The Eurosystem closely monitors developments regarding the European Union's Corporate Sustainability Reporting Directive[7] and considers it to be the natural reference point for sustainability reporting within the EU. The climate-related financial disclosures are not verified by an external party.

The report is structured as follows. Section 2 summarises the governance and decision-making responsibilities for the APP, the PEPP and the ECB's foreign reserves. Section 3 outlines the Eurosystem's strategy for integrating climate change considerations into the portfolios. Section 4 explains how climate considerations are integrated into the management of the risks related to the portfolios. Section 5 presents the climate-related metrics and targets.

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5 See "Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures", Task Force on Climate-related Financial Disclosures, October 2021 and "Guide on climate-related disclosure for banks", Network for Greening the Financial System, December 2021. The Task Force on Climate-related Financial Disclosures was disbanded in October 2023 and its recommendations are fully incorporated into the standards of the International Sustainability Standards Board, an independent standard-setting body within the International Financial Reporting Standards Foundation.

6 This is consistent with the expansion of the ECB work into the area of nature loss and degradation; see "Climate and nature plan 2024-2025 at a glance" on the ECB's website.

7 Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (OJ L 322, 16.12.2022, p. 15-80).

# 2 Governance

This section summarises the governance aspects of the climate change considerations concerning Eurosystem assets held for monetary policy purposes and of the ECB's foreign reserves. It recalls the main aspects of the more detailed explanations set out in the June 2024 report.[8] The ECB's Governing Council sets the monetary policy for the euro area. It consists of the six members of the ECB's Executive Board and 20 national central bank (NCB) governors, one from each euro area country.

Monetary policy is implemented through various instruments, including the outright purchases of financial assets. The assets bought under the APP and PEPP are part of the Eurosystem's monetary policy portfolios. Following the ECB's monetary policy strategy review of 2020-21, the Governing Council adopted an action plan to incorporate climate change considerations into the Eurosystem's monetary policy framework.

The ECB addresses climate-related risks and opportunities within its existing governance structures.[9] The climate risk management of the ECB's foreign reserves (which are managed in a decentralised manner within the Eurosystem) is integrated into these governance structures. The ECB's Executive Board is exclusively competent for preparing the meetings of the Governing Council. This includes preparations for discussing the oversight of climate-related risks for monetary policy-related holdings and the ECB's foreign reserves and related decisions, with input from the relevant committees.[10] The ECB's Annual Report provides an overview of the ECB's climate strategy and its implementation.

When developing policy proposals to put forward to the Governing Council, ECB and NCB staff responsible for portfolio and risk management convene in dedicated working groups and taskforces focused on integrating climate considerations into the Eurosystem's asset purchases, along with staff and/or committees responsible for monetary policy and legal assessments as appropriate. Additionally, ECB and NCB staff collaborate with external stakeholders such as standard-setting bodies, international organisations and academic institutions to exchange knowledge, share best practices and develop common frameworks for assessing and disclosing climate-related impacts on the portfolios and for addressing climate risks. One example of such collaboration is the involvement of ECB and NCB staff in the work of the Network for Greening the Financial System.

ECB and NCB staff responsible for portfolio and risk management convene in dedicated working groups and taskforces to prepare policy proposals aimed at

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8 See the governance section of Climate-related financial disclosures of Eurosystem assets held for monetary policy purposes and of the ECB's foreign reserves, June 2024.

9 See the governance section of Climate-related financial disclosures of the Eurosystem's corporate sector holdings for monetary policy purposes, March 2023.

10 See Figure 2 in the governance section of Climate-related financial disclosures of Eurosystem assets held for monetary policy purposes and of the ECB's foreign reserves, June 2024.

integrating climate-related considerations into the management of the ECB's foreign reserves. These proposals are submitted to the Governing Council for their consideration and decision making.

# 3 Strategy

This section gives an overview of the purpose of the Eurosystem's monetary policy portfolios and the ECB's foreign reserves and summarises strategic aspects relating to climate change considerations. It first outlines general policy aspects that apply across the APP and PEPP, before focusing on corporate bond holdings, and finally on the ECB's foreign reserves.

The monitoring and analysis of climate risks is relevant for the monetary policy portfolios and the ECB's foreign reserve holdings because they are exposed to these risks.[11] The Eurosystem therefore needs to manage as effectively as possible the climate-related financial risks to which it is exposed when implementing monetary policy in pursuit of its primary objective of maintaining price stability.[12]

The Eurosystem currently sets transition targets only for its corporate bond holdings. This reflects its commitment to reducing these portfolios' exposure to climate-related transition risks and their environmental footprint, without prejudice to the ECB's monetary policy objectives. The Eurosystem does not define similar targets for its public sector and covered bond holdings under the APP and PEPP, or for the ECB's foreign reserves. Sovereign bond holdings are expected to decarbonise in line with action taken by national governments to fulfil their emissions reduction pledges under the Paris Agreement and as required by the European Climate Law. The ECB calls upon governments to deliver on these pledges. Supranational, agency and covered bond holdings will mirror the emissions reductions achieved by their respective issuers.

## 3.1 General strategic aspects relating to the APP and PEPP

The APP was among the policy measures initiated in mid-2014 to support the monetary policy transmission mechanism and provide the amount of policy accommodation needed to ensure price stability. The APP, combined with other monetary policy tools, helped the ECB meet its price stability objective at a time when room for further interest rate cuts had become limited.[13] It comprises the public sector purchase programme (PSPP), the corporate sector purchase programme (CSPP), the third covered bond purchase programme (CBPP3) and the asset-backed securities purchase programme (ABSPP).[14] The Governing Council decided to discontinue reinvestments under the APP as of July 2023. Since then, the stock of

11 See "Climate change and monetary policy in the euro area", *Occasional Paper Series*, No 271, ECB, September 2021.

12 The adoption by the Eurosystem of measures designed to circumscribe the risk of financial losses, including climate-related financial losses, forms part of the definition and implementation of monetary policy, as also reflected in the Statute of the European System of Central Banks and of the European Central Bank.

13 See "Taking stock of the Eurosystem's asset purchase programme after the end of net asset purchases" on the ECB's website.

14 Asset-backed securities are excluded from the scope of this report as not enough data are available.

APP holdings has been gradually declining at the rate of principal redemptions from maturing debt instruments.

The PEPP was initiated in March 2020 to counter the serious risks to the monetary policy transmission mechanism and the outlook for the euro area posed by the coronavirus (COVID-19) outbreak. It included all asset classes that are eligible under the APP. The Governing Council decided to discontinue net asset purchases under the PEPP as of the end of March 2022. Maturing principal payments from securities purchased under the PEPP were reinvested in full until the end of June 2024. The PEPP portfolio was reduced by €7.5 billion per month on average over the second half of 2024 and reinvestments were fully discontinued at the end of 2024.

The composition of APP and PEPP holdings is driven by monetary policy considerations and takes due account of legal requirements and risk management considerations. Regarding public sector assets, the stock of PSPP and PEPP holdings is gradually declining. This follows the end of APP reinvestments in July 2023, as well as the full discontinuation of PEPP reinvestments in December 2024 after a six-month partial run-off phase. Developments in holdings by jurisdiction and asset class have meanwhile been driven mostly by the timing of redemptions.[15] The reduction of emissions related to sovereign, supranational, agency and covered bonds mainly depends on issuers delivering on their individual emissions reduction pledges. The development of the portfolios' composition will now depend on the maturity profile of holdings, given the run-off of portfolios since the end of 2024.

## 3.2 Strategic aspects relating to corporate holdings

This section outlines how the strategic aspects of the tilting framework for corporate holdings evolved in 2024. This includes the switch to partial reinvestment and then the full run-off of the PEPP holdings in 2024.

To mitigate climate-related risks on its balance sheet, in July 2022 the Governing Council decided to gradually reduce the emissions of its corporate bond holdings on a path that supports the goals of the Paris Agreement and the EU's climate neutrality objectives by tilting the reinvestment of redemptions towards issuers with a better climate performance.[16] This measure was also aimed at providing incentives for issuers to be more transparent and reduce their greenhouse gas emissions.[17] The strength of the tilting was increased following the decision in March 2023 to reduce APP reinvestments.

The Eurosystem's tilting framework for corporate purchases, which guided the reinvestments until the end of 2024, relied on an internally calculated climate score. This score was developed to assess eligible corporate sector issuers' climate

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15 Public sector reinvestments under the PEPP took place until June 2024 and gradually declined by an average of €7.5 billion per month from July until the end of 2024.

16 See "ECB takes further steps to incorporate climate change into its monetary policy operations", *press release*, ECB, 4 July 2022.

17 Subsequently, greenhouse gases are referred to as "emissions" and denote the greenhouse gases defined in the Kyoto Protocol.

performance based on their past emissions, the level of ambition in their reduction targets and the quality of their climate-related disclosures.[18] In addition, the tilting framework contained maturity limits for issuers assessed as having a high level of climate risk (and thus a low climate score), preferential treatment for green bonds that fulfilled stringent criteria and a higher primary market bid for bonds from issuers with better climate performance.[19]

As of 2025, the Eurosystem is no longer conducting reinvestments of corporate sector securities. This follows the Governing Council's decision on 15 June 2023 to discontinue reinvestments under the APP as of July 2023 and its decision on 12 December 2024 to fully discontinue reinvestments under the PEPP at the end of 2024.

In May 2024, the Governing Council agreed that interim emissions reduction targets should be set for the aggregate corporate portfolios in the APP and PEPP. These interim targets are used to inform the Eurosystem as to whether the emissions reduction path of the corporate portfolios supports the goals of the Paris Agreement and the EU's climate neutrality objectives. The interim targets take into account the weighted average emissions intensity of issuers within the portfolios from the end of 2021 onwards. If deviations from the desired average decarbonisation trajectory are identified for the aggregate corporate portfolios, remedial action within the limits of the ECB's mandate will be assessed on a case-by-case basis.

## 3.3 Strategic aspects relating to the ECB's foreign reserves

The ECB's foreign reserves have been in place since the introduction of the euro at the end of 1998.[20] As part of the basic tasks to be carried out by the ECB in accordance with Article 127(2) of the Treaty on the Functioning of the European Union, the main purpose of the ECB's foreign reserves is to ensure that the Eurosystem has sufficient and liquid resources for foreign exchange operations whenever needed. The euro's external value is not a policy target for the ECB.

The ECB's foreign reserves are composed of gold, special drawing rights (SDRs) and highly liquid and creditworthy assets in US dollars, Japanese yen and Chinese renminbi. The currency composition of the ECB's reserves reflects policy considerations focused on the ability to conduct and fund effective interventions in euro against other major currencies. From this point of view, the US dollar and Japanese yen are the two most relevant intervention currencies. The Chinese renminbi was added in 2017 following its inclusion in the SDR basket in 2016 and given its increasing international role and the importance of China as one of the euro area's largest trading partners.

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18 See the strategy section in Climate-related financial disclosures of the Eurosystem's corporate sector holdings for monetary policy purposes, March 2023.

19 See "FAQ on the integration of climate-related considerations into the CSPP" on the ECB's website.

20 For more information on the ECB's foreign reserves, see the article entitled "Trends in central banks' foreign currency reserves and the case of the ECB", *Economic Bulletin*, Issue 7, ECB, 2019.

The objectives and the current composition of the foreign reserves portfolio leave limited leeway for a specific climate strategy. Climate risks are integrated into the general risk management framework for the portfolio (Section 4.3).

# 4 Risk management

This section summarises climate-related risk management aspects relating to the Eurosystem's asset holdings for monetary policy purposes and to the ECB's foreign reserves. It first outlines general aspects that apply across portfolios and goes on to focus on the APP and PEPP, as well as the ECB's foreign reserves.

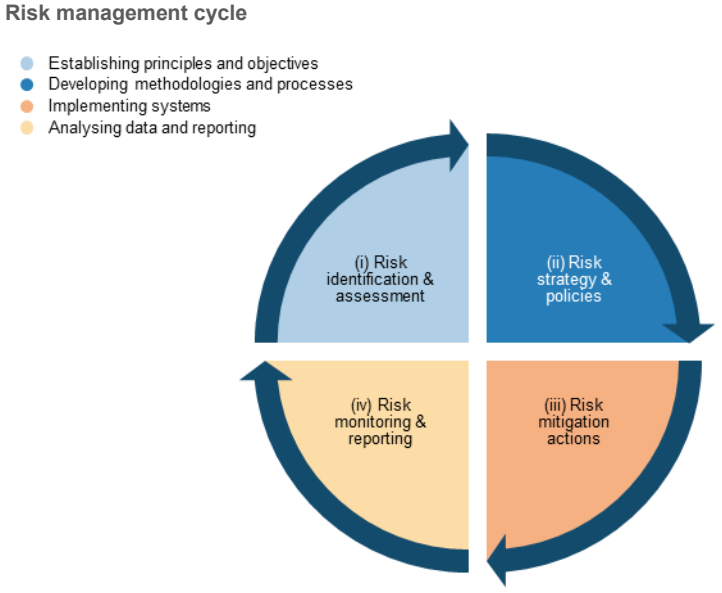
## 4.1 General risk management aspects

Assets held under the APP and PEPP, as well as the ECB's foreign reserves, are exposed to transition risks and physical risks. Transition risks are risks related to the transition to a low-carbon economy. Physical risks relate to the physical impacts of climate change. The Eurosystem takes a bottom-up approach to assessing climate risks and treats them as amplifiers of financial risks. Climate risks are integrated into the Eurosystem's financial risk management framework on an ongoing basis.

### 4.1.1 Integration of climate risks into the risk management cycle

As outlined in the 2024 report on the Eurosystem's climate-related financial disclosures, climate risks are integrated into the four stages of the Eurosystem's risk management cycle.

**Figure 2**
Overview of the Eurosystem's risk management cycle




Source: ECB.

At the risk identification and assessment stage, climate risks are captured to the extent that they are already reflected in asset prices, asset price volatilities and credit risk indicators, such as ratings by external credit rating agencies. Qualitative and scenario analyses, such as climate stress tests, incorporate climate risks beyond those priced in by market indicators. Additionally, the Eurosystem continues to improve climate data through backward-looking metrics (based on historical emissions) and forward-looking metrics (i.e. scenario projections), as well as metrics for inward and outward risks.[21]

Risk strategies and policies are defined by the ECB's decision-making bodies. The Eurosystem's financial risk management frameworks aim to achieve the objectives of the monetary policy and foreign reserves portfolios with the lowest possible risk. In doing so, they also take into consideration the materiality of climate risks.

The Eurosystem mitigates the risks of its portfolios, including climate risk, by applying eligibility criteria, credit risk assessment and purchase limits, and price checks. For some portfolios, this includes applying benchmarks, issuer (group) limits and counterparty limits, and/or carrying out due diligence. These measures can reduce transition risks in certain sectors through portfolio diversification and mitigate the impact of acute, localised physical risks caused by too much exposure to geographically concentrated issuers. Additional climate risk-specific measures include the tilting of corporate asset purchases in the CSPP and PEPP portfolios.

The monitoring and reporting of portfolios' exposure to climate risks is gradually being enhanced and expanded as the coverage and quality of data improve. In 2023 the Eurosystem published its first climate-related financial disclosures for the Eurosystem's corporate sector holdings for monetary policy purposes under the CSPP and PEPP.[22] This has continued in 2024 and 2025, with expanded portfolio coverage.

### 4.1.2 Climate stress testing

The Eurosystem has developed a comprehensive climate stress testing framework designed to evaluate the impact of climate risks on its financial risk profile. Building on the initial exercise conducted in 2022, the Eurosystem undertook a second climate stress test in 2024, broadening the scope to include additional asset classes.[23] This 2024 climate stress test incorporated non-marketable collateral alongside the previously assessed assets, which comprised credit operations, holdings of corporate bonds, covered bonds and asset-backed securities in the Eurosystem's monetary policy portfolios. The climate stress test is aligned with the methodology and scope of the Fit-for-55 climate scenario analysis conducted on

[21] As defined in the Guide on climate-related disclosures for central banks, inward risks are climate-related risks to central banks' balance sheets and internal operations, while outward risks arise because central banks indirectly finance greenhouse gas emissions when lending to, or investing in, countries or companies responsible for those emissions.

[22] See Climate-related financial disclosures of the Eurosystem's corporate sector holdings for monetary policy purposes, March 2023.

[23] For more information on the 2022 results, see the article entitled "Results of the 2022 climate risk stress test of the Eurosystem balance sheet", *Economic Bulletin*, Issue 2, ECB, 2023.

banks and other financial institutions. It was led by the ECB in conjunction with the European Systemic Risk Board and the European Supervisory Authorities. It explores the impact of three mid-term scenarios centred on climate transition risk in order to assess the resilience of the EU financial sector in the face of climate-related shocks. The exercise assumes that the European Commission's plan to reduce carbon emissions by at least 55% by 2030 will be fully implemented and achieved. The Fit-for-55 climate scenarios are supplemented by an additional physical risk scenario depicting severe floods, which was also included in the 2022 exercise.

The 2024 climate stress test finds that climate transition risk has a material impact on the risk profile of the Eurosystem exposures in scope. It identifies outright holdings of corporate bonds as the exposure the most impacted by the shock. The impact of transition risk on corporate assets is mainly concentrated in sectors characterised by high emissions intensity and high energy consumption. The risk for this asset class more than doubles in a scenario combining an abrupt climate transition and financial stress. By contrast, the contribution of losses stemming from the Eurosystem's credit operations to the total increase in risk is limited. It is driven by the asset types that face the highest risk increase whenever banks (counterparties of the Eurosystem's credit operations) are also confronted with a high level of risk. Since these assets are also pledged as collateral by banks, in the event of risks materialising both the credit operation counterparties and the collateral posted by them are affected, which makes such exposures a larger risk contributor in these scenarios.

Climate risk stress tests of the Eurosystem balance sheet will continue to be performed in the future. The Eurosystem regards climate scenario analysis as a key tool in assessing the implications of climate change for financial risks. Its findings improve the Eurosystem's understanding of the sensitivity of the different asset classes to climate-related shocks.

### 4.1.3 Integrating climate considerations into the Eurosystem credit assessment framework

The Eurosystem seeks to ensure that climate considerations are integrated into the credit assessment systems which underpin the credit risk assessment for assets. The Eurosystem credit assessment framework mitigates the credit risk of collateral used in monetary policy operations and establishes appropriate valuation and risk control measures. To assess the credit quality of eligible assets, the Eurosystem takes into account information from credit assessment systems belonging to one of three sources: (i) external credit assessment institutions (ECAIs), i.e. credit rating agencies, (ii) national central banks' full in-house credit assessment systems (F-ICASs), and (iii) counterparties´ internal rating-based approaches (IRBs).[24]

[24] Starting from 2026, a fourth source, statistical in-house credit assessment systems, will also be accepted; for details, see the box entitled "Introducing statistical in-house credit assessment systems (S-ICASs) as an additional source of credit assessments under the general collateral framework", *Economic Bulletin*, Issue 3, ECB, 2025.

ECAIs are largely used to assess the creditworthiness of marketable assets for collateral and play an important role in the risk control framework for outright purchase programmes. The ECB investigated whether ECAIs are disclosing the necessary information about the integration of climate change risk into their credit ratings. Staff analysis and recommendations on this topic were included in an ECB Occasional Paper in September 2022.[25] The ECB continues its close dialogue with ECAIs and regularly monitors developments in disclosure by ECAIs.

The Eurosystem also sets standards for incorporating climate change risks into the rating process of F-ICASs, and common minimum standards had been implemented by all operating F-ICASs by the end of 2024.[26] In addition, IRBs are included in the scope of initiatives undertaken by ECB Banking Supervision to assess the level of preparedness for managing the climate risks of supervised institutions.[27]

The review and evaluation of climate change-related risks in credit ratings will continue in 2025 and beyond as part of the ECB's climate and nature plan.

## 4.2 Risk management aspects related to the APP and PEPP

The risk management framework of the Eurosystem's monetary policy operations aims to achieve policy objectives with the lowest possible risk to the Eurosystem and the ECB.[28] The options for effectively managing and mitigating climate risks in the Eurosystem and ECB portfolios differ across asset classes.

Euro area sovereign bonds held under the PSPP (as part of the APP) and PEPP account for a major part of those portfolios' exposure to climate risks. Their transition risks are linked in particular to the level of, and trend in, carbon emissions, which are related to countries' economic models. Their physical risks depend on the country's geography and its capacity for risk adaptation, which means adjusting to the current and future effects of climate change.

Supranational and agency bonds account for the remainder of public sector securities held under the PSPP and PEPP. Their exposure to transition risks depends on issuers' carbon emissions (and thus also on their financing activities). Their exposure to physical risks depends on the geographical location of their offices as well as the location and diversification of their financing activities.

Corporate bonds are particularly exposed to climate-related financial risks that could affect their value and risk profile. The Eurosystem's climate-related action plan presented in 2021 therefore identified corporate sector assets held under the CSPP

25 See "Disclosure of climate change risk in credit ratings", *Occasional Paper Series*, No 303, ECB, September 2022.

26 The requirements are described in the box entitled "Common minimum standards for incorporating climate change risks into in-house credit assessment systems in the Eurosystem", *Economic Bulletin*, Issue 6, ECB, 2022.

27 In July 2022 ECB Banking Supervision conducted a climate risk stress test and in November 2022 assessed the banking sector's implementation of its Good practices for climate related and environmental risk management. For further details, see Section 1.8 of the ECB guide to internal models.

28 See "The financial risk management of the Eurosystem's monetary policy operations", ECB, July 2015.

and PEPP as a priority for the management and reporting of climate risks. To this end, climate considerations were incorporated into the due diligence procedure, the application of maturity limits and a tilting framework guiding the purchases and reinvestments from October 2022 to the end of 2024. These actions contributed to shaping the holdings of the CSPP and PEPP portfolios, thus helping to bring a significant shift towards improved climate performance. Since the start of the run-off phase, the portfolios' climate performance has been driven mainly by issuers' emissions reduction efforts and the maturity profile of the holdings. Interim targets for the corporate portfolios are being monitored. If deviations from the desired average decarbonisation trajectory are identified for the aggregate corporate portfolios, remedial actions will be assessed, within our mandate, on a case-by-case basis.

Covered bonds are characterised by a double-recourse structure. This structure includes both the bond issuer and the cover pool, which serves as an additional layer of security in case the issuer defaults on its bond payments. The exposure of covered bonds to climate risks can therefore be analysed and managed from these two different angles. However, since available data for cover pools remains fragmented, the current evaluation of the exposure to climate risks of covered bonds held under the CBPP3 and PEPP is based only on issuer-specific carbon emissions data. The Eurosystem is working with regulators and data providers to improve the availability of emissions data at cover pool level.[29]

## 4.3 Risk management aspects related to the ECB's foreign reserves

The ECB's foreign reserves ensure that the ECB has sufficient liquidity to conduct foreign exchange operations if needed.[30] The management of the foreign reserves is therefore aimed at meeting three main requirements: liquidity, security and return, in that order. The ECB manages the investment of its foreign currency holdings by designing benchmark portfolios, approved by the ECB's decision-making bodies. The permitted deviation from these benchmarks in terms of risk is controlled by the ECB, making the benchmarks an important driver of the risk profile of the ECB's foreign reserves. The fixed-income assets of the foreign reserves portfolio consist mainly of sovereign bonds of the United States, Japan and China.

Transition risks depend on the carbon emissions and the emissions reduction path of these jurisdictions, as well as the transition policies that are, or will be, implemented by the respective governments and other national authorities. Physical risks, which depend on a country's geography and its capacity for risk adaptation, can affect the market value of bonds in the short run and can also be a driver of volatility.

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29 In the Call for advice to the European Banking Authority on the performance and review of the EU covered bond framework, the Commission invited the EBA to assess the relevance of introducing disclosure requirements for the ESG risks of the cover pools for covered bonds, taking into account interlinkages with the Pillar 3 disclosures on ESG risks and the March 2023 ESA/ECB joint statement on disclosures. The deadline for providing a response to this request was 30 June 2025.

30 See "Foreign reserves and own funds" (paragraph headed "Foreign reserves") on the ECB's website for more information on objectives and related legal acts.

The objectives of the foreign reserves portfolio leave limited leeway for specific climate risk management measures. Nevertheless, the financial risk framework for this portfolio, focused on ensuring liquidity, security and returns, allows for the efficient management of various risk factors, including climate change-related risks.

# 5 Metrics and targets

This section provides information on the exposure to climate risks of the Eurosystem's monetary policy portfolios and the ECB's foreign reserves. The key metrics include the weighted average carbon intensity (WACI), carbon intensity, total carbon emissions and carbon footprint of the portfolios. Annex 1 sets out calculation methods and outlines the main elements of the Eurosystem common disclosure principles. Annex 2 provides additional information on the emissions allocation methods, normalisation factors and attribution factors applied.

High levels of data availability and quality are essential for calculating reliable and relevant climate metrics. The independent climate data providers Institutional Shareholder Services and Carbon4 Finance supply the Eurosystem with climate data. The Eurosystem promotes transparent disclosures aimed at providing the most relevant and accurate information available. To this end, the Eurosystem regularly discusses improvements in data availability and quality with policymakers, standard setters and climate data providers. Where relevant, data availability has been indicated in percentage terms for each metric and asset class.

Sovereign bond financed emissions are reported in three different ways: (i) as emissions within a country's physical borders (production emissions), (ii) as emissions related to domestic consumption (consumption emissions), and (iii) as emissions related to government institutions and government expenditure (government emissions). Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). Production emissions are self-reported by sovereigns, while all other sovereign emissions metrics are modelled by the above-mentioned data providers. All three sovereign emissions metrics are reported to ensure maximum transparency. The calculation methods are complementary, as each provides a different angle on the emissions associated with sovereign issuers.

Metrics for supranational, agency and corporate issuers are based on issuers' scope 1 and scope 2 emissions. For the first time, total scope 3 carbon emissions for these underlying issuers are also reported and analysed in the main text of this report for the most recent data. A longer history of absolute and relative metrics based on scope 3 emissions is reported in Annexes 4 and 6. Scope 1, 2 and 3 emissions are either self-reported by issuers or modelled by the data providers, with self-reported emissions preferred whenever available. Quality issues affecting scope 3 emissions data continue to limit their reliability and comparability over time. These issues include (i) considerable estimation uncertainty, (ii) diverging estimates across different data providers, and (iii) methodological refinements. Despite these shortcomings, the Eurosystem decided to start reporting scope 3 total carbon emissions in the main text of the report as of 2025 and notes a steady expansion of issuers' reporting of types of activities, which will enhance comparability over time.

Emissions and financial data that match the reference year of the holdings are used whenever possible for calculating the metrics. However, reference years do not

match for the most recent reporting periods, owing to the natural delay with which emissions data become available. For this reason, emissions data from 2023 have been applied to non-sovereign holdings for 2023 and 2024, while data from 2022 have been applied to sovereign holdings for 2022 to 2024. Of the three sovereign emissions metrics, government emissions data are no longer updated by the data provider following a revision to the guidance from the Partnership for Carbon Accounting Financials.[31] As a result these data refer to 2021. The use of past emissions data artificially stabilises the reported metrics for these years across the portfolios, as only the impact of changes in portfolio composition is shown, while the impact of measures taken by issuers themselves to reduce or increase emissions is not reflected.

In future reports, as the emissions data become available, the ECB will retrospectively update the metrics that were based on data with different reference years than those of the portfolio holdings. Following this logic, this report presents updated metrics for corporate sector assets for the years 2022 and 2023 and for sovereign assets for the years 2021 and 2022, which are different from the metrics presented for these years in the June 2024 report.

## 5.1 APP and PEPP holdings

As at the end of 2024, the Eurosystem's holdings of all assets (including ABSPP holdings) under its APP and PEPP amounted to €4,082 billion in nominal value. The nominal holdings declined by 8% during 2024, owing to the end of APP reinvestments in 2023 and the gradual reduction of the PEPP portfolio during the partial reinvestment phase in the second half of 2024. Chart 1 shows a breakdown of the holdings by asset class, which is broadly unchanged from the previous year. The reported asset classes in the rest of the report account together for around 99.8% of the total assets held for monetary policy purposes under the APP and PEPP.[32]

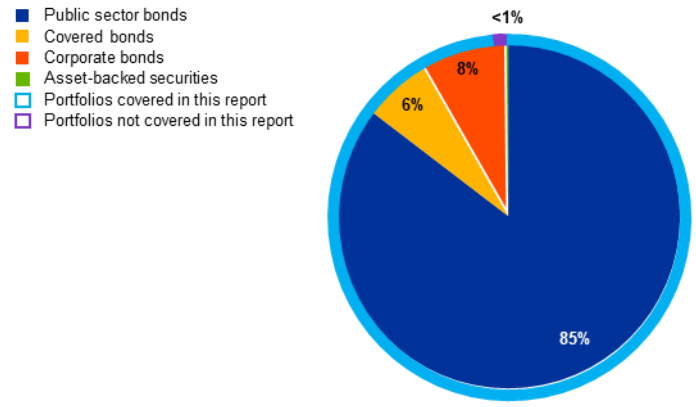
[31] Institutional Shareholder Services stopped providing data on government emissions in December 2024, as the second edition of the GHG Protocol, published by the Partnership for Carbon Accounting Financials in December 2022, recommends reporting production emissions and does not consider government emissions as part of its methodology.

[32] Asset-backed securities remain out of the reporting scope owing to a lack of reliable climate data.

**Chart 1**

Eurosystem APP and PEPP holdings by asset class

(percentages)



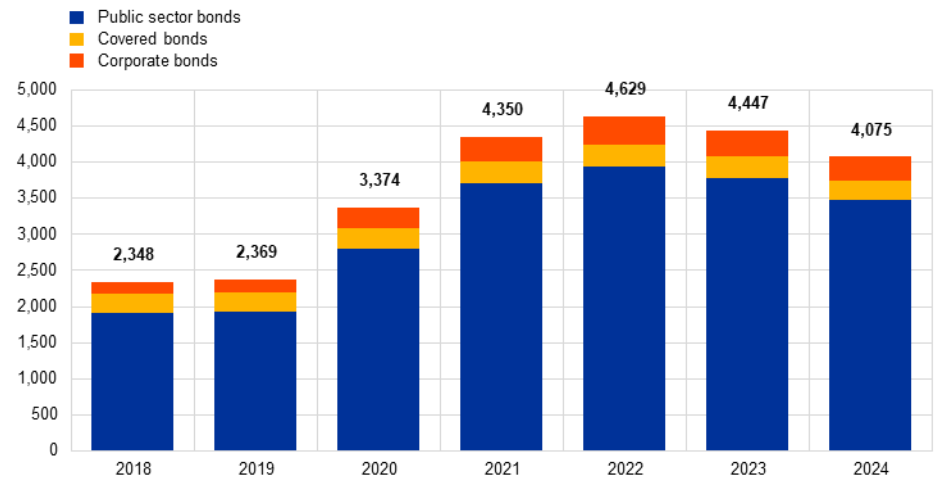

Source: ECB calculations.
Notes: The chart shows the allocation of Eurosystem holdings for monetary policy purposes under the APP and PEPP across asset classes. The percentages refer to nominal amounts.

Chart 2 shows the total value of APP and PEPP holdings covered in this report over time. Holdings started to decline gradually from mid-2023 onwards, following the Governing Council's decisions to reduce the pace of APP and PEPP reinvestments (as of 1 March 2023 and 1 July 2024 respectively) and to discontinue them altogether (as of 1 July 2023 and the end of 2024 respectively).

**Chart 2**

Historical developments in the Eurosystem's APP and PEPP holdings by asset class

(EUR billions)




Source: ECB calculations.
Note: The chart shows the historical breakdown of Eurosystem holdings for monetary policy purposes under the APP and PEPP across the asset classes covered in this report, expressed as a nominal value.

Tables 1 and 2 show the key emissions metrics for the Eurosystem's assets as at the end of 2024 based on scope 1 and 2 emissions. In addition, the analysis in the main text of the report this year covers total scope 3 carbon emissions. Annex 3 provides historical metrics based on scope 1 and 2 emissions, while Annex 4 provides metrics based on scope 3 emissions.

The following sections analyse each asset class separately.

**Table 1**

Financial and climate-related metrics for sovereign issuers held in the Eurosystem's APP and PEPP portfolios at the end of 2024

| | | Sovereign issuers | | | |
|---|---|---|---|---|---|
| | | Sovereign and sub-sovereign bonds | | | |
| | | Production | | Consumption | Government |
| | | excl. LULUCF | incl. LULUCF | | |
| **Portfolio value** | EUR billion nominal value | 3,006.6 | | | |
| **Total carbon emissions** | $tCO_2e$ | 385,360,764 | 368,118,968 | 506,863,293 | 38,478,965 |
| **WACI** | tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure | 128 | 122 | 10 | 63 |
| **Carbon footprint** | $tCO_2e$ per EUR million invested | 128 | 122 | 169 | 13 |
| **Carbon intensity** | tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure | 128 | 122 | 9 | 62 |

**Table 2**

Financial and climate-related metrics for non-sovereign issuers held in the Eurosystem's APP and PEPP portfolios at the end of 2024

| | | Non-sovereign issuers | | | | |
|---|---|---|---|---|---|---|
| | | Total | Agency bonds | Supranational bonds | Covered bonds | Corporate bonds |
| **Portfolio value** | EUR billion nominal value | 1,068.6 | 274.7 | 203.9 | 258.6 | 331.4 |
| **Total carbon emissions** | $tCO_2e$, scope 1+2 emissions | 33,088,600 | 189,601 | 1,284 | 46,273 | 32,851,441 |
| | $tCO_2e$, scope 3 emissions | 359,464,522 | 15,443,107 | 9,755,045 | 89,052,145 | 245,214,225 |
| **WACI** | $tCO_2e$ per EUR million revenue, scope 1+2 emissions | 51 | 2.4 | 0.1 | 0.9 | 165 |
| **Carbon footprint** | $tCO_2e$ per EUR million invested, scope 1+2 emissions | 33 | 0.8 | 0.0 | 0.2 | 108 |
| **Carbon intensity** | $tCO_2e$ per EUR million revenue, scope 1+2 emissions | 127 | 11 | 0.1 | 1.0 | 178 |

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: Metrics are calculated using bonds' nominal values.

### 5.1.1 Public sector bond metrics

Public sector bonds accounted for 85% of total APP and PEPP holdings in nominal amounts as at the end of 2024. Methodologies underlying the calculation of emissions for sovereign bonds (i.e. production, consumption and government) and non-sovereign bonds (i.e. scope 1 and 2 emissions, along with scope 3 emissions)

are not comparable. Therefore, sovereign bond metrics should be interpreted separately from non-sovereign metrics.

When interpreting the results, it should be noted that the metrics and trends for public sector bonds are subject to uncertainty as well as methodological and data-related limitations. These limitations include (i) the typical two-year delay with which sovereign emissions data become available (and, as was the case this year, the three-year delay for government emissions), (ii) the embedded downward bias in metrics over time as a result of inflation, and (iii) the effects of temporary shocks to sovereign emissions and economic activity, for example the shock from the pandemic. Given these limitations, specific metric values and trends should be understood as indicative. Work is being done to address these limitations and improve climate-related disclosure frameworks for sovereign bond investments at investor, data provider and standard-setter level.

### Sovereign and sub-sovereign bonds

Sovereign (and sub-sovereign) bonds account for 86% of the Eurosystem's public sector bond holdings.[33]

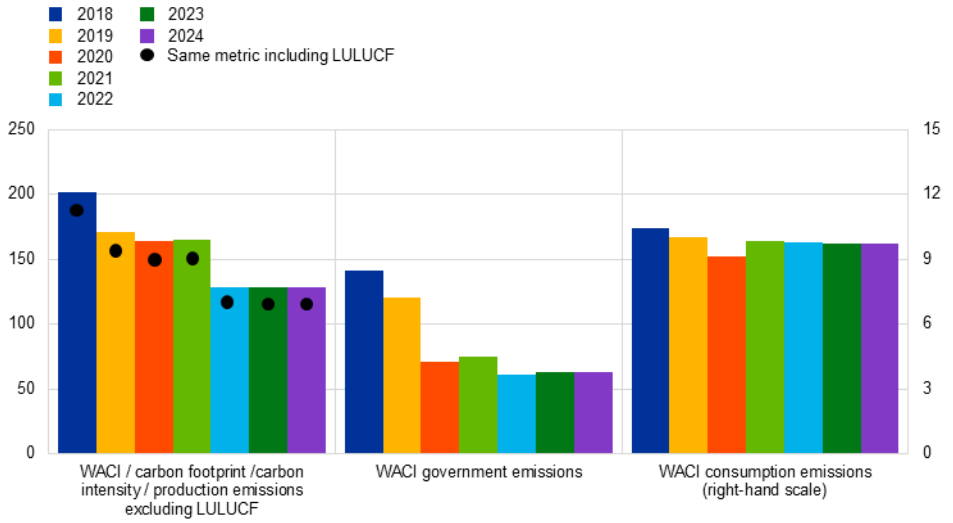
Sovereign bond holdings decarbonised further, as shown by the decline in the WACI (Chart 3). The WACI for production emissions (equal to the carbon footprint and the carbon intensity metrics) fell by 22% in 2022 compared with 2021 (excluding and including LULUCF). Meanwhile, the data used for government emissions are the same as for 2021, so there is no meaningful change compared with last year's report.

[33] For the purposes of this report, bonds issued by the EU are classified as sovereign bonds, while EFSF and ESM bonds are classified as supranational bonds. In the implementation and reporting of APP and PEPP purchases, the bonds issued by the EU were treated as supranational securities.

**Chart 3**

Developments in the WACI for sovereign bond holdings in the PSPP and PEPP

(left-hand scale: $tCO_2e$ per EUR million; right-hand scale: $tCO_2e$ per capita)




Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: The WACI is shown for production, consumption and government emissions. Production and government emissions are based on data provided by Institutional Shareholder Services; consumption emissions are based on data provided by Carbon4 Finance. Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). The WACI is denominated in $tCO_2e$ per EUR million GDP (production emissions), $tCO_2e$ per EUR million government consumption (government emissions) and $tCO_2e$ per capita (consumption emissions). Metrics are calculated using bonds in nominal value. Underlying holdings refer to year-end values.

While the pandemic lockdowns and the resulting widespread reduction in global economic activity made an impact in the period to 2021, it is likely that the reduction in emissions since then has been overstated as it is driven by recent macro data that reflect increased economic activity in the euro area following the pandemic. Specifically, this is because government emissions still use 2021 emissions data and production and consumption emissions still use 2022 emissions data, while 2023 macro data are being used for the 2023 and 2024 metrics. Finally, some of the emissions reduction shown in the metrics is driven by inflation. This is because, owing to the current lack of established market standards, the data are not adjusted for inflation.

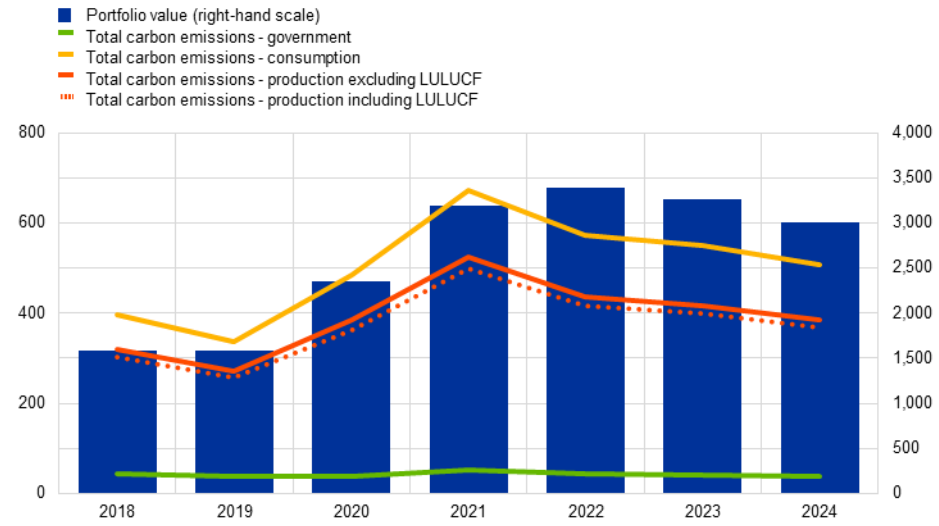
The total carbon emissions associated with the sovereign bond holdings peaked in 2021 and have declined steadily in recent years (Chart 4), led by countries' falling emissions, an increase in PPP-adjusted GDP (driven partly by exchange rate effects, as this denominator is reported in US dollars), and the reduction in the size of the portfolio since April 2023 following the end of APP reinvestments in 2023, along with the switch to partial reinvestments and subsequent full run-off of PEPP at the end of 2024. The inclusion of LULUCF lowers production emissions by 5% on average over the reporting period. The drop in total production emissions that can be observed from 2022 to 2024 is partly due to the decline in Eurosystem's portfolio holdings from 2023 onwards, although the extent of this decline is overestimated because of the mismatch in the reference years for the available emissions data (2022) and GDP (2023). The effect will be corrected retrospectively in the next reports as the emissions data become available. The consumption emissions associated with Eurosystem holdings exceed production emissions, indicating that the issuers of

sovereign bonds held under the PSPP and PEPP are, on aggregate, net carbon importers. The total government emissions (direct emissions from the public sector and emissions from investments made by the government) are low compared with sovereign production and consumption emissions.

**Chart 4**

Developments in total carbon emissions and portfolio value for sovereign bond holdings in the PSPP and PEPP

(left-hand scale: millions $tCO_2e$; right-hand scale: EUR billions nominal value)




Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: Production and government emissions are based on data provided by Institutional Shareholder Services; consumption emissions are based on data provided by Carbon4 Finance. Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). Metrics are calculated using bonds' nominal values. Underlying holdings refer to year-end values.

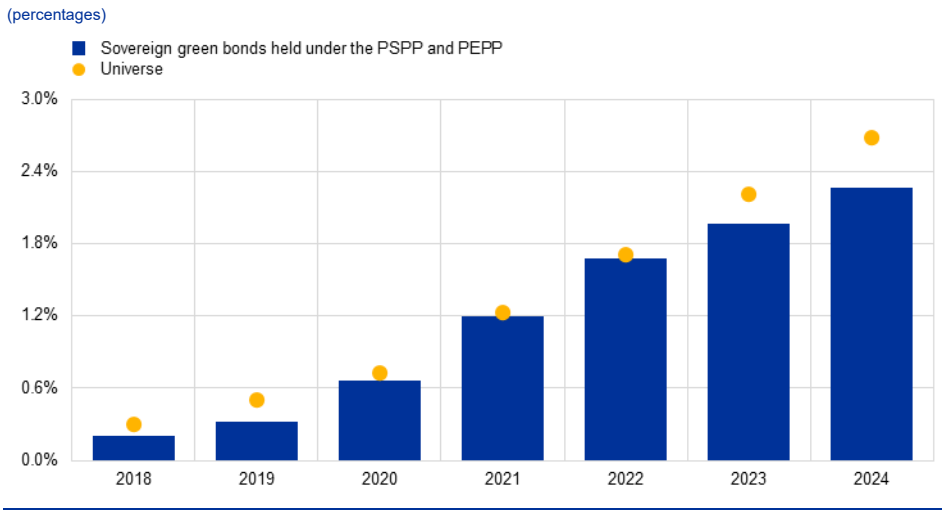
Data gaps remain for sub-sovereign issuers for which consumption and government emissions are unavailable. The lack of specific climate data for sub-sovereign issuers is overcome by assigning the data for the sovereign.

Green bonds contribute to the transition to a low-carbon economy and provide targeted financing for projects with a positive environmental impact. Moreover, they can create a funding advantage for issuers compared with funding via conventional bonds (this advantage is known as the "greenium"). The share of green bonds in sovereign bond holdings under the PSPP and PEPP has gradually increased over the years and stood at 2.3% in 2024. Up until the end of 2022 and during the active purchase phase, the share of green bonds in sovereign bond holdings under the PSPP and PEPP was close to their share in the eligible universe (Chart 5). From 2023 onwards, the share of green bonds in this portfolio has grown at a slower pace than their share in the eligible universe. This is due to limited reinvestment volumes, the faster pace of green bond issuance compared with conventional bond issuance, the more limited secondary market liquidity of green bonds and the prohibition of monetary financing.[34]

[34] In accordance with Article 123(1) of the Treaty on the Functioning of the European Union, which prohibits the Eurosystem from conducting primary market purchases of sovereign bonds.

**Chart 5**

Share of green bonds in the sovereign bond holdings under the PSPP and PEPP



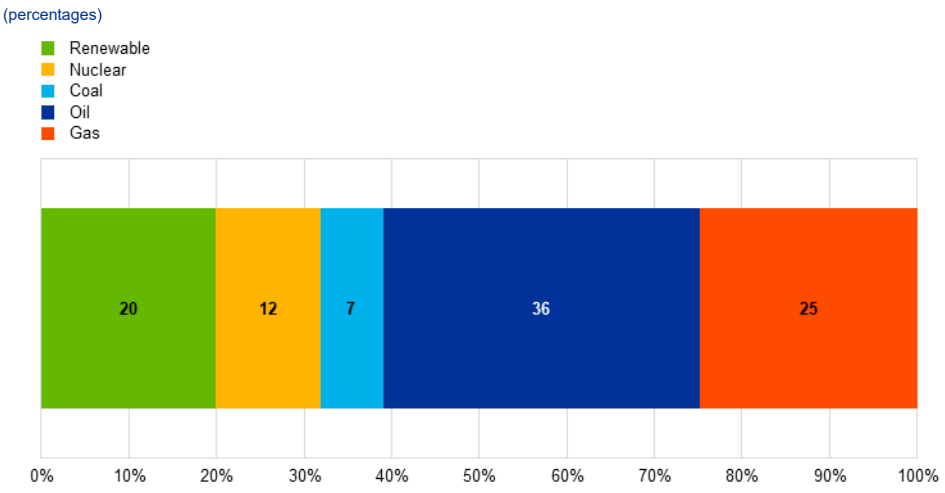

Sources: ICMA and ECB calculations.
Notes: The chart shows the share of green bonds in the sovereign bond holdings under the PSPP and PEPP over time, compared with their share in the eligible universe. To identify green bonds, the ECB relies on the labelling applied by the ICMA. The calculation is based on bonds' nominal values. Underlying holdings refer to year-end values.

The Eurosystem also holds sovereign and sub-sovereign sustainability and social bonds, as many governments have recently introduced programmes of this kind. Social bonds raise funds for new and existing projects that address or mitigate social challenges and seek to achieve positive social outcomes, such as affordable housing and basic infrastructure, or to provide access to essential services (e.g. health, education and vocational training). Sustainable bonds combine social and green projects, with no strict minimum percentage requirements as to the allocation of proceeds between the two types of projects. In 2024, the share of sustainability and social bonds aligned with the relevant ICMA principles and guidelines stood at 0.5% and 1.3% of the Eurosystem's nominal sovereign and sub-sovereign portfolio holdings respectively. The comparatively low shares reflect the fact that (i) issuers have only recently start to develop labelled bond programmes of this kind, and (ii) most of the new issuance started during the reinvestment phase.

Chart 6 shows the weighted average total energy supply mix of the sovereign bond holdings in the APP and PEPP portfolios in 2024. Renewable energy and low-carbon nuclear energy together account for around one-third of the issuers' total energy supply, while fossil fuels including coal, oil and gas account for the remaining two-thirds.

**Chart 6**

Total energy supply mix of sovereign bond issuers in the monetary portfolios in 2024




Sources: Institutional Shareholder Services and ECB calculations.
Notes: The chart shows the weighted average total energy supply mix of the sovereign bond issuers in the corporate portfolios. Weighting is done using bonds' nominal values. The total energy supply is the quantity of all energy necessary to satisfy inland consumption. It is defined as production + imports - exports - international marine bunkers - international aviation bunkers +/- stock changes.

## Supranational and agency bonds

Supranational and agency bonds account for 14% of public sector bond holdings. Chart 7 shows changes in the key emissions metrics for these portfolios. The scope 1 and 2 total carbon emissions associated with agency bonds (panel a) increased steadily until 2022, mostly in response to rising exposure to individual, high-emitting issuers and to the growth in portfolio holdings. The trend has reversed since then, with a decline of over 37% from the peak in 2022. This fall is due to redemptions of bonds from a high-emitting issuer. The scope 1 and 2 carbon footprint and WACI metrics have also declined by more than 25% since 2022 from already low levels.

The scope 1 and 2 total emissions associated with supranational bonds (panel b) were subject to volatility in the past years. The availability of climate data for supranational issuers fluctuates over time, depending on coverage-related data and the climate data provider's cut-off policy. This makes it complicated to interpret changes in the key metrics over time, as sudden jumps may reflect changes in the data coverage of financial metrics rather than meaningful emissions reduction trends. The marked improvement in coverage from 2022 onwards (corrected in this year's reporting to 100%, compared with 62% in 2021) largely explains the strong increase in reported total emissions in 2023 and 2024 compared with 2021 levels. Total emissions did not increase in line with the wider data coverage in 2022. This was due to one large issuer reporting a level of scope 2 emissions that it subsequently revised upwards (which is not reflected in the data from the data provider).

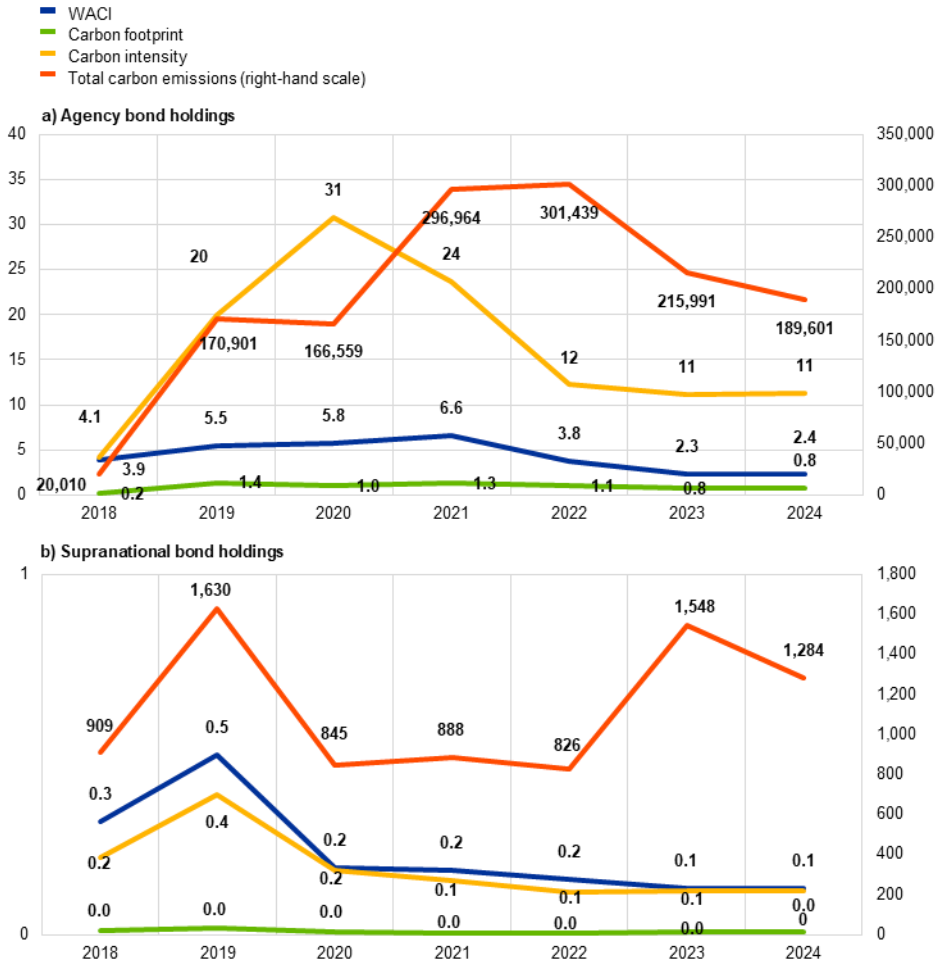
Total scope 3 carbon emissions accounted for over 99% of the total carbon emissions for agencies and supranational issuers in 2024. This reflects the nature of

these issuers' business, with low administrative costs (scope 1 and 2) but high scope 3 emissions resulting from financed projects.

**Chart 7**

Developments in key scope 1 and 2 metrics for supranational and agency bond holdings under the PSPP and PEPP

(left-hand scale: $tCO_2e$/EUR million; right-hand scale: $tCO_2e$)




Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
Notes: The chart shows historic values for the four key metrics used for supranational and agency bond holdings based on issuers' scope 1 and 2 emissions. Metrics are calculated using bonds' nominal values. Emissions normalisation in the WACI and carbon intensity metrics is based on revenue (in EUR millions), while emissions normalisation in the carbon footprint metric is based on the investment amount (in EUR millions). Underlying holdings refer to year-end values.

The share of green bonds in agency and supranational bond holdings under the PSPP and PEPP has continued to increase gradually over time, although it remains below the share of green bonds in the eligible universe (Chart 8). Similarly to sovereign bonds, the reasons include the need to comply with the monetary financing prohibition, the limited secondary market liquidity for green bonds, and the fast pace of green bond issuance in a context of low and declining reinvestment volumes. The share of green agency and supranational bonds increased by 3 percentage points to 12% of the eligible investment universe in 2024, representing its fastest rate of growth to date and confirming the leading role played by these issuers in financing the transition.

**Chart 8**

Share of green bonds in the agency and supranational bond holdings under the PSPP and PEPP


Sources: ICMA and ECB calculations.
Notes: The chart shows the share of green bonds in the agency and supranational bond holdings under the PSPP and PEPP over time, compared with the universe. To identify green bonds, the ECB relies on the labelling applied by the ICMA. The calculation is based on bonds' nominal values. Underlying holdings refer to year-end values.

The share of sustainability bonds in the Eurosystem's supranational and agency bond portfolios, at 2%, was broadly in line with the share of these bonds in the eligible universe. The share of social bonds in the portfolios was comparatively high at 8%, although it was lower than the share of these bonds in the eligible universe, which stood at 13%. The more modest share of social bonds in the supranational agency and bond portfolios compared with the eligible universe reflects the strong increase in social issuance from these type of institutions in response to the pandemic in a period when purchase volumes started to decline owing to (i) the reduction in reinvestments, (ii) the monetary financing prohibition, and (iii) limited secondary market liquidity for labelled bonds.

### 5.1.2 Corporate bond metrics

Corporate bonds accounted for 8% of the total APP and PEPP holdings as at the end of 2024. Metrics in this section are based on issuers' self-reported scope 1 and 2 emissions data as defined in the Greenhouse Gas Protocol[35] and on scope 3 emissions data,[36] which are reported and analysed separately in the main text of the report for the first time this year.

The Eurosystem continues to call on corporates to set and deliver on emissions reduction targets in line with the goals of the Paris Agreement. Since reinvestments under the PEPP were discontinued at the end of 2024, the Eurosystem has not been actively steering the composition of its portfolios. It is therefore crucial that issuers

35 The Eurosystem uses market-based scope 2 emissions data if these are available and reliable. Location-based scope 2 emissions data might be used when market-based reporting is not available.

36 The ECB integrated data on scope 3 emissions at the sector level into the climate scoring tool used to tilt its purchases of corporate sector bonds until the end of 2024.

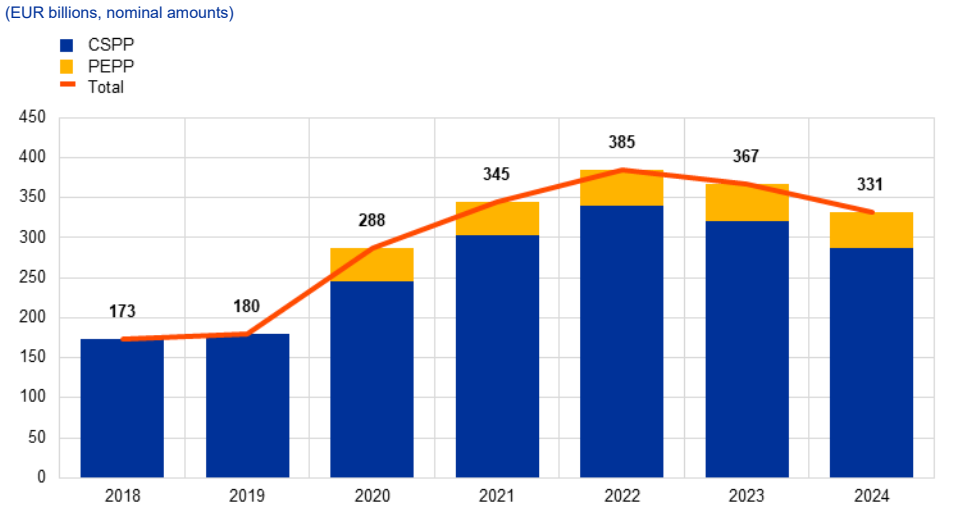
fulfil the forward-looking commitments they have announced and provide corporate disclosures and data on emissions so that the Eurosystem can deliver on its emissions reduction objectives and transparency commitments.

### Developments in key climate metrics within the corporate sector portfolios

At the end of 2024, the corporate holdings within the asset purchase programme (APP) made up approximately 86% of the Eurosystem's corporate sector assets held for monetary policy purposes, with PEPP holdings accounting for the remaining 14%. Since reaching a peak in 2022, the aggregate level of corporate bond holdings has decreased by 14% to €331 billion (Chart 9).

**Chart 9**

Historical developments in the Eurosystem's corporate sector holdings and portfolio breakdown




Source: ECB calculations.
Note: Underlying holdings refer to year-end values.

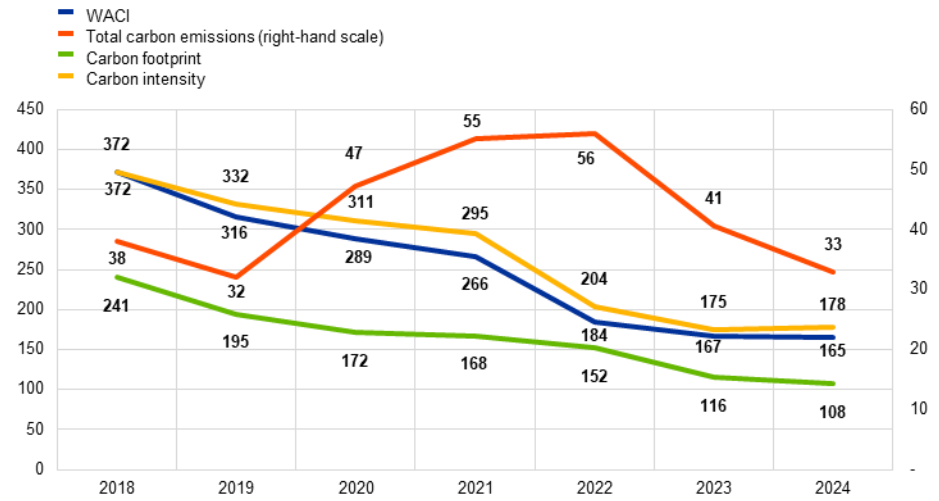
Chart 10 shows developments in key climate and financial metrics for corporate sector holdings for scope 1 and 2 emissions. In 2023, the latest year for which the Eurosystem has a full set of issuers' climate data, all carbon metrics show a downward trend in the portfolios' emissions.

The total carbon emissions associated with the corporate sector portfolios declined from 2022 onwards following the reduction in the size of the portfolio holdings that started around mid-2022. Scope 3 carbon emissions accounted for 88% of the total carbon emissions of the corporate portfolios in 2024. The lower share of scope 3 emissions in the corporate portfolio than in the other non-sovereign issuer portfolios reflects the relevance of financed emissions for financial institutions and other types of issuers with large investment portfolios such as supranational issuers and agencies.

**Chart 10**

Developments in key scope 1 and 2 metrics for the Eurosystem's corporate sector portfolios

(left-hand scale: $tCO_2e$/EUR million; right-hand scale: million $tCO_2e$)



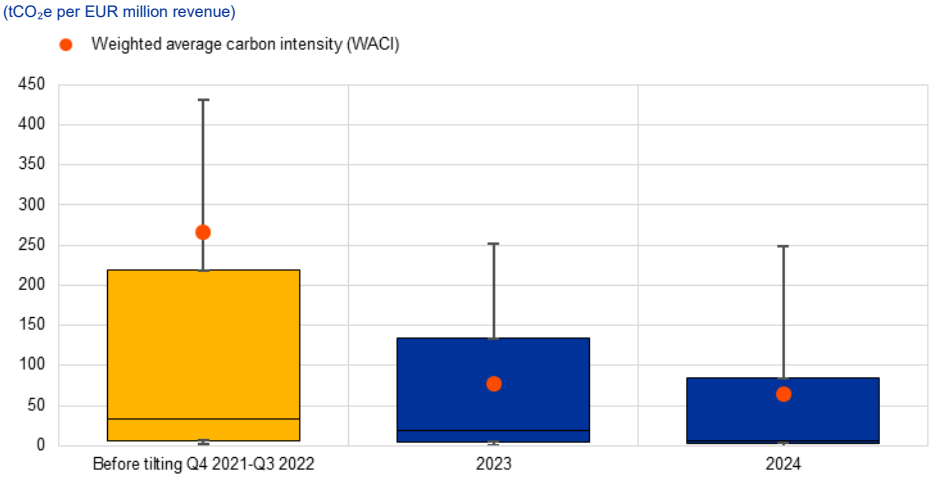

Sources: Institutional Shareholder Services, Bloomberg and ECB calculations.
Notes: The chart shows historic values for the four key metrics used for corporate sector holdings based on issuers' scope 1 and 2 emissions. Metrics are calculated using bonds' nominal values. Emissions normalisation in the WACI and carbon intensity metrics is based on revenue (in EUR millions), while emissions normalisation in the carbon footprint metric is based on the investment amount (in EUR millions). Underlying holdings refer to year-end values.

The vintage of issuer self-reported climate data shows that normalised metrics of carbon intensity based on scope 1 and 2 continued to decline in 2023, albeit at a lower speed. Issuers became more carbon-efficient on aggregate owing to a decline in their overall emissions, while normalisation factors such as revenues and EVIC did not materially affect the trend. At the disaggregated level, some sectors (for example, construction and materials) benefited from a significant increase in weighted average revenues in 2023, while others (such as energy and basic resources) struggled to keep revenues at the levels of 2022 and saw their average carbon intensity rise (see also Chart 12).

The tilting of purchases and the redemption of carbon-intensive bonds have contributed at the margin to the decline in the metrics, owing to the relatively low but continuous reinvestment throughout 2024. The end of reinvestments under the PEPP means that, as of 2025, tilting can no longer be expected to be a driver of further reduction in the portfolios' emissions. The tilting framework significantly lowered carbon intensity when in active use during the reinvestment phase (Chart 11). The updated emissions data for 2023 show that the scope 1 and 2 WACI of purchases conducted in 2024 declined by 76% compared with the year preceding the implementation of the tilting framework.

**Chart 11**

Distribution of the scope 1 and 2 carbon intensity of corporate bond purchases




Sources: Institutional Shareholder Services and ECB calculations.
Notes: The interquartile box range represents the 75th to 25th percentiles of the carbon intensity of each corporate sector purchase conducted within the period. The straight lines within the boxes represent the median carbon intensity for each period, while the whiskers comprise the 90th and 10th percentiles. The orange dot represents the WACI of trades conducted within the period. Climate data used to calculate these figures are expected to be revised in subsequent reports in the light of issuers' disclosures on emissions for the year. Metrics are based on issuers' scope 1 and 2 emissions.

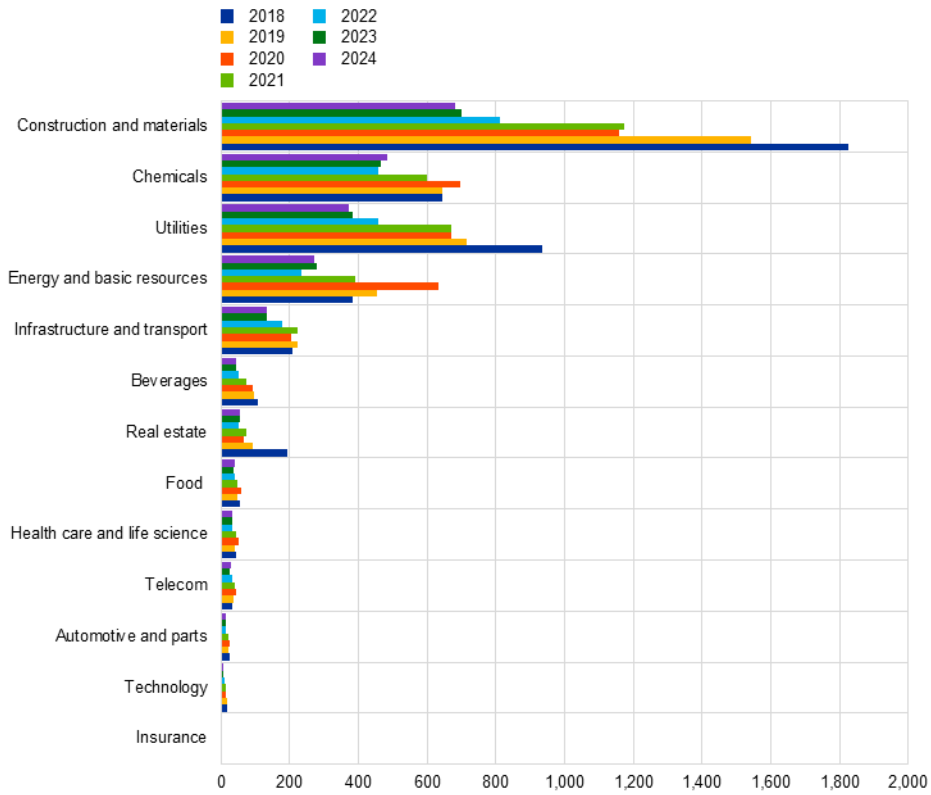
Chart 12 shows that the scope 1 and 2 sector-specific climate performance of issuers in the corporate portfolios, particularly in the most carbon-intensive sectors, continued to improve generally in 2023, albeit at a slower pace than in previous years. However, in some carbon-intensive sectors such as chemicals, as well as energy and basic resources, the emissions reduction trend ceased in 2023. While aggregate absolute emissions for these sectors continued to decline, their revenues fell at a faster pace owing to the lower prices of goods sold within this period, leading to an increase in each sector's WACI.

The sectoral declines currently seen in the scope 1 and 2 WACI for 2024 are exclusively the result of capital reallocation effects due to the lag in the availability of issuer emissions data. When full issuer climate data are available for 2024, the Eurosystem expects to see a change in sectoral emissions and will revise the numbers accordingly. The companies grouped under the construction and materials, chemicals, and utilities sectors remain the most emissions-intensive on average when normalised on a revenue basis.

**Chart 12**

Developments in the scope 1 and 2 WACI of the corporate portfolios by sector

($tCO_2e$ per EUR million revenue)



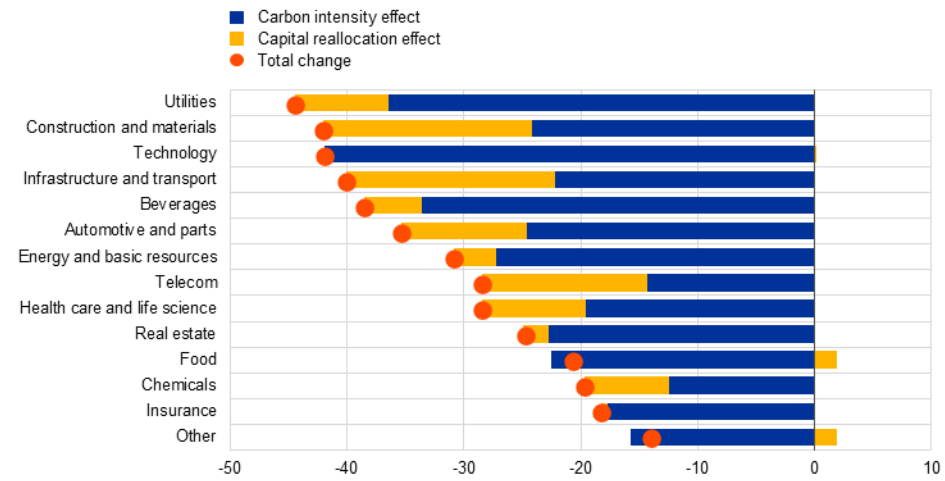

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
Note: Sectors are sorted according to the highest WACI for 2023 (top) to the lowest WACI for 2023 (bottom).

Two factors contribute to changes in the sectoral scope 1 and 2 WACI over time: (i) changes in issuers' carbon intensity (issuers' emissions normalised by revenue), and (ii) capital reallocation. Capital reallocation includes the impact of the Eurosystem's tilted purchases and the redemption of securities. Chart 13 isolates the contribution of both factors to the realised sectoral emissions reduction between 2021 and 2024. The yellow bars show that the tilting of Eurosystem reinvestment purchases towards issuers with better climate scores improved the WACI in most sectors, and particularly in those responsible for a significant part of the emissions associated with the corporate portfolios.

**Chart 13**

Attribution of the changes in sectoral scope 1 and 2 WACI between 2021 and 2024 to the capital reallocation effect and the carbon intensity effect

(percentages)




Sources: Institutional Shareholder Services and ECB calculations.
Notes: To isolate the capital reallocation and the capital intensity effect, we apply a Marshall-Edgeworth-type decomposition which uses the simple average of the previous and present period values. For 2024, the attribution analysis only considers capital reallocation effects, as the latest available climate data are from 2023.

Overall, the decrease in issuers' emissions was responsible for most of the decline in scope 1 and 2 carbon intensity associated with the portfolios, with inflation possibly leading to the emissions reduction path being overstated. In addition, capital reallocation effects were responsible for about 26% of the substantial emissions reduction observed between 2021 and 2024. This was the case, for example, in high-emitting sectors such as construction and materials, and infrastructure and transport. The tilting policy was active for 27 out of the 36 months in this period and affected €26.1 billion in reinvestments.

The ECB is aware that inflation continues to have a positive impact on metrics of issuers' carbon efficiency. Over time, this could lead to a downward bias in metrics such as the WACI, which are not adjusted for inflation. Currently, there is no widely used methodology available to robustly adjust for the impact of inflation on the WACI. However, the ECB internally monitors inflation-adjusted metrics associated with the APP and PEPP corporate portfolios when assessing the decrease in the emissions associated with these portfolios and the support they provide to the EU's climate neutrality objectives.

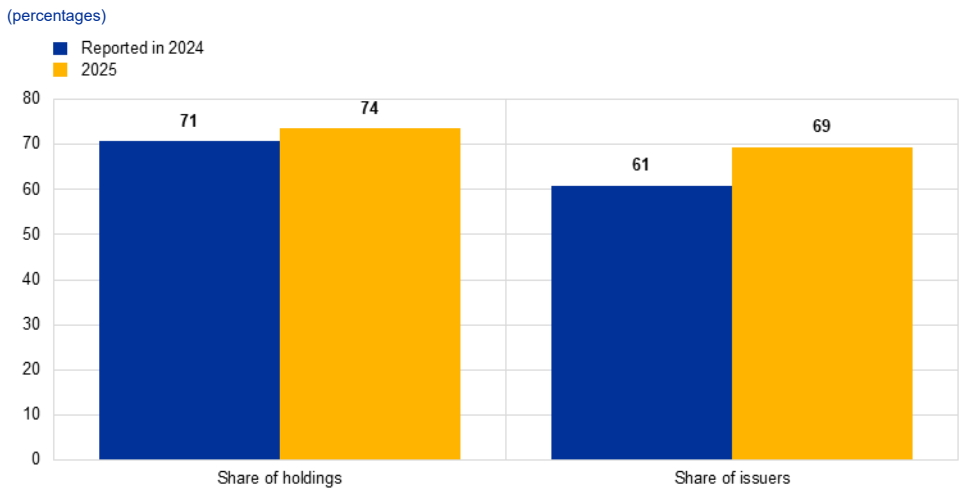
The corporate portfolios' share of assets associated with certified science-based forward-looking emissions reduction targets increased to 74% in 2024 from 71% the previous year (Chart 14).[37] This increase was primarily driven by (i) the tilting framework, which assigns higher forward-looking sub-scores to issuers with

[37] Science-based targets provide a clearly defined pathway for companies and financial institutions to reduce greenhouse gas emissions. Targets are considered "science-based" if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement, i.e. limiting global warming to 1.5°C above pre-industrial levels. The Science-Based Targets initiative is a partnership between the CDP, the United Nations Global Compact, World Resources Institute and the World Wide Fund for Nature.

scienced-based and verified ambitious targets, and (ii) the growing number of issuers setting such targets. As only 69% of all eligible issuer groups have carbon reduction targets, the portfolios' corporate holdings continue to be skewed towards more ambitious issuers. In the run-off phase, further developments will be driven mainly by issuers' emissions reduction efforts and the maturity profile of the holdings.

**Chart 14**

Share of holdings and issuers in the corporate sector portfolios with science-based carbon reduction targets




Sources: Institutional Shareholder Services, Science-Based Targets initiative, issuers' annual reports and climate reports, and ECB calculations.

The share of green bonds in the eligible corporate bond universe increased further to over 15% by the end of 2024 compared with 13.5% at the end of 2023. This was due to the leading role played by euro area corporates in financing the green transition (Chart 15). The share of green bonds in the corporate sector portfolios also continued to increase, albeit at a slower pace than their share in the eligible universe. There are two reasons for this relative under-allocation. First, the prohibition on monetary financing prevented the Eurosystem from placing primary market bids for bonds from government-owned entities. This restriction applied to corporate green bonds that were issued during the active purchase phase and that pertained to government-owned entities in the industrial sector (e.g. utilities). Second, limited reinvestments in 2024 also meant that the share of green bonds in the corporate sector portfolios grew more slowly than their share in the eligible universe.

During the active tilting phase, the Eurosystem placed frequent primary market bids for eligible green bonds. In 2024, purchases only took place for the partial PEPP reinvestments, and the primary market activity of the Eurosystem was concentrated on qualifying green and regular bonds from issuers with a strong climate performance. These measures contributed to the growth in the share of green bonds in the corporate portfolios. The aggregate nominal share of sustainability-linked bonds, sustainable bonds and social bonds aligned with the ICMA principles stood at 2.9% of the portfolio holdings in 2024. This was close to, but slightly below, their aggregate share in the eligible universe, which stood at 4%.

**Chart 15**

Share of green bonds in the corporate bond holdings under the CSPP and PEPP

(percentages)


Sources: ICMA and ECB calculations.
Notes: The chart shows the share of green bonds in corporate bond holdings under the CSPP and PEPP over time compared with the universe. To identify green bonds, the ECB relies on the labelling applied by the ICMA. The calculation is based on bonds' nominal values. Underlying holdings refer to year-end values.

## Corporate exposure to nature-related priority sectors

This report discloses for the first time the Eurosystem's exposure to nature-related priority sectors in its corporate asset portfolios, incorporating an element of the framework of the Taskforce on Nature-related Financial Disclosures.[38] This disclosure is the first step towards assessing the Eurosystem's exposure to sectors considered to have material nature-related dependencies or impacts. The gradual approach acknowledges the current limitations of methodologies and data.

The corporate exposure metric provides an overview of potential, rather than actual, dependencies of, or impacts on, nature. Although companies within the priority sectors are more likely to have impacts and dependencies, these are influenced by various factors, such as the company's location, action taken to limit the impacts and dependencies, and the robustness of the company's supply chains. Identifying actual dependencies, and measuring the financial implications that nature-related risks may have, requires further analysis. Identifying priority sectors from the outset could help to provide guidance in this respect.

At the end of 2024, exposures to the three most material nature-related priority sectors in the Eurosystem's corporate holdings were (i) utilities, commercial and professional services (16%), (ii) food and beverage (8%), and (iii) real estate, consumer durables and apparel, and capital goods (6%). On aggregate, 30% of the Eurosystem's corporate holdings were exposed to the three top sectors that are considered to have material nature-related dependencies or impacts.

[38] The metric disclosed is the "Financial institution core disclosure metric (FI.C0.0) – Exposure to sectors" of the Taskforce on Nature-related Financial Disclosures.

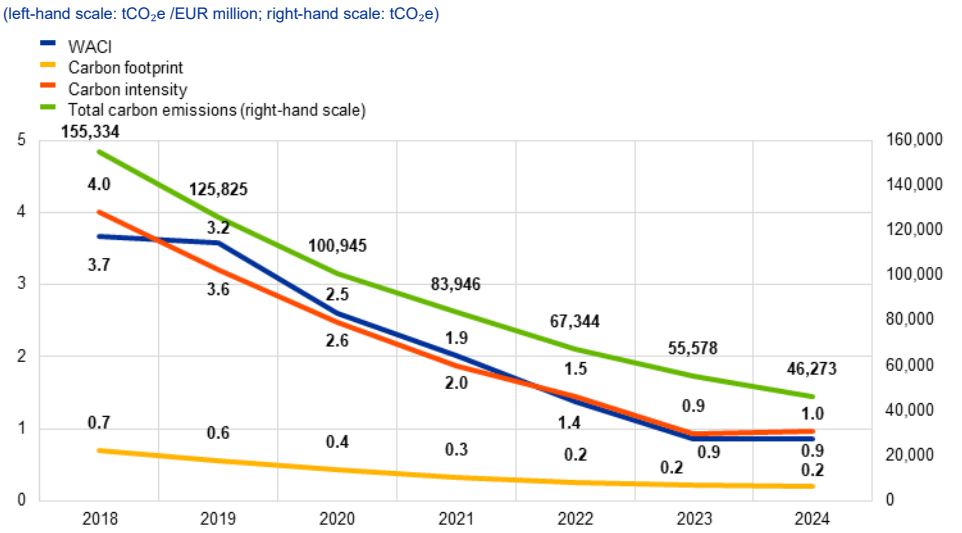
### 5.1.3 Covered bond metrics

Covered bonds accounted for 6% of the total CBPP3 and PEPP holdings as at the end of 2024. Since cover pool-specific emissions data remain fragmented, emissions financed by the issuing banks via their investments and loans are not included in the analysis. Self-reported data from covered bond issuers on climate metrics for cover pools would provide investors with the necessary information to properly assess climate-related risks. Cover pool-related emissions will be included in the analysis as soon as data availability and quality allow.

Chart 16 shows a falling trend in scope 1 and 2 emissions for covered bond holdings across all metrics, with declines of over 70% since 2018. These declines have been driven by emissions reduction trends at issuer level, which offset the effects of an increase in portfolio size. The scope 3 carbon emissions accounted for almost 100% of the total carbon emissions of the CBPP3 and PEPP covered bond holdings in 2024.

**Chart 16**

Developments in key scope 1 and 2 metrics for covered bond holdings under the CBPP3 and PEPP



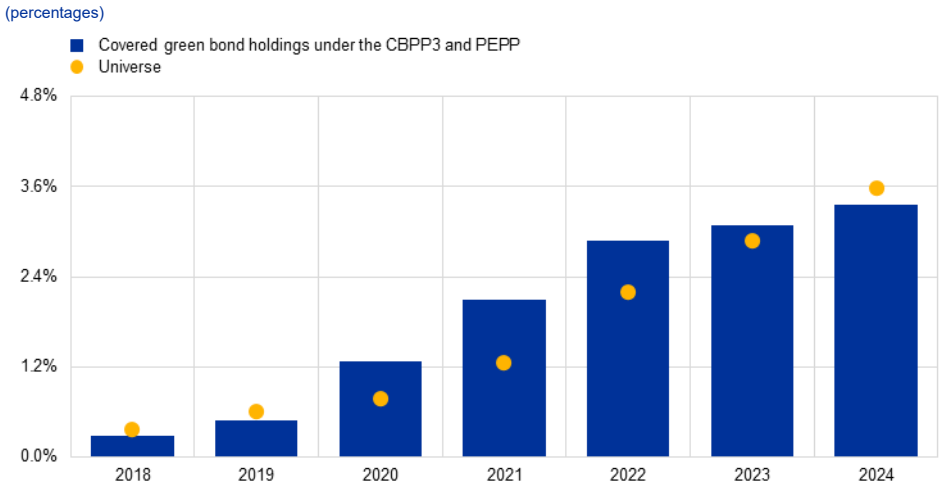

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
Notes: The chart shows historic values of the key metrics for the covered bond holdings under the CBPP3 and PEPP, based on issuers' scope 1 and 2 emissions. Metrics are calculated using bonds' nominal values. Emissions normalisation in the WACI and carbon intensity metrics is based on revenue in EUR millions, while emissions normalisation in the carbon footprint metric is based on the investment amount in EUR millions. Underlying holdings refer to year-end values.

The share of green bonds in the covered bond holdings continued to increase gradually in 2024, albeit at a slightly slower pace than the share of green bonds in the eligible universe owing to the full run-off of the CBPP3 (Chart 17). Although still at low levels, the share of green covered bonds in the eligible universe expanded further to 3.6% in 2024, supported by an increasing number of inaugural issuers and low redemptions. Order books indicate that issuers of green covered bonds benefit from a broader investor base, which results in higher bid-to-cover ratios or investor demand in primary market issuances. The aggregate share of sustainable and social covered bonds aligned with the ICMA principles and guidelines stood at the very low

level of around 1% of CBPP3 and PEPP nominal covered bond holdings and was broadly in line with the share of these bonds in the eligible universe.

**Chart 17**

Share of green bonds in covered bond holdings under the CBPP3 and PEPP




Sources: ICMA and ECB calculations.
Notes: The chart shows the share of green bonds in covered bond holdings under the CBPP3 and PEPP over time compared with the universe. To identify green bonds, the ECB relies on the labelling applied by the ICMA. The calculation is based on bonds' nominal values. Underlying holdings refer to year-end values.

### 5.1.4 Targets

The Eurosystem does not define targets for its public sector and covered bond holdings under the APP and PEPP. Sovereign bond holdings are expected to decarbonise in line with action by national governments to deliver on their emissions reduction pledges under the Paris Agreement and as required by the European Climate Law. The ECB calls upon governments to deliver on these pledges. Supranational, agency and covered bond holdings will mirror the emissions reductions achieved by their respective issuers.

Meanwhile, targets continue to fulfil an essential forward-looking role for Eurosystem corporate bond holdings. Targets reflect the Eurosystem's commitment to reduce the portfolios' exposure to climate-related risks as well as their environmental footprint. Importantly, climate-related targets for the corporate bond holdings can only be pursued without prejudice to the ECB's price stability objective and are therefore conditional on and thus constrained by monetary policy considerations.

By reducing the emissions associated with its corporate bond holdings, the Eurosystem aims to address the financial risks related to climate change in its monetary policy operations and to place the holdings on a path that supports the goals of the Paris Agreement and the European Climate Law. In doing so, the Eurosystem is targeting a decarbonisation trajectory consistent with achieving carbon neutrality for its corporate bond portfolios by 2050[39], in line with the Paris

[39] The corporate portfolios are expected to mature by 2051 at the latest.

Agreement objective of limiting global warming to well below 2° Celsius (while pursuing efforts to limit it to 1.5° Celsius).

To support this long-term trajectory, the Eurosystem aims to reduce the weighted average emissions intensity[40] associated with its corporate bond portfolios by an average of at least 7% per year, starting from the end of 2021[41], as an interim target. The Eurosystem will monitor progress towards this interim target and will also consider the impact of inflation on the portfolios' emissions intensity trajectory. If deviations from the desired average decarbonisation trajectory are identified for the aggregate corporate portfolios, we will assess remedial action within the limits of our mandate on a case-by-case basis.

Particularly during the full run-off phase that started at the end of 2024, the decarbonisation path of the corporate bond holdings depends on several developments that are outside of the Eurosystem's control. These include issuers' effectiveness in decarbonising their operations as indicated in their plans, the changing composition of the portfolio holdings during the run-off and corporate actions (which may lead, for instance, to early redemptions). However, it is worth noting that remedial action would not be considered in response to deviations by individual issuers but only if the average decarbonisation rate for the aggregate portfolios fell short of the desired trajectory.

While certain assumptions are important in order for the expected emissions reduction trajectory to materialise, the annual review of the effective rate of emissions reduction in the corporate portfolios will allow the Governing Council to assess and decide on potential measures if meaningful deviations are observed at the aggregate level. In addition, the annual publication of the portfolios' climate-related financial disclosures will continue to ensure a high level of transparency and accountability towards the public.

## 5.2 The ECB's foreign reserves

As at the end of 2024, the ECB's foreign reserves had a total euro equivalent market value of €103.1 billion held in foreign currency portfolios, physical gold and SDRs (Chart 18).[42] The market value of the foreign reserves increased by 18% compared with 2023, mostly led by the strong appreciation of gold, and to a lesser extent by foreign exchange movements. The three currencies included in the reserves are the United States dollar, the Japanese yen and the Chinese renminbi. These portfolios

40 Based on issuers' self-reported scope 1 and 2 emissions data as defined in the Greenhouse Gas Protocol.

41 The year 2021 is chosen as the baseline for the portfolios' decarbonisation, as it is the end of the fiscal year preceding the Eurosystem's decision to set a long-term decarbonisation goal for the corporate portfolios and tilt purchases to integrate climate risk considerations, which was taken during the second half of 2022.

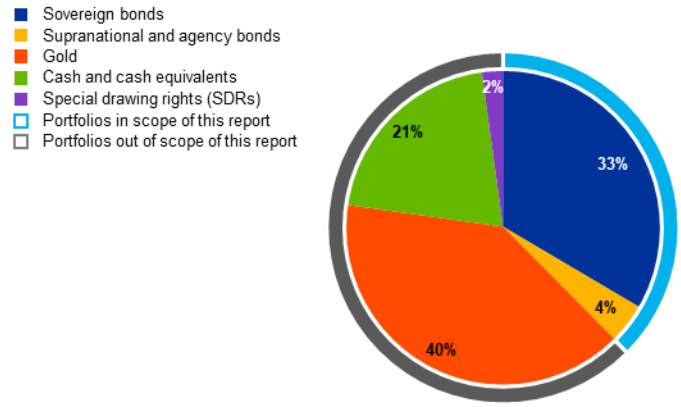
42 Special drawing rights (SDRs) are an international reserve asset created by the International Monetary Fund (IMF) to supplement the official reserves of its member countries. It is a potential claim on the freely usable currencies of IMF members. A basket of currencies defines the SDRs. The currencies are the US dollar, the euro, the Chinese renminbi, the Japanese yen and the pound.

can be further broken down into sovereign bonds, supranational and agency bonds, and cash and cash equivalents.

**Chart 18**

The ECB's foreign reserves by asset class

(percentages)

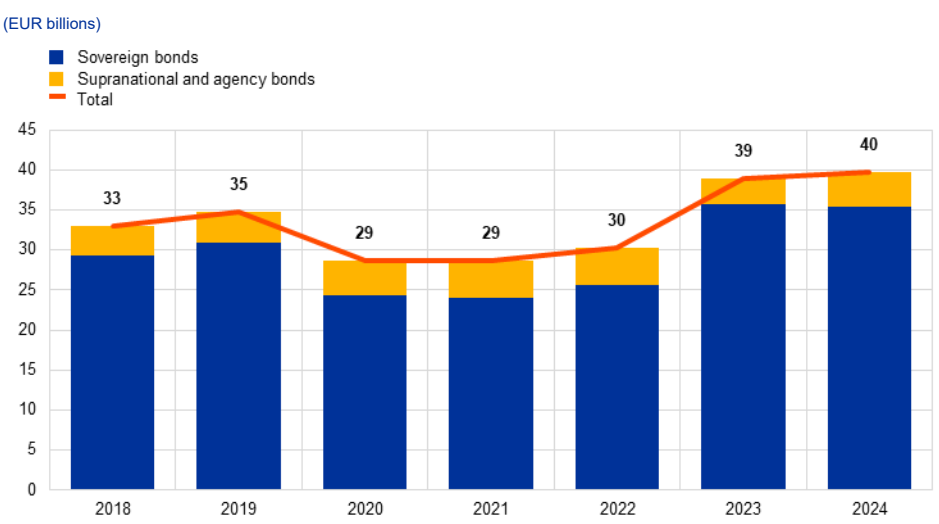



Source: ECB calculations.
Note: The chart shows the allocation of the ECB's foreign reserves across asset classes, measured in market values (please note that the rest of the report and the emissions metrics use nominal amounts).

The nominal bond holdings in all three currencies amounted to a total of €40 billion nominal value equivalent as at the end of 2024, of which 89% was attributable to sovereign bonds, 7% to supranational bonds and 4% to agency bonds (Chart 19). Physical gold, SDRs, and cash and cash equivalents (i.e. two-thirds of the holdings) are excluded from the climate-related reporting owing to a lack of guidance on their methodological treatment. After a sizeable increase in 2023 driven by cash investments in the ECB foreign reserves portfolio, the nominal amounts in bond holdings remained little changed in 2024. In terms of asset composition, there was a slight increase in the share of supranational and agency bonds at the expense of sovereign nominal holdings.

**Chart 19**

Historical developments in the ECB's foreign reserves




Source: ECB calculations.
Notes: The chart shows the historical breakdown of the ECB's foreign reserves across the asset classes covered in this report, expressed in terms of nominal value. Underlying holdings refer to year-end values.

Tables 3 and 4 show the key metrics for the ECB's foreign reserves as at the end of 2024, while Annex 5 contains a comprehensive overview of historic key metrics for the ECB foreign reserves based on scope 1 and 2 emissions, and Annex 6 contains an overview of the same historic key metrics for scope 3 emissions. In this 2024 report, the ECB reports and analyses total carbon emissions based on scope 3 in the main text for the first time. There is no historical comparison of scope 3 total carbon emissions as data quality and availability remain poor.

**Table 3**

Key climate-related metrics for sovereign issuers held in the ECB's foreign reserves portfolios at the end of 2024

| | | Sovereign and sub-sovereign bonds | | | |
|---|---|---|---|---|---|
| | | Production | | | |
| | | excl. LULUCF | incl. LULUCF | Consumption | Government |
| **Portfolio value** | EUR billion nominal value | 35.4 | | | |
| **Total carbon emissions** | $tCO_2e$ | 8,565,943 | 7,533,177 | 9,547,163 | 1,243,801 |
| **WACI** | tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure | 242 | 213 | 19 | 250 |
| **Carbon footprint** | $tCO_2e$ per EUR million invested | 242 | 213 | 270 | 35 |
| **Carbon intensity** | tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure | 242 | 213 | 18 | 239 |

**Table 4**

Financial and climate-related metrics for non-sovereign issuers held in the ECB's foreign reserves portfolios at the end of 2024

| | | Non-sovereign issuers | | |
|---|---|---|---|---|
| | | Total | Agency bonds | Supranational bonds |
| **Portfolio value** | EUR billion nominal value | 4.3 | 1.4 | 2.9 |
| **Total carbon emissions** | $tCO_2e$, scope 1+2 emissions | 103 | 16 | 87 |
| | $tCO_2e$, scope 3 emissions | 480,873 | 302,161 | 178,712 |
| **WACI** | $tCO_2e$ per EUR million revenue, scope 1+2 emissions | 0.5 | 0.2 | 0.7 |
| **Carbon footprint** | $tCO_2e$ per EUR million invested, scope 1+2 emissions | 0.0 | 0.0 | 0.1 |
| **Carbon intensity** | $tCO_2e$ per EUR million revenue, scope 1+2 emissions | 0.5 | 0.2 | 0.7 |

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: Metrics are calculated using bonds' nominal values.

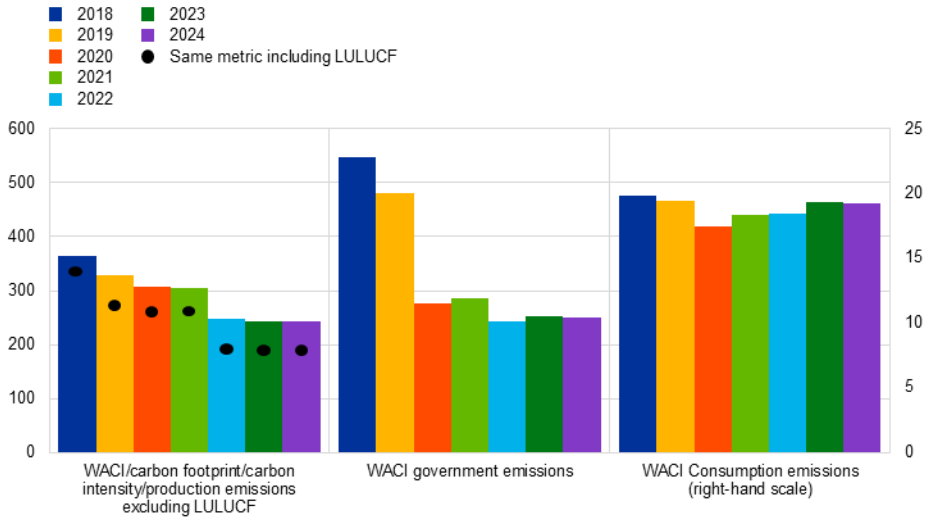
### 5.2.1 Sovereign bond metrics

Chart 20 shows the WACI for the sovereign bond holdings in the ECB's foreign reserves. Since 2018 the WACI has declined for production, consumption and government emissions, with the largest relative decline coming in government emissions. The decline in the WACI for government emissions in 2022 is due to macroeconomic factors. This is because, following a change in the methodology used by the Partnership for Carbon Accounting Financials, government emissions have not been updated from 2021 onwards. As signatories to the Paris Agreement, the United States, Japan and China had committed to climate action by submitting climate action plans to reduce their emissions over time. On 20 January 2025, the United States announced that it was withdrawing from the Paris Agreement with immediate effect and would not be implementing its nationally determined contribution. The WACI including the effects of LULUCF activities was lower by 11% on average compared with the metric excluding these effects. This indicates that direct human-induced LULUCF activities in the United States, Japan and China had a net carbon-absorbing effect on a portfolio aggregate basis. The largest relative decline in the key metrics took place in government emissions (indicated by a 54% decrease in the WACI at 2021 emissions levels), with a particularly steep fall between 2019 and 2020 as a result of the pandemic. Government consumption emissions have remained at low relative levels in the past years, which is consistent with the commitment countries have made to decarbonising their economies.

**Chart 20**

Developments in the WACI for sovereign bond holdings in the ECB's foreign reserves

(left-hand scale: $tCO_2e$ per EUR million; right-hand scale: $tCO_2e$ per capita)




Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: The WACI is illustrated for production, consumption, and government emissions. Production and government emissions are based on data provided by Institutional Shareholder Services; consumption emissions are based on data provided by Carbon4 Finance. Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). The WACI is denominated in $tCO_2e$ per EUR million GDP (production emissions), $tCO_2e$ per EUR million government consumption (government emissions) and $tCO_2e$ per capita (consumption emissions). Metrics are calculated using bonds' nominal values. Underlying holdings refer to year-end values.

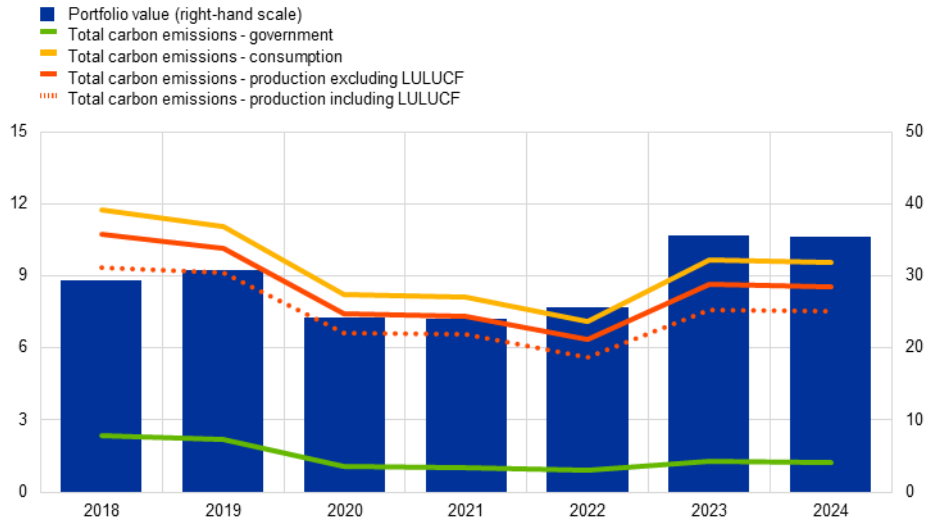
Total carbon emissions continued to decline in 2022, most notably in the case of production emissions (Chart 21). The fall in production emissions was driven by a combination of a reduction in emissions from economic activity within the countries concerned and an increase in PPP-adjusted GDP (an indicator of the normalisation of domestically produced emissions) owing to the rebound after the pandemic lockdowns. The increase in sovereign carbon production emissions in 2023 reflects the growth in the size of the ECB's portfolio (an increase of 40%, or €10 billion, in the nominal amount of sovereign bonds). The level of consumption emissions exceeds that of production emissions, reflecting the fact that the three countries represented in the ECB's foreign reserves are net carbon importers. The emissions directly attributable to government activity are comparatively small.

The overall emissions reduction trend in 2023 and 2024 may be overstated, as emissions data are only available up to 2022 for production and consumption emissions and up to 2021 for government emissions, while macroeconomic data are available up to 2023. The data mismatch will be corrected retrospectively in next year's report as the emissions data become available. Owing to the lack of green bonds in the eligible investment universe, no sovereign green bonds are held in the ECB's foreign reserve portfolio. In addition, no social, sustainability and sustainability-linked sovereign bonds aligned with the relevant ICMA principles and guidelines were held in the ECB's foreign reserves portfolio in 2024. In February 2024, the Japanese government began issuing Japan Climate Transition Bonds and set a target of providing JPY 20 trillion in support for green transformation efforts over the coming decade, with the goal of achieving a decarbonised society.

**Chart 21**

Developments in total carbon emissions and portfolio value for sovereign bond holdings in the ECB's foreign reserves

(left-hand scale: millions $tCO_2e$; right-hand scale: EUR billions nominal value)

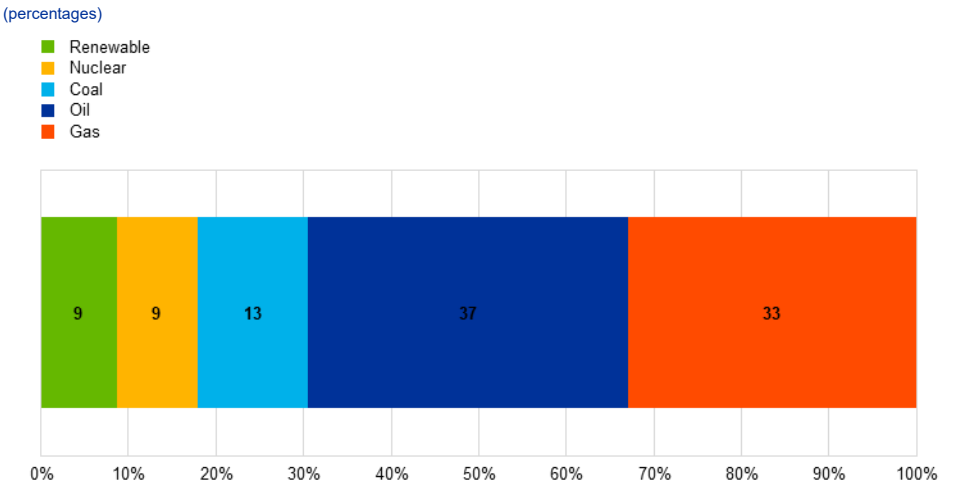



Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: Production and government emissions are based on data provided by Institutional Shareholder Services; consumption emissions are based on data provided by Carbon4 Finance. Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). Metrics are calculated using bonds' nominal values. Underlying holdings refer to year-end values.

Monitoring countries' energy mix can provide insights into the progress made on their low-carbon energy transition. Chart 22 shows the weighted average energy supply mix of the sovereign bond issuers in the ECB's foreign reserves in 2024. Renewable energy and low-carbon nuclear energy together account for less than one-fifth of total energy supply, while fossil fuels including coal, oil and gas account for over 80% of the total energy supply. This indicates that the European Union's transition towards renewable energy (as reflected in the sovereign holdings of the APP and PEPP portfolios) is progressing faster than that of the United States, Japan and China (as measured on an aggregate portfolio basis for the ECB's foreign reserves).

**Chart 22**

Total energy supply mix of sovereign bond issuers in the ECB's foreign reserves in 2024




Sources: Institutional Shareholder Services and ECB calculations.
Notes: The chart shows the weighted average total energy supply mix of the sovereign bond issuers in the ECB's foreign reserves. Weighting is conducted using bonds' nominal values. Total energy supply represents the quantity of all energy necessary to satisfy inland consumption. It is defined as production + imports - exports - international marine bunkers - international aviation bunkers +/- stock changes.

### 5.2.2 Supranational and agency bond metrics

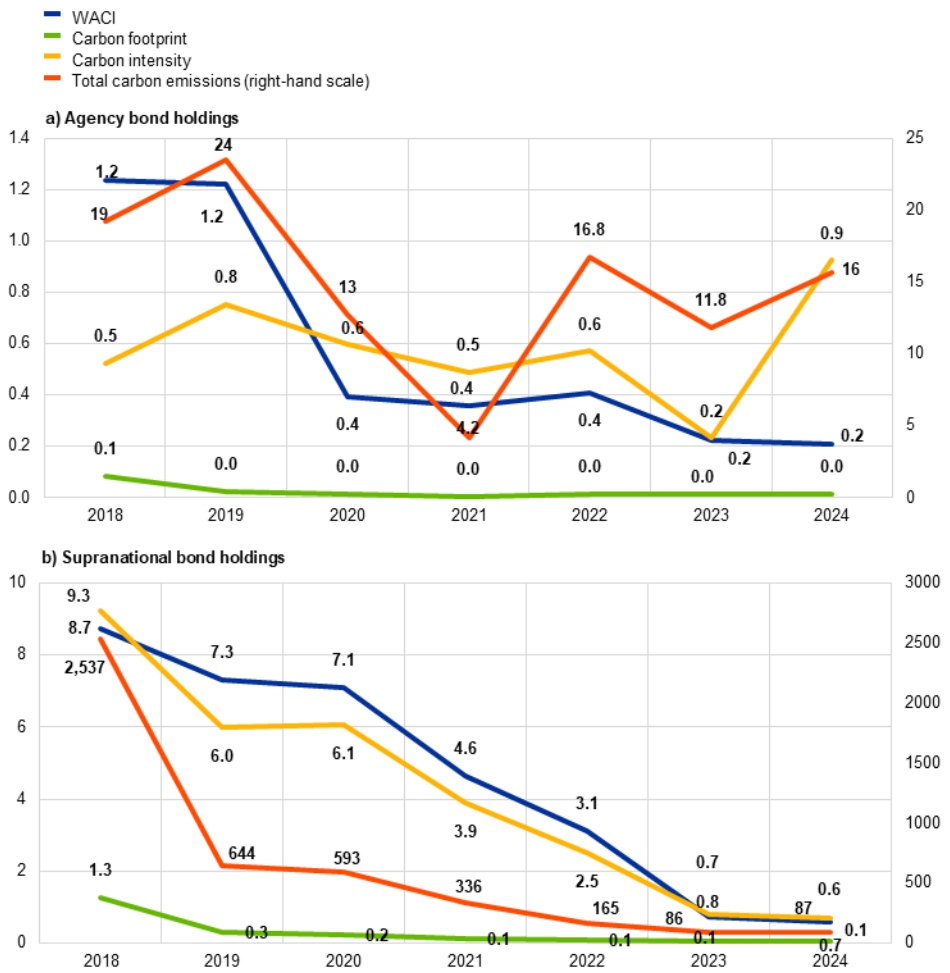
Emissions associated with supranational and agency bond holdings account for only a minor part of the ECB's foreign reserves. The availability of climate data for supranational and agency issuers fluctuates over time, depending on coverage-related decisions taken by the climate data providers. For supranational entities, 2023 coverage is lower than it was in 2021 and 2022. This trend makes it complicated to interpret changes in the key metrics over time, as sudden jumps may reflect changes in data coverage rather than meaningful trends. In addition, owing to the low levels of the metrics for these holdings, small year-on-year changes may appear large when expressed in percentage terms.

Panel a) of Chart 23 shows a declining trend in the scope 1 and 2 carbon footprint and WACI metrics for holdings of agencies. Total scope 1 and 2 carbon emissions have increased since 2022. This is due to the shifts in portfolio holdings and changes in data coverage of financial metrics affecting one issuer and an increase in reported emissions for another issuer. Panel b) shows a declining trend in all four key metrics for holdings of supranational bonds over the reporting period, partly due to a slight reduction in the allocation to supranational bonds. Scope 3 carbon emissions stood at 480 million tCO2e in 2024, accounting for almost all of the total carbon emissions of the supranational and agency bond holdings.

**Chart 23**

Developments in key scope 1 and 2 metrics for supranational and agency bond holdings in the ECB's foreign reserves

(left-hand scale: $tCO_2e$/EUR million; right-hand scale: $tCO_2e$)




Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
Notes: The chart shows historic values of the key metrics for the agency and supranational bond holdings in the ECB's foreign reserves, based on issuers' scope 1 and 2 emissions. Metrics are calculated using bonds' nominal values. Emissions normalisation in the WACI and carbon intensity metrics is based on revenue in EUR millions, while emissions normalisation in the carbon footprint metric is based on investment amount in EUR millions. Underlying holdings refer to year-end values.

The ECB's foreign reserves are invested in green, social and sustainable bonds issued by agencies and supranational institutions, with the proceeds providing funding for projects enabling a just transition towards a low-carbon economy and for social projects. In 2024 sustainable bonds aligned with the relevant ICMA principles and guidelines represented 21.8% of the aggregate nominal holdings of supranational and agency bonds, while green and social bonds accounted for only very small shares.

## 5.2.3 Targets

The ECB does not define emissions reduction targets for its foreign reserves. Sovereign bond holdings from Japan and China are expected to decarbonise in line

with national governments delivering on their commitments under the Paris Agreement. On 20 January 2025, the United States announced that it was withdrawing from the Paris Agreement and would not be implementing its nationally determined contribution. Supranational and agency bond holdings will mirror the emissions reduction paths of their respective issuers.

# Annexes

## Annex 1

### Elements of the Eurosystem common disclosure principles for the "Metrics and targets" category

| Element | Details |
|---|---|
| **Weighted average carbon intensity (WACI)** | $= \sum_{i=1}^{n} \left( \frac{\text{current value of investment}_i}{\text{current portfolio value}} \right) \text{x} \left( \frac{\text{issuer's carbon emissions}_i}{\text{issuer's revenue, PPP adj. GDP, population, or final consumption expenditure}_i} \right)$ |
| **Total carbon emissions** | $= \sum_{i=1}^{n} \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \text{x issuer's carbon emissions}_i \right)$ |
| **Carbon footprint** | $= \frac{\sum_{i=1}^{n} \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \right) \text{x issuer's carbon emissions}_i}{\text{current portfolio value}}$ |
| **Green bond share** | Share of fixed-income portfolios based on ICMA's Green Bond Principles. |
| **Aggregate share of sustainability, sustainability-linked and social bonds** | Share of fixed-income portfolios based on ICMA's Sustainability Bond Guidelines, Sustainability-linked Bond Principles and Social Bond Principles. |
| **Portfolio size** | Expressed in EUR billions. |
| **Asset classes** | All asset classes of the portfolio, with metrics to be shown per asset class. |
| **Data availability** | Indicated in brackets as a percentage for each metric and asset class. |
| **Emissions scope** | Scope 1 and 2 emissions metrics, together with scope 3 (reported separately) subject to possible exemptions for some asset classes (covered bonds, supranational bonds and agencies) |
| **Data sources** | Such as the names of the (climate) data providers. |
| **Target** | At least one broadly defined long-term target that covers all NMPPs under management control of the central bank and is aligned with the goals of the Paris Agreement and the EU's climate neutrality objectives. Targets can be set at portfolio level, central bank level, or a combination of both. Targets should ideally be quantitative. |

Notes: The formulae of the Task Force for Climate-related Financial Disclosures are provided here. For the Eurosystem disclosure framework, they have been adjusted where necessary to reflect the latest guidance from the Partnership for Carbon Accounting Financials and cover additional asset classes.

In addition to the elements of the Eurosystem common disclosure principles, the ECB publishes the carbon intensity metric and the corporate exposure to nature-related priority sectors, which are defined as:

$$\text{Carbon Intensity} = \frac{\sum_{i=1}^{n} \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \right) \text{x issuer's carbon emissions}_i}{\sum_{i=1}^{n} \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \text{x} \begin{matrix} \text{issuer's revenue, PPP adj. GDP,} \\ \text{population, or final consumption} \\ \text{expenditure} \end{matrix}_i \right)}$$

### Corporate exposure to nature-related priority sectors

$$= \frac{\sum_{i=1}^{n} \text{current value of investment}_i \text{ x issuer's sector TNFD priority}_i}{\text{current portfolio value}}$$

where issuer's sector TNFD priority$_i$ equals 1 if sector is listed in the TNFD priority sectors, and 0 if it is not listed.

## Annex 2

Carbon emissions allocation methods, normalisation factors and attribution factors

### Allocation

| Issuer type | Factor | Remarks | Unit |
|---|---|---|---|
| **Corporate, supranational and agency** | Scope 1, 2 and 3 emissions | Scope 1 comprises direct carbon emissions that occur from sources that are controlled or owned by an organisation (e.g. emissions associated with fuel combustion in boilers, furnaces, vehicles). Scope 2 comprises indirect carbon emissions associated with the purchase of electricity, steam, heat, or cooling. Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 2 emissions do not differentiate between market-based and location-based emissions, and the data providers used for the report prioritise market-based emissions when both are available. | $tCO_2e$ |
| **Sovereign** | Production emissions | Emissions produced domestically within a country's physical borders, including domestic consumption and exports. This definition follows the territorial emissions approach adopted by the United Nations Framework Convention on Climate Change for annual national inventories. Production emissions are reported excluding and including the effects of land use, land-use change and forestry (LULUCF). | $tCO_2e$ |
| | Consumption emissions | Emissions related to domestic demand, accounting for trade effects. This metric provides a broader view of a sovereign's emissions and tackles the issue of carbon leakage that arises due to production shifts from countries where goods are consumed later. | $tCO_2e$ |
| | Government emissions | Direct emissions (e.g. from buildings, vehicles) and indirect emissions (e.g. emissions related to energy consumption, but also expenditures, subsidies and investments) of the central government. | $tCO_2e$ |

### Normalisation

| Issuer type | Factor | Remarks | Unit |
|---|---|---|---|
| **Corporate, supranational and agency** | Revenue | The total amount of income generated by the sale of goods and services related to the primary operations of the business. Commercial revenue may also be referred to as sales or as turnover. | EUR millions |
| **Sovereign** | Production: PPP-adjusted GDP | GDP is the sum of gross value added by all resident producers plus any product taxes and minus any subsidies not included in the value of the products. The purchasing power parity (PPP) conversion factor is a spatial price deflator and currency converter that eliminates effects of differences in countries' price levels. | EUR millions |
| | Consumption: Population | Total population of a country. | People |
| | Government: Final consumption expenditure | General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and security but excludes government military expenditures that are part of government capital formation. | EUR millions |

### Attribution

| Asset class | Factor | Remarks | Unit |
|---|---|---|---|
| **Sovereign bonds** | PPP-adjusted GDP | See description of factor "PPP-adjusted GDP" in "Normalisation". | EUR |
| **Supranational and agency bonds**<br>**Corporate bonds**<br>**Covered bonds** | EVIC | The sum of the market capitalisation of ordinary shares at fiscal year-end, the market capitalisation of preferred shares at fiscal year-end, and the book values of total debt and minorities' interests. | EUR |

## Annex 3

Climate-related metrics of the Eurosystem's APP and PEPP portfolios – scopes 1 and 2

**Portfolio value (EUR billion nominal value)**

| APP and PEPP | Sovereign issuers | | | | Other issuers | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Sovereign and sub-sovereign bonds | | | | | | | | |
| | Production | | Consumption | Government | Total | Agency bonds | Supra-national bonds | Covered bonds | Corporate bonds |
| | excl. LULUCF | incl. LULUCF | | | | | | | |
| 2024 | 3,006.6 | | | | 1,068.6 | 274.7 | 203.9 | 258.6 | 331.4 |
| 2023 | 3,259.8 | | | | 1,187.1 | 298.1 | 231.2 | 290.8 | 367.0 |
| 2022 | 3,386.3 | | | | 1,242.9 | 298.0 | 254.0 | 305.6 | 385.2 |
| 2021 | 3,189.4 | | | | 1,160.9 | 262.1 | 254.0 | 299.3 | 345.5 |
| 2020 | 2,355.4 | | | | 1,018.3 | 201.0 | 244.8 | 285.1 | 287.5 |
| 2019 | 1,586.9 | | | | 782.3 | 148.1 | 195.7 | 258.3 | 180.3 |
| 2018 | 1,583.9 | | | | 763.8 | 140.7 | 193.8 | 256.1 | 173.1 |

**WACI (tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2024 | 128 | 122 | 9.7 | 63 | 51 | 2.4 | 0.1 | 0.9 | 165 |
| | 100% | 100% | 100% | 100% | 94% | 91% | 100% | 96% | 93% |
| 2023 | 128 | 123 | 9.7 | 63 | 53 | 2.3 | 0.1 | 0.9 | 167 |
| | 100% | 100% | 100% | 100% | 95% | 92% | 100% | 93% | 96% |
| 2022 | 129 | 123 | 9.8 | 61 | 58 | 3.8 | 0.2 | 1.4 | 184 |
| | 100% | 100% | 100% | 100% | 96% | 96% | 100% | 94% | 96% |
| 2021 | 165 | 157 | 9.8 | 75 | 89 | 6.6 | 0.2 | 2.0 | 266 |
| | 100% | 100% | 100% | 100% | 88% | 98% | 62% | 92% | 96% |
| 2020 | 164 | 154 | 9.1 | 71 | 97 | 5.8 | 0.2 | 2.6 | 289 |
| | 100% | 100% | 100% | 100% | 82% | 83% | 61% | 86% | 96% |
| 2019 | 171 | 162 | 10 | 120 | 87 | 5.5 | 0.5 | 3.6 | 316 |
| | 100% | 100% | 100% | 100% | 79% | 90% | 43% | 91% | 92% |
| 2018 | 202 | 191 | 10 | 141 | 105 | 3.9 | 0.3 | 3.7 | 372 |
| | 100% | 100% | 100% | 100% | 75% | 80% | 42% | 87% | 91% |

### Total carbon emissions (scope 1 and 2 in tCO2e)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2024** | 385,360,764 | 368,118,968 | 506,863,293 | 38,478,965 | 33,088,600 | 189,601 | 1,284 | 46,273 | 32,851,441 |
| | 100% | 100% | 100% | 100% | 93% | 91% | 100% | 93% | 92% |
| **2023** | 417,783,815 | 399,353,291 | 549,366,762 | 41,740,176 | 40,911,825 | 215,991 | 1,548 | 55,578 | 40,638,708 |
| | 100% | 100% | 100% | 100% | 94% | 91% | 100% | 90% | 96% |
| **2022** | 435,225,409 | 415,888,142 | 571,878,833 | 43,540,056 | 56,391,041 | 301,439 | 826 | 67,344 | 56,021,433 |
| | 100% | 100% | 100% | 100% | 94% | 94% | 100% | 89% | 96% |
| **2021** | 524,975,843 | 499,298,722 | 672,886,718 | 51,140,727 | 55,585,135 | 296,964 | 888 | 83,946 | 55,203,337 |
| | 100% | 100% | 100% | 100% | 85% | 89% | 62% | 88% | 95% |
| **2020** | 385,707,626 | 362,793,333 | 485,547,462 | 36,976,642 | 47,583,955 | 166,559 | 845 | 100,945 | 47,315,607 |
| | 100% | 100% | 100% | 100% | 77% | 79% | 46% | 83% | 96% |
| **2019** | 271,742,701 | 257,189,543 | 338,146,657 | 37,981,432 | 32,434,532 | 170,901 | 1,630 | 125,825 | 32,136,176 |
| | 100% | 100% | 100% | 100% | 76% | 84% | 43% | 87% | 92% |
| **2018** | 319,185,784 | 302,998,259 | 397,425,747 | 44,541,683 | 38,256,411 | 20,010 | 909 | 155,334 | 38,080,158 |
| | 100% | 100% | 100% | 100% | 75% | 79% | 42% | 87% | 91% |

### Carbon footprint (tCO2e per EUR million invested)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2024** | 128 | 122 | 169 | 13 | 33 | 0.8 | 0.0 | 0.2 | 108 |
| | 100% | 100% | 100% | 100% | 93% | 91% | 100% | 93% | 92% |
| **2023** | 128 | 123 | 169 | 13 | 37 | 0.8 | 0.0 | 0.2 | 116 |
| | 100% | 100% | 100% | 100% | 94% | 91% | 100% | 90% | 96% |
| **2022** | 129 | 123 | 169 | 13 | 48 | 1.1 | 0.0 | 0.2 | 152 |
| | 100% | 100% | 100% | 100% | 94% | 94% | 100% | 89% | 96% |
| **2021** | 165 | 157 | 211 | 16 | 56 | 1.3 | 0.0 | 0.3 | 168 |
| | 100% | 100% | 100% | 100% | 85% | 89% | 62% | 88% | 95% |
| **2020** | 164 | 154 | 206 | 16 | 61 | 1.0 | 0.0 | 0.4 | 172 |
| | 100% | 100% | 100% | 100% | 77% | 79% | 46% | 83% | 96% |
| **2019** | 171 | 162 | 213 | 24 | 54 | 1.4 | 0.0 | 0.6 | 195 |
| | 100% | 100% | 100% | 100% | 76% | 84% | 43% | 87% | 92% |
| **2018** | 202 | 191 | 251 | 28 | 67 | 0.2 | 0.0 | 0.7 | 241 |
| | 100% | 100% | 100% | 100% | 75% | 79% | 42% | 87% | 91% |

**Carbon Intensity (tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure)**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **2024** | 128 | 122 | 9 | 62 | 127 | 11 | 0.1 | 1.0 | 178 |
| | 100% | 100% | 100% | 100% | 93% | 91% | 100% | 93% | 92% |
| **2023** | 128 | 123 | 9 | 62 | 126 | 11 | 0.1 | 0.9 | 175 |
| | 100% | 100% | 100% | 100% | 94% | 91% | 100% | 90% | 96% |
| **2022** | 129 | 123 | 9 | 61 | 160 | 12 | 0.1 | 1.5 | 204 |
| | 100% | 100% | 100% | 100% | 94% | 94% | 100% | 89% | 96% |
| **2021** | 165 | 157 | 10 | 74 | 222 | 24 | 0.1 | 1.9 | 295 |
| | 100% | 100% | 100% | 100% | 85% | 89% | 62% | 88% | 95% |
| **2020** | 164 | 154 | 8.8 | 71 | 234 | 31 | 0.2 | 2.5 | 311 |
| | 100% | 100% | 100% | 100% | 77% | 79% | 46% | 83% | 96% |
| **2019** | 171 | 162 | 10 | 118 | 218 | 20 | 0.4 | 3.2 | 332 |
| | 100% | 100% | 100% | 100% | 76% | 84% | 43% | 87% | 92% |
| **2018** | 202 | 191 | 10 | 139 | 255 | 4.1 | 0.2 | 4.0 | 372 |
| | 100% | 100% | 100% | 100% | 75% | 79% | 42% | 87% | 91% |

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Notes: Percentages below each metric indicate data availability, calculated as the percentage of holdings for which all required data (i.e. emissions data and financial data) are available. One supranational issuer has been excluded from the calculation of metrics in 2021 owing to a data error. Scope 2 emissions do not differentiate between market-based and location-based emissions, and the data providers used for the report prioritise market-based emissions when both are available.

## Annex 4

Climate-related metrics of the Eurosystem's APP and PEPP portfolios – scope 3

### WACI (scope 3 in tCO2e/EUR million revenue)

| | Total | Agency bonds | Supranational bonds | Covered bonds | Corporate bonds |
|---|---|---|---|---|---|
| **2024** | 1,264 | 1,170 | 863 | 1,725 | 1,237 |
| | 95% | 91% | 100% | 96% | 94% |
| **2023** | 1,263 | 1,173 | 862 | 1,780 | 1,201 |
| | 95% | 92% | 100% | 93% | 97% |
| **2022** | 1,192 | 1,216 | 888 | 1,587 | 1,077 |
| | 97% | 96% | 100% | 94% | 97% |
| **2021** | 790 | 330 | 325 | 797 | 1,344 |
| | 89% | 98% | 62% | 92% | 99% |
| **2020** | 734 | 351 | 344 | 454 | 1,414 |
| | 83% | 83% | 61% | 86% | 98% |

### Total carbon emissions (scope 3 in tCO2e)

| | | | | | |
|---|---|---|---|---|---|
| **2024** | 359,464,522 | 15,443,107 | 9,755,045 | 89,052,145 | 245,214,225 |
| | 93% | 91% | 100% | 93% | 92% |
| **2023** | 436,291,283 | 17,894,058 | 11,754,909 | 107,381,871 | 299,260,445 |
| | 94% | 91% | 100% | 90% | 96% |
| **2022** | 424,710,140 | 13,006,238 | 7,056,772 | 68,673,302 | 335,973,828 |
| | 94% | 94% | 100% | 89% | 96% |
| **2021** | 333,155,861 | 4,190,967 | 1,967,203 | 32,768,967 | 294,228,723 |
| | 85% | 89% | 62% | 88% | 95% |
| **2020** | 287,534,117 | 1,816,219 | 1,668,724 | 13,970,791 | 270,078,383 |
| | 77% | 79% | 46% | 83% | 96% |

### Carbon intensity (scope 3 in tCO2e/EUR million revenue)

| | | | | | |
|---|---|---|---|---|---|
| **2024** | 1,384 | 919 | 917 | 1,858 | 1,330 |
| | 93% | 91% | 100% | 93% | 92% |
| **2023** | 1,348 | 922 | 917 | 1,794 | 1,292 |
| | 94% | 91% | 100% | 90% | 96% |
| **2022** | 1,205 | 527 | 1,013 | 1,479 | 1,225 |
| | 94% | 94% | 100% | 89% | 96% |
| **2021** | 1,332 | 335 | 331 | 734 | 1,573 |
| | 85% | 89% | 62% | 88% | 95% |
| **2020** | 1,416 | 336 | 355 | 344 | 1,774 |
| | 77% | 79% | 46% | 83% | 96% |

**Carbon footprint (scope 3 in tCO2e per EUR million invested)**

| | | | | | |
|---|---|---|---|---|---|
| **2024** | 360 | 62 | 48 | 370 | 803 |
| | 93% | 91% | 100% | 93% | 92% |
| **2023** | 391 | 66 | 51 | 409 | 853 |
| | 94% | 91% | 100% | 90% | 96% |
| **2022** | 362 | 46 | 28 | 254 | 912 |
| | 94% | 94% | 100% | 89% | 96% |
| **2021** | 338 | 18 | 13 | 124 | 894 |
| | 85% | 89% | 62% | 88% | 95% |
| **2020** | 367 | 11 | 15 | 59 | 980 |
| | 77% | 79% | 46% | 83% | 96% |

Sources: Institutional Shareholder Services and ECB calculations.
Notes: Percentages below each metric indicate data availability, calculated as the percentage of holdings for which all required data (i.e. emissions data and financial data) are available. The time series does not start until 2020 (while reporting on scope 1 and 2-based metrics starts in 2018) owing to a significant methodological change, which prevents pre-2020 metrics from being compared with those after 2020. One supranational issuer has been excluded from the calculation of metrics in 2021 owing to a data error.
Disclaimer: Scope 3 emissions are reported on a best-effort basis to aid transparency. Scope 3 emissions data remain subject to considerable quality issues which limit the reliability of the metrics. Substantial revisions to the disclosures are therefore possible in the future.

## Annex 5

Climate-related metrics of the ECB's foreign reserves portfolios – scopes 1 and 2

**Portfolio value (EUR billion nominal value)**

| FX Reserves | Sovereign issuers | | | | Other issuers | | |
|---|---|---|---|---|---|---|---|
| | Sovereign and sub-sovereign bonds | | | | | | |
| | Production | | Consumption | Government | Total | Agency bonds | Supranational bonds |
| | excl. LULUCF | incl. LULUCF | | | | | |
| 2024 | 35.4 | | | | 4.3 | 1.4 | 2.9 |
| 2023 | 36.6 | | | | 3.3 | 0.9 | 2.4 |
| 2022 | 25.6 | | | | 4.7 | 1.3 | 3.4 |
| 2021 | 24.0 | | | | 4.7 | 1.2 | 3.5 |
| 2020 | 24.3 | | | | 4.4 | 1.0 | 3.4 |
| 2019 | 30.9 | | | | 3.9 | 1.3 | 2.5 |
| 2018 | 29.3 | | | | 3.7 | 1.2 | 2.5 |

**WACI (tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2024 | 242 | 213 | 19 | 250 | 0.5 | 0.2 | 0.7 |
| | 100% | 100% | 100% | 100% | 68% | 88% | 60% |
| 2023 | 243 | 213 | 19 | 253 | 0.6 | 0.2 | 0.8 |
| | 100% | 100% | 100% | 100% | 68% | 92% | 59% |
| 2022 | 248 | 220 | 18 | 242 | 2.1 | 0.4 | 3.1 |
| | 100% | 100% | 100% | 100% | 72% | 92% | 65% |
| 2021 | 305 | 274 | 18 | 287 | 3.5 | 0.4 | 4.6 |
| | 100% | 100% | 100% | 100% | 87% | 89% | 86% |
| 2020 | 307 | 273 | 17 | 276 | 5.7 | 0.4 | 7.1 |
| | 100% | 100% | 100% | 100% | 95% | 88% | 97% |
| 2019 | 328 | 296 | 19 | 481 | 5.5 | 1.2 | 7.3 |
| | 100% | 100% | 100% | 100% | 79% | 68% | 84% |
| 2018 | 365 | 323 | 20 | 546 | 8.0 | 1.2 | 8.7 |
| | 100% | 98% | 100% | 100% | 61% | 18% | 82% |

### Total carbon emissions (scope 1 and 2 in tCO2e)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2024** | 8,565,943 | 7,533,177 | 9,547,163 | 1,243,801 | 103 | 16 | 87 |
| | 100% | 100% | 100% | 100% | 68% | 88% | 60% |
| **2023** | 8,664,914 | 7,607,726 | 9,652,442 | 1,260,598 | 98 | 12 | 86 |
| | 100% | 100% | 100% | 100% | 68% | 92% | 59% |
| **2022** | 6,359,466 | 5,631,916 | 7,097,809 | 904,404 | 182 | 17 | 165 |
| | 100% | 100% | 100% | 100% | 72% | 92% | 65% |
| **2021** | 7,309,668 | 6,566,327 | 8,109,457 | 1,036,162 | 340 | 4 | 336 |
| | 100% | 100% | 100% | 100% | 82% | 72% | 86% |
| **2020** | 7,443,158 | 6,621,136 | 8,231,312 | 1,050,386 | 606 | 13 | 593 |
| | 100% | 100% | 100% | 100% | 80% | 80% | 80% |
| **2019** | 10,126,285 | 9,152,224 | 11,057,823 | 2,176,310 | 667 | 24 | 644 |
| | 100% | 100% | 100% | 100% | 79% | 68% | 84% |
| **2018** | 10,722,559 | 9,325,777 | 11,730,770 | 2,328,107 | 2,556 | 19 | 2,537 |
| | 100% | 98% | 100% | 100% | 61% | 18% | 82% |

### Carbon footprint (tCO2e per EUR million invested)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2024** | 242 | 213 | 270 | 35 | 0.0 | 0.0 | 0.1 |
| | 100% | 100% | 100% | 100% | 68% | 88% | 60% |
| **2023** | 243 | 213 | 271 | 35 | 0.0 | 0.0 | 0.1 |
| | 100% | 100% | 100% | 100% | 68% | 92% | 59% |
| **2022** | 248 | 220 | 277 | 35 | 0.1 | 0.0 | 0.1 |
| | 100% | 100% | 100% | 100% | 72% | 92% | 65% |
| **2021** | 305 | 274 | 339 | 43 | 0.1 | 0.0 | 0.1 |
| | 100% | 100% | 100% | 100% | 82% | 72% | 86% |
| **2020** | 307 | 273 | 339 | 43 | 0.2 | 0.0 | 0.2 |
| | 100% | 100% | 100% | 100% | 80% | 80% | 80% |
| **2019** | 328 | 296 | 358 | 70 | 0.2 | 0.0 | 0.3 |
| | 100% | 100% | 100% | 100% | 79% | 68% | 84% |
| **2018** | 365 | 323 | 400 | 79 | 1.136 | 0.1 | 1.3 |
| | 100% | 98% | 100% | 100% | 61% | 18% | 82% |

**Carbon Intensity (tCO2e per EUR million PPP-adj. GDP, or per capita, or per EUR million final consumption expenditure)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2024** | 242 | 213 | 18 | 239 | 0.5 | 0.2 | 0.7 |
| | 100% | 100% | 100% | 0% | 68% | 88% | 60% |
| **2023** | 243 | 213 | 18 | 239 | 0.6 | 0.3 | 0.8 |
| | 100% | 100% | 100% | 100% | 68% | 92% | 59% |
| **2022** | 248 | 220 | 17 | 243 | 1.9 | 0.6 | 2.5 |
| | 100% | 100% | 100% | 100% | 72% | 92% | 65% |
| **2021** | 305 | 274 | 17 | 227 | 3.6 | 0.5 | 3.9 |
| | 100% | 100% | 100% | 100% | 82% | 72% | 86% |
| **2020** | 307 | 273 | 16 | 271 | 5.1 | 0.6 | 6.1 |
| | 100% | 100% | 100% | 100% | 80% | 80% | 80% |
| **2019** | 328 | 296 | 18 | 263 | 4.8 | 0.8 | 6.0 |
| | 100% | 100% | 100% | 100% | 79% | 68% | 84% |
| **2018** | 365 | 318 | 19 | 465 | 8.2 | 0.5 | 9.3 |
| | 100% | 98% | 100% | 100% | 61% | 18% | 82% |

Sources: Institutional Shareholder Services, Carbon4 Finance, World Bank, Bloomberg, United Nations Framework Convention on Climate Change and ECB calculations.
Note: Percentages below each metric indicate data availability, calculated as the percentage of holdings for which all required data (i.e. emissions data and financial data) are available.

## Annex 6

Climate-related metrics of the ECB's foreign reserves portfolios – scope 3**WACI scope 3 emissions (tCO2e/EUR million revenue)**

| | Total | Agency bonds | Supranational bonds |
|---|---|---|---|
| **2024** | 2,268 | 3,394 | 1,456 |
| | 68% | 88% | 60% |
| **2023** | 1,753 | 2,370 | 1,383 |
| | 68% | 92% | 59% |
| **2022** | 1,333 | 1,178 | 1,421 |
| | 72% | 92% | 65% |
| **2021** | 324 | 329 | 323 |
| | 87% | 89% | 86% |
| **2020** | 349 | 341 | 352 |
| | 95% | 88% | 97% |

**Total carbon emissions scope 3 (tCO2e)**

| | | | |
|---|---|---|---|
| **2024** | 480,873 | 302,161 | 178,712 |
| | 68% | 88% | 60% |
| **2023** | 283,625 | 138,129 | 145,496 |
| | 68% | 92% | 59% |
| **2022** | 101,028 | 23,929 | 77,099 |
| | 72% | 92% | 65% |
| **2021** | 29,822 | 2,873 | 26,949 |
| | 82% | 72% | 86% |
| **2020** | 38,737 | 6,199 | 32,539 |
| | 80% | 80% | 80% |

**Carbon intensity scope 3 (tCO2e/EUR million revenue)**

| | | | |
|---|---|---|---|
| **2024** | 2,505 | 4,471 | 1,437 |
| | 68% | 88% | 60% |
| **2023** | 1,834 | 3,064 | 1,328 |
| | 68% | 92% | 59% |
| **2022** | 1,060 | 814 | 1,171 |
| | 72% | 92% | 65% |
| **2021** | 315 | 336 | 313 |
| | 82% | 72% | 86% |
| **2020** | 326 | 292 | 333 |
| | 80% | 80% | 80% |

**Carbon footprint scope 3 (tCO2e/EUR million invested)**

| | | | |
|---|---|---|---|
| **2024** | 163 | 244 | 104 |
| | 68% | 88% | 60% |
| **2023** | 125 | 162 | 102 |
| | 68% | 92% | 59% |
| **2022** | 30 | 19 | 35 |
| | 72% | 92% | 65% |
| **2021** | 7.7 | 3.3 | 9.0 |
| | 82% | 72% | 86% |
| **2020** | 11 | 7.8 | 12 |
| | 80% | 80% | 80% |

Sources: Institutional Shareholder Services and ECB calculations.
Notes: Percentages below each metric indicate data availability, calculated as the percentage of holdings for which all required data (i.e. emissions data and financial data) are available. The time series does not start until 2020 (while reporting on scope 1 and 2-based metrics starts in 2018). This is due to a significant methodological change, which prevents pre-2020 metrics from being compared with those after 2020.
Disclaimer: Scope 3 emissions are reported on a best-effort basis aid transparency. Scope 3 emissions data remain subject to considerable quality issues which limit the reliability of the metrics. Substantial revisions to the disclosures are therefore possible in the future.

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For specific terminology please refer to the ECB glossary (available in English only).

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