



EUROPEAN CENTRAL BANK

EUROSYSTEM

Climate-related financial disclosures of the ECB's non-monetary policy portfolios

March 2023



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Foreword



Climate change is not a long-term prospect anymore but has become a reality. This is clear from its devastating effects, which are becoming increasingly frequent across our planet.

Tackling climate change requires a transition towards a net-zero economy. Finance has a crucial role to play here, and central banks – like the European Central Bank – can support this transition within the limits of their mandates. As part of our work on climate change, we at the ECB aim to align our balance sheet with a decarbonisation path that is consistent with the Paris Agreement and the EU's climate neutrality objectives. We will regularly review our approach to ensure, within our mandate, that we are on track to achieve these goals. To do so, we must make sure we have a clear view of where we stand, how we can reach our target, and how we can be open about this. Transparency about our own holdings is therefore essential. Our first climate-related disclosures for our euro-denominated non-monetary policy portfolios allow us to chart a course through these waters.

This report provides quantitative and qualitative climate-related information about the ECB's own funds and staff pension fund. The information covers governance, strategy, risk management, and metrics and targets. To date, our efforts have already halved the carbon footprint of our equity and corporate bond investments – which comprise some three-quarters of the ECB's staff pension fund. By contrast, the ECB's own funds are mainly invested in bonds issued by euro area governments. As such, reducing the climate impact of our own funds depends largely on these governments' commitments and actions, as signatories to the Paris Agreement and adopters of the European Climate Law. Nevertheless, we have also increased the share of green bonds in our own funds portfolio – from 1% in 2019 to 13% in 2022 – thereby contributing to the transition to a greener economy.

These disclosures are part of a concerted effort by all Eurosystem central banks to publish climate-related information on their respective non-monetary policy portfolios, in line with the common framework developed by the Eurosystem. By being transparent about the carbon footprint of our own investments and exposure to climate-related risks, we also hope to help harmonise disclosure practices, foster a better understanding of climate risks, and contribute to the transition to a net-zero economy and EU climate goals.

Our disclosures show how far we have come, but also how far we still have to go. Monitoring our progress against concrete benchmarks and interim goals will be important, yet by itself insufficient for meeting the goals of the Paris Agreement. That is why, going forward, we will develop interim decarbonisation targets that help us stay on track towards our final targets.

Moreover, together with all Eurosystem members, we will regularly review and improve the scope and quality of our climate-related disclosures to keep up with advancements in data and regulation. In doing so, we aim to uphold our firm

commitment to remaining transparent and accountable for our climate risk exposure and the carbon footprint of our financial portfolios, as we continue on our path towards a balance sheet aligned with the Paris Agreement.

Frankfurt am Main, March 2023
Isabel Schnabel
Board Member, European Central Bank

1 Introduction

This report presents the ECB's first climate-related financial disclosures for its own funds portfolio and the staff pension fund.¹

The disclosures follow the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) in the four categories "Governance", "Strategy", "Risk management" and "Metrics and targets", as well as the TCFD's supplemental guidance for asset owners. For the category "Metrics and targets", the Eurosystem developed a common disclosure framework that defines minimum standards for each member. In developing this framework, the Eurosystem additionally considered recommendations of the Partnership for Carbon Accounting Financials (PCAF) and the Network of central banks and supervisors for Greening the Financial System (NGFS).²

The disclosures will be refined over time, in line with increasing availability and quality of climate-related data, evolving disclosure practices and growing expertise in handling climate-related risks. By increasing the transparency of its own investments, the ECB aims to make a positive contribution to the availability of climate-related information and the understanding of climate-related risks. In doing so, the ECB hopes to foster wider action beyond the institution, which is one of the ECB's three main objectives for its work on climate change.³

The report is structured as follows: Section 2 summarises the organisational set-up and the decision-making responsibilities underlying the ECB's own funds portfolio and the staff pension fund. Section 3 describes how the ECB integrates sustainability considerations in both portfolios, and Section 4 explains how the ECB considers climate risks when managing risks to the portfolios. Section 5 closes with the relevant quantitative and qualitative metrics and targets. The presented metrics mark an important step towards enhanced transparency about the ECB's exposure to climate-related risks in its non-monetary policy portfolios (NMPPs) and their climate impact. By developing targets, the ECB aims to reduce its exposure to such risks and to support the goals of the Paris Agreement and the EU's climate neutrality objectives. The ECB is committed to regularly reviewing its approach in order to ensure, within its mandate, that it continues to support the decarbonisation path to reach these goals. Therefore, the ECB may consider increasing the level of the ambition of the targets over time, while respecting portfolio-specific objectives and constraints.

¹ See "[Eurosystem agrees on common stance for climate change-related sustainable investments in non-monetary policy portfolios](#)", *press release*, ECB, 4 February 2021.

² See TCFD, "[Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures](#)", October 2021 and NGFS, "[Guide on climate-related disclosure for central banks](#)", December 2021.

³ See the "[Climate change and the ECB](#)" section of the ECB website.

2 Governance

The ECB and each of the Eurosystem national central banks (NCBs) manage NMPP investments under their own responsibility, and activities in this regard are usually outside the scope of monetary policy mandates.⁴ The ECB consequently has a wider range of options to steer its NMPP investments in a climate-friendly manner while achieving the specific objectives of these portfolios, compared with the portfolios it holds for implementation of monetary policy. The ECB's approach to its own NMPP investment policies is partly guided by the common Eurosystem stance for applying climate change-related sustainable investment principles to these portfolios.

The ECB has adopted an integrated approach for the governance of climate-related risks and opportunities, under which climate change-related considerations are addressed within existing governance structures and investment strategies. In the area of NMPPs, the Executive Board is supported in its oversight of climate-related risks and opportunities for its own funds portfolio by the ECB's internal Investment Committee (ICO), and for the staff pension fund by the Investment Committee in its Pension Fund composition (ICO/PF), which includes two staff representatives. The investment decisions in the pension fund also fall under the oversight of the staff-elected Pension Oversight Committee (OCO). Investment strategies incorporating climate change considerations are implemented by the ECB's portfolio management experts (for the own funds portfolio) and external investment managers (for the pension fund). Figure 1 presents the governance structures for the investments in the ECB's own funds portfolio and the staff pension fund.

The objective of the ECB's **own funds portfolio** is to generate income to help fund the operating expenses of the ECB that are not related to the delivery of its supervisory tasks. The own funds portfolio predominantly invests the ECB's financial resources, namely the ECB's paid-up capital, the amounts set aside in general reserves and the general provision for financial risks. The portfolio is invested in euro-denominated fixed income assets of high credit quality. It is managed passively by the ECB's Directorate General Market Operations, and closely tracks a benchmark maintained by the ECB's Directorate Risk Management. The ECB's Directorate Risk Management develops the risk control framework and strategic benchmark for the own funds portfolio, which are discussed in the ECB's ICO and approved by the Executive Board.

The ECB's **staff pension fund** aims to cover the current and future pension liabilities for ECB staff members and pensioners. The ICO/PF governs the investment policy for the pension fund and is therefore also responsible for the integration of climate change considerations in these investments.⁵ The staff-elected

⁴ However, there are some exceptions: for example, direct stakeholder engagement by the ECB could be interpreted as overlapping with Eurosystem monetary policy operations and is therefore not used by the ECB.

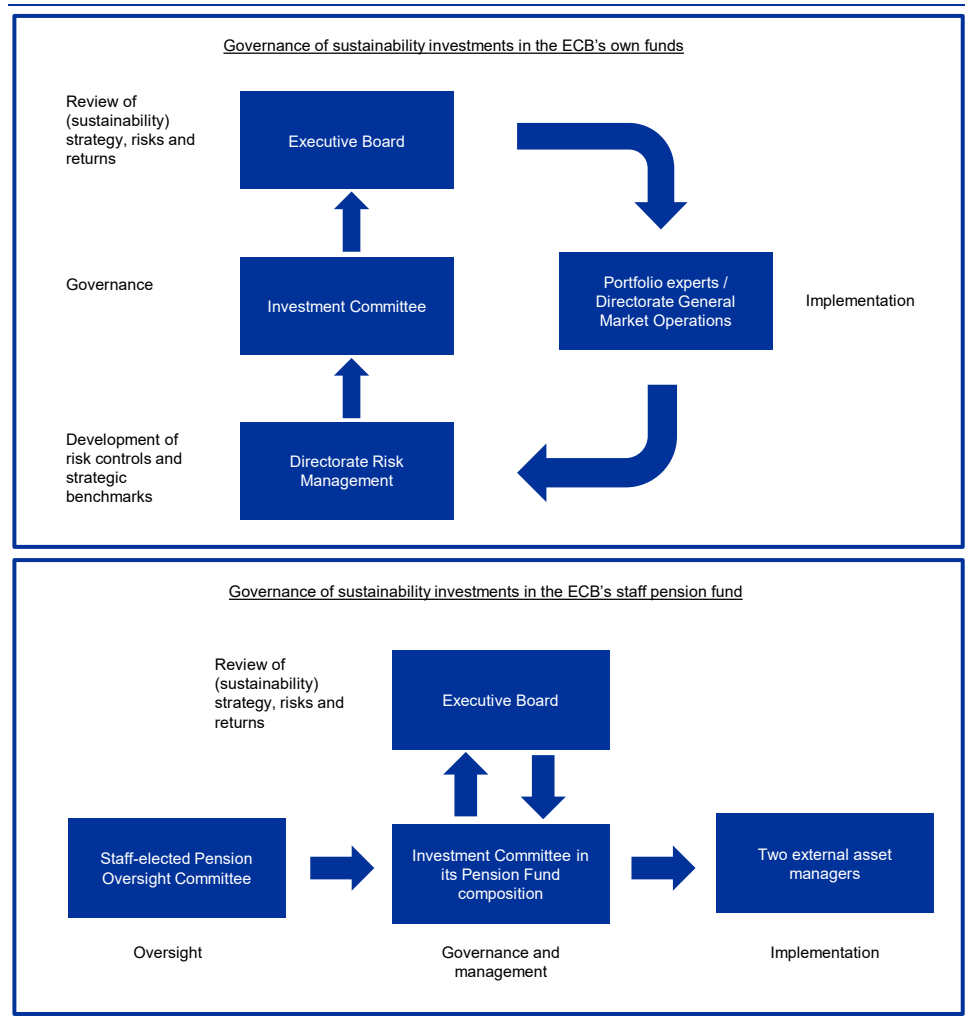
⁵ In addition, an ECB internal pension administrator is in charge of pension liabilities and the administration of the related accounts.

OCO acts as a watchdog representing the interests of the beneficiaries, by checking that the pension funds are being administered in accordance with the rules. Asset management is entrusted to two external investment managers, while an external custodian is responsible for safeguarding the assets. Their activities are monitored by the ICO/PF.

The ICO, the ICO/PF and the ECB's Risk Management Directorate report to the Executive Board at least annually to enable monitoring of relevant risks and returns, including those related to climate change, and steering towards the sustainability targets. The Executive Board approves the investment strategies and interim and final sustainability targets for both portfolios annually on the proposals of the ICO and ICO/PF.

Figure 1

Governance structures for the investments in the ECB's own funds portfolio and staff pension fund



3 Strategy

As an asset owner of its NMPPs, the ECB needs to assess climate-related risks and opportunities arising from that role. In line with the integrated approach, climate-related risks are monitored as part of the overall risk management process, whereby they do not form a new risk category but rather an amplifying factor for existing categories such as credit and market risks. To build and exchange knowledge with peers, the ECB actively participates in the international discussions on climate-related risks in the context of the Network for Greening the Financial System (NGFS). Risks and opportunities related to climate change are also discussed within the Eurosystem.

The ECB strategy is to align its NMPPs with the EU's long-term decarbonisation objective in support of the Paris Agreement. While alignment can be implemented immediately for some portfolio parts, for other asset classes, methodological and data issues require careful consideration and advances in disclosures and measurements. Section 5 elaborates on the climate-related metrics of the ECB's NMPPs and presents climate-related long-term targets. In addition, the ECB will calibrate intermediate targets and consider defining transition plans for gradually decarbonising its NMPPs.

The strategy to include sustainability considerations in its staff pension fund and own funds portfolios involves action along different dimensions, considering portfolio specific objectives and constraints. Figure 2 summarises the main features of the climate-related investment strategy for the two portfolios.

In its **own funds portfolio**, which predominantly comprises sovereign bonds, the ECB pursues an impact investment strategy that targets a continuous increase in the share of green bonds by:

- directly purchasing green bonds in secondary markets during monthly rebalancing;
- investing in the euro-denominated green bond investment fund for central banks launched by the Bank for International Settlements (BIS) in January 2021.⁶

On an annual basis, the Executive Board sets the year-end target share of green bond holdings based on a proposal by the ECB's ICO. The increase will be realised via a combination of direct green bond purchases and additional investments into the externally managed BIS green bond investment fund for central banks.

In its **staff pension fund** the ECB has pursued a sustainability strategy since 2017, consisting of the following four elements:

⁶ See "ECB to invest in Bank for International Settlements' green bond fund", *press release*, ECB, 25 January 2021.

- Investment managers: are required to be signatories to the [United Nations' Principles for Responsible Investment \(UN PRI\)](#) and the [United Nations' Global Compact \(UN GC\)](#).
- Proxy voting and engagement: the investment managers vote and engage in line with their proxy voting and engagement guidelines, which incorporate environmental, social and governance (ESG) principles. Both managers apply their guidelines independently and regularly report to the ECB on the impact of their voting and engagement activities.
- Exclusions: the exclusion list is based on violations of the UN GC principles, international treaties, and conventions related to controversial weapons. Issuers on the exclusion list are excluded from the investment universe.
- Benchmarks: The replacement of all conventional equity benchmarks by their low-carbon equivalent in May 2020 reduced the carbon footprint of the equity holdings by over 60%.⁷ The replacement of the conventional corporate bond benchmarks by their Paris-aligned equivalent in February 2022 reduced the carbon footprint of the holdings by 50%, with subsequent annual reductions in carbon intensity of 7%.

Figure 2

Climate change strategies for the ECB's own funds and staff pension fund

ECB's own funds	ECB's staff pension fund
Increased investment in green securities through: <ul style="list-style-type: none"> • direct purchases • investments in the BIS green bond investment fund for central banks 	<ul style="list-style-type: none"> • Investment manager commitment • Proxy voting framework • Selective exclusions • Carbon footprint reduction

⁷ The equity benchmark indices are the MSCI EMU Low Carbon Target (gross), MSCI World excluding EMU Low Carbon Target (gross) and MSCI Emerging Markets Low Carbon Target (net).

4 Risk management

The ECB has adopted the recommendations and terminology proposed by the TCFD when identifying, assessing, and mitigating climate-related risks. The ECB actively integrates long-term climate-related risks into the processes governing its NMPPs and continues to explore methodological enhancements. To support this work, the central banks of the Eurosystem have jointly identified relevant data sources.

As a prominent public institution operating at the centre of the European financial system, the ECB recognises the importance of developing a thorough understanding of the climate risks of its NMPPs. The ECB is continuously working on improving this knowledge.

The ECB's NMPPs are exposed to climate-related risks, which might lead to adverse outcomes in the event of a gradual change in risk factors or a climate shock. We distinguish between transition risks and physical risks. Transition risks concern the likelihood and impact of the economic consequences of the transition to a carbon-neutral economy. Physical risks, by contrast, concern the likelihood and impact of severe weather events or natural disasters occurring.

The ECB takes a holistic view in assessing and managing the potential impact of climate-related risks via the NMPPs on its balance sheet. Carbon intensity metrics are used as a proxy for transition risks with a potential negative impact on the balance sheet, as policies adopted to align with the Paris Agreement can affect the financial position and performance of issuers.

Investment limits are monitored within the established risk management framework for the NMPPs. For the staff pension fund it is ensured that the externally managed investment funds closely follow their respective low-carbon and Paris-aligned benchmarks. Detected breaches are investigated by the Directorate Risk Management following a standardised procedure, and appropriate resolutions are investigated and implemented. The Directorate Risk Management reports monthly to ICO-PF on the general performance of the funds, and benchmark breaches are explicitly discussed by the committee. Similarly, for the own funds portfolio, it is ensured that the thematic investment objectives are integrated in the ECB's strategic benchmark in accordance with pre-specified risk budgets.

5 Metrics and targets

To limit global temperature increases to 1.5°C, the [Paris Agreement](#) requires countries to decarbonise their economies and investors to make finance flows consistent with a pathway towards low greenhouse gas emissions.⁸

[Scientific estimates](#) by the Intergovernmental Panel on Climate Change (IPCC) suggest that countries need to achieve net-zero emissions by mid-century to limit global temperature increases to 1.5°C in line with the goals of the Paris Agreement. Countries' current policies are projected to lead to global warming of 2.8°C by the end of the 21st century, according to the latest [UN report](#). Global annual emissions must be reduced by 45% compared with emission projections under current policies by 2030 and must continue to fall rapidly after 2030 to avoid exhausting the limited remaining atmospheric carbon budget. Countries' efforts to reduce emissions and adapt to the impact of climate change are summarised in Nationally Determined Contributions (NDCs), which are registered in accordance with the United Nations Framework Convention on Climate Change (UNFCCC). In 2023, the first in a series of global “stocktakes” will assess if current NDCs are on track to achieve the goals of the Paris Agreement.⁹

For the EU, the [European Climate Law](#) implements the Paris Agreement into Union law by setting out the goal for Europe's economy and society to become climate-neutral by 2050 and additionally setting the interim target of reducing net emissions by at least 55% by 2030 compared with 1990 levels. Climate neutrality by 2050 means EU countries have to achieve net-zero emissions, mainly by cutting emissions, investing in green technologies and protecting the natural environment. Data confirms that EU decarbonisation efforts are already having a positive impact. According to [Eurostat](#), emissions in the EU across sectors including energy and manufacturing decreased by 32% between 1990 and 2020 (the most recent reference year for which data officially reported under the UNFCCC are available).¹⁰

The ECB's staff pension fund and own funds portfolios account for around €23 billion in investments, most of which is held in sovereign bonds. Therefore, the reduction of emissions related to these portfolios rely largely on governments to deliver on the decarbonisation pledges they have made under the Paris Agreement. The ECB calls upon governments to deliver on these pledges.

The metrics presented in this section create transparency about both portfolios' exposure to climate risks by quantifying the associated emissions financed by their investments. Four key [metrics](#) form the foundation of the TCFD reporting on the ECB's staff pension fund and its own funds portfolio. These metrics are the weighted

⁸ Hereinafter, greenhouse gases are simply referred to as “emissions” and denote the greenhouse gases under the [Kyoto Protocol](#).

⁹ See “[All about the NDCs](#)”, United Nations Climate Action.

¹⁰ Eurostat, “[Climate change – driving forces](#)”, August 2022.

average carbon intensity (WACI), carbon intensity, total carbon emissions and carbon footprint.

The WACI measures a portfolio's exposure to carbon-intensive issuers and serves as a proxy for a portfolio's exposure to climate transition risks. The carbon intensity measures the carbon efficiency of a portfolio in financing economic activity. Both metrics are comparable across differently sized portfolios and over time, as they normalise issuers' emissions by a measure of issuers' economic activity.

By contrast, the total carbon emissions metric measures the absolute emissions associated with a portfolio and serves as a proxy for the contribution to global warming that a portfolio finances, and thus its environmental impact. Among the four key metrics, it is the only non-normalised metric and is driven by fluctuations in portfolio values, which limits its informative value for comparison over time or across portfolios of different sizes. The carbon footprint metric normalises the total carbon emissions metric by a portfolio's value and thereby enables comparability.

The four key metrics are reported for both portfolios and, where appropriate, enriched with additional metrics to enhance transparency. These metrics inform the ECB's internal decision-making processes and enable progress on the key elements of the portfolios' investment strategies. The selected pension fund metrics focus on aspects related to the active decarbonisation of the portfolio, while own funds metrics provide information about the decarbonisation at issuer level and the increase in green bond investments. [Annex 1](#) sets out how each metric is calculated and outlines the main elements of the common Eurosystem framework that was developed to align the reporting methodology. Further information on the applied emissions allocation methods, normalisation and attribution factors are provided in [Annex 2](#).

The independent climate data providers Institutional Shareholder Services (ISS) and Carbon4 Finance supply the ECB with climate data. Metrics for corporate, supranational and agency issuers are based on issuers' scope 1 and scope 2 emissions. As a leading principle, issuers' self-reported emissions data are preferred over emissions data modelled by the data providers, which is only used if self-reported data is unavailable. Metrics for sovereign issuers are based on production-, consumption- and government emissions. Whenever possible, the metrics are calculated using holdings, emissions and financial data for the same reference year. Reference years do not match only for recent reporting periods, owing to the natural delay with which financial data and emissions data become available.

The availability of climate data for assets held in the staff pension fund and the own funds portfolio has improved in recent years, reflecting a broader market trend towards enhanced climate-related reporting. The latest available scope 1 and scope 2 emissions data cover 99% of the corporate issuers held in the pension fund and 71% of the non-sovereign issuers held in the own funds' portfolio. Production, consumption and government emissions cover 100% of sovereign issuers held in both portfolios.

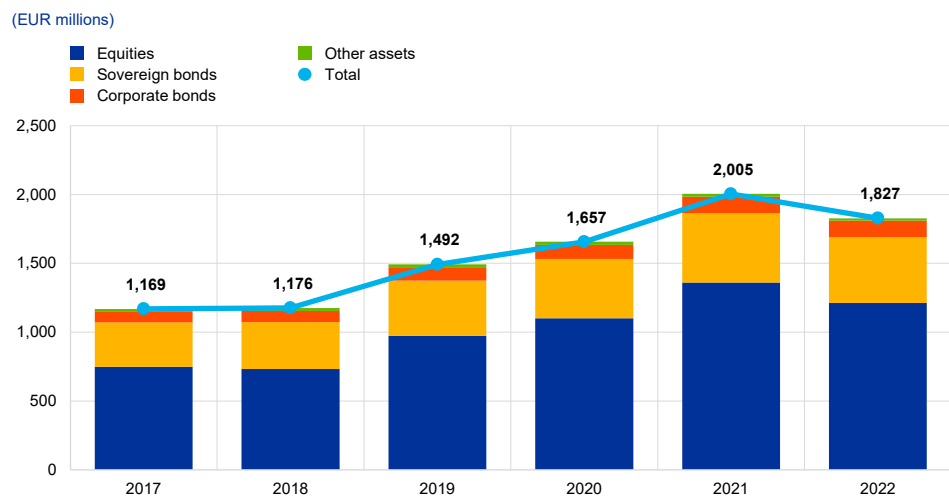
Several factors contributed to changes in the key metrics used for both portfolios in recent years. On a macro level, the coronavirus (COVID-19) pandemic led to widespread reductions in global emissions due to lockdowns and temporary production curbs. Economic fundamentals such as corporate revenue and national GDP were also affected.¹¹ At issuer level, the results of corporate and sovereign decarbonisation initiatives led to a gradual decline in absolute emissions. At portfolio level, capital reallocation, some of which was based on climate considerations, led to changes in the level and trends observed in key metrics. The following sections analyse the metrics and climate-related developments of the ECB's staff pension fund and own funds portfolio in greater detail.

5.1 Staff pension fund

- Portfolio holdings are actively decarbonised in semi-annual rebalancings of the Paris-aligned corporate bond benchmark and low-carbon equity benchmarks that cover some three-quarters of total portfolio assets.
- Corporate investments have been decarbonised by more than 50% since 2019, as is evident in the decline in all key metrics.

The ECB staff pension fund portfolio value was €1.83 billion as at year-end 2022, of which 66% was invested in equities, 26% in sovereign bonds, 6% in corporate bonds and 1% in other assets such as cash and derivatives that are excluded from the calculation of metrics (**Chart 1**). Year-on-year changes in portfolio value reflect investment returns and the paid-in contributions of members and of the ECB. The pension fund invests globally in financial assets across developed and emerging markets.

Chart 1
Portfolio value and asset allocation of the staff pension fund



Source: ECB calculations.

¹¹ See analysis of the [Carbon Monitor](#) and the [International Energy Agency](#).

Table 1 summarises the four key metrics for the sovereign bond, corporate bond and equity investments in the staff pension fund as at 31 December 2022, which is the most recent reporting date. **Annex 3** presents a comprehensive overview of climate-related metrics of the ECB’s pension fund over five years.

Metrics for sovereign investments must be interpreted separately from metrics for non-sovereign investments, as the different nature of the underlying emissions allocation methods do not allow for direct comparisons. The scope 1 and scope 2 emissions of non-sovereign issuers are included in countries’ production and consumption emissions.

Table 1 illustrates that the pension fund is exposed to climate transition risks via its sovereign and corporate investments, which could result from policy actions targeted at reducing emissions at issuer or portfolio level. In 2022, the WACI of sovereign investments was 161 tCO₂e (tonnes of carbon dioxide equivalent emissions) per € million purchasing power parity (PPP) -adjusted GDP (production method), 9 tCO₂e per capita (consumption method), and 72 tCO₂e per € million final consumption expenditure (government method). The WACI of corporates’ scope 1 and scope 2 emissions was 108 tCO₂e per € million revenue for corporate bonds, 101 tCO₂e per € million revenue for equities, and 102 tonnes on aggregate. Equities contributed 90% to the total carbon emissions of corporate investments, which is almost fully proportional to their share of investments in corporate issuers.

Table 1
Key climate-related metrics for the staff pension fund in 2022

	Sovereign issuers			Corporate issuers		
	Sovereign and sub-sovereign bonds			Total	Corporate bonds	Equities
	Production	Consumption	Government			
Portfolio value		479		1331	119	1,212
WACI	161	9	72	102	108	101
Total carbon emissions	81,503	104,267	7,968	52,846	5,528	47,318
Carbon footprint	161	206	16	41	41	41
Carbon intensity	161	9	71	110	121	109

Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
Notes: The table shows key metrics for the staff pension fund per asset class. For sovereign bonds, metrics are separately provided for the production, consumption and government emissions. For corporate bonds and equity, metrics are provided on asset class and aggregate level (“Total”), based on issuers’ scope 1 and scope 2 emissions. Portfolio value is expressed in € millions market value. The WACI and carbon intensity are expressed as tCO₂e per € million revenue (corporate issuers), PPP-adjusted GDP (sovereign issuers, production emissions), per capita (sovereign issuers, consumption emissions), or final consumption expenditure (sovereign issuers, government emissions). Total carbon emissions are expressed as tCO₂e. Carbon footprint is expressed as tCO₂e per € million invested. Metrics are calculated using market values for equities and nominal values for bonds.

5.1.1 Staff pension fund – corporate investments

The staff pension fund’s corporate investments (equity + corporate bonds) have decarbonised by more than 50% since 2019, as evident in the decline in all four key metrics (**Chart 2**). The significant reduction in the portfolio’s exposure to climate risks was driven by the introduction of low-carbon equity benchmarks in 2020 and a Paris-aligned corporate bond benchmark in 2022. Both benchmarks reallocate funds

towards a sector’s most carbon efficient issuers on a semi-annual basis based on a best-in-class methodology.

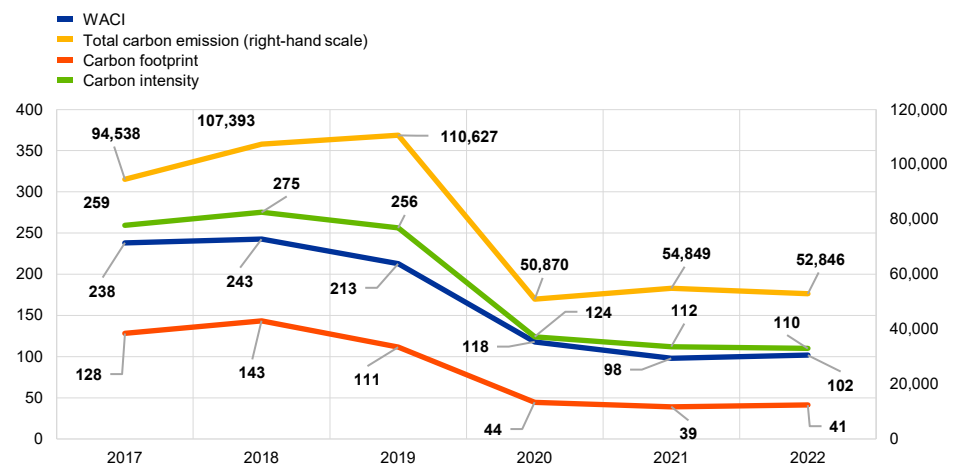
While the equity benchmark reallocates funds on a best effort basis, the corporate bond benchmark follows a pre-defined self-decarbonisation path in line with the [EU Regulation](#) on minimum standards for Paris-aligned benchmarks. The regulation stipulates that corporate bond benchmarks labelled “Paris-aligned” must generate an initial baseline reduction in carbon intensity of at least 50% compared with a traditional corporate bond index, followed by an average annual reduction of at least 7%. The ECB currently considers the adoption of Paris-aligned benchmarks for its equity investments for the staff pension fund.

For a correct interpretation of the trends observed in Chart 2, it is important to consider aspects related to the underlying data. Metrics calculated for the staff pension fund holdings of 2021 and 2022 are based on the same corporate emissions and corporate financial data because of the natural delay with which those data are released. The application of identical data to 2021 and 2022 holdings works as an artificial stabiliser for related metrics throughout this report. In future reports, the ECB will retrospectively update metrics that were based on data with different reference years compared to that of the portfolio holdings, as the revised data become available.

Chart 2

Evolution of key metrics for corporate investments in the staff pension fund

(left-hand scale: tCO₂e/ EUR millions, right-hand scale: tCO₂e)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.

Notes: The chart shows historic values of the key metrics for the pension fund’s corporate investments (equity + corporate bonds) based on issuers’ scope 1 + 2 emissions. Metrics are calculated using market values for equities and nominal values for bonds.

Emissions normalisation in the WACI and the carbon intensity is based on revenue in € millions; and in the carbon footprint based on investment amount in € millions.

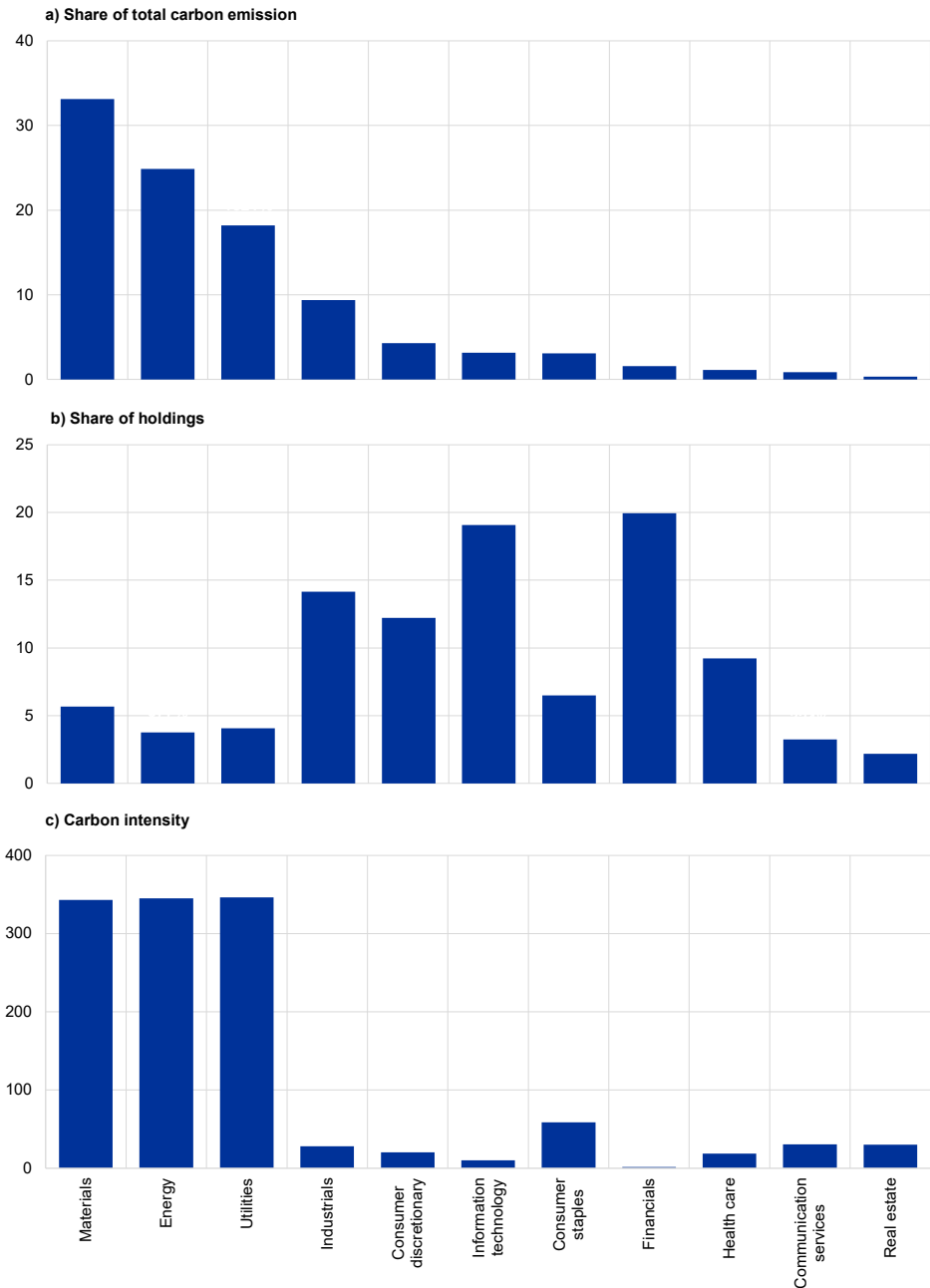
A breakdown of the staff pension fund’s total carbon emissions into the contributing corporate sectors shows a high concentration in materials, energy and utilities ([Chart 3](#)). Together, these three sectors contribute 76% to corporates’ total carbon emissions (upper panel) while only accounting for 14% of corporate holdings (middle panel). The observed concentration is explained by the high carbon intensity of each

sector (lower panel) and illustrates that the decarbonisation potential of an economy is concentrated in its most energy-intensive sectors.

Chart 3

Sectoral breakdown of corporate total carbon emissions in the staff pension fund in 2022

(panel a) and b) percentages, panel c) tCO₂e/ EUR millions)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.

Notes: Panel a) shows the sectoral contribution to the pension fund's corporate (equity and bonds) total carbon emissions. Panel b) shows the sectoral share of corporate holdings. Panel c) shows the sectoral median carbon intensity expressed as scope 1 + 2 emissions (in tCO₂e) divided by revenue (in € millions).

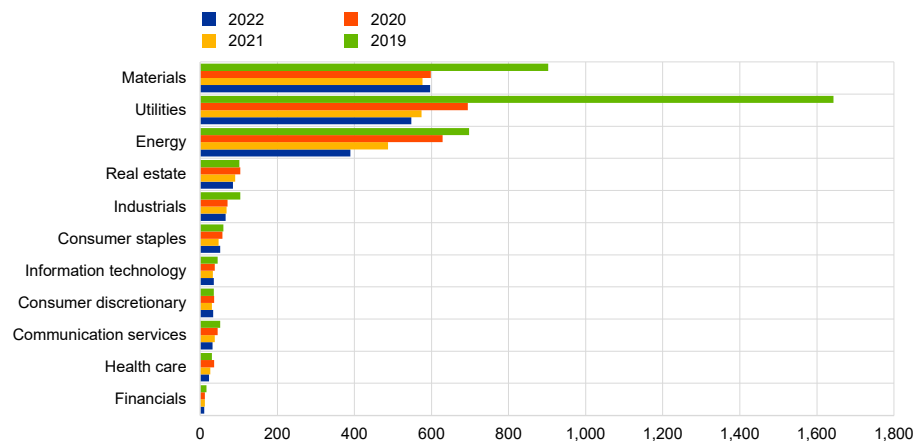
The ECB incentivises corporate issuers whose securities are held in its staff pension fund to improve the carbon efficiency of their operations via three channels. First, via voting and issuer engagement that considers ESG principles and promotes greater environmental responsibility. The voting and issuer engagement is conducted by the external investment managers on behalf of the ECB. Second, via best-in-class based capital reallocation towards sectors' most carbon efficient issuers. Third, via activity-based exclusions of issuers from the Paris-aligned corporate bond benchmark based on criteria defined in the EU Regulation. The Regulation defines upper thresholds for revenue generated from coal mining, fossil fuel production, exploration and distribution, and electric power generation from fossil fuel sources.

Breaking down the WACI into corporate sectors provides insights into how the staff pension fund's corporate investments have decarbonised over time (**Chart 4**). Between 2019 and 2022 the corporate WACI declined across all 11 sectors, with the sharpest declines visible in the carbon-intensive sectors utilities (-67%), energy (-44%) and materials (-34%).

Chart 4

Sectoral breakdown of corporate WACI in the staff pension fund from 2019 to 2022

(tCO₂e/ EUR millions)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.

Notes: The chart shows the pension funds' WACI per corporate sector. Metrics are calculated using market values for equities and nominal values for bonds.

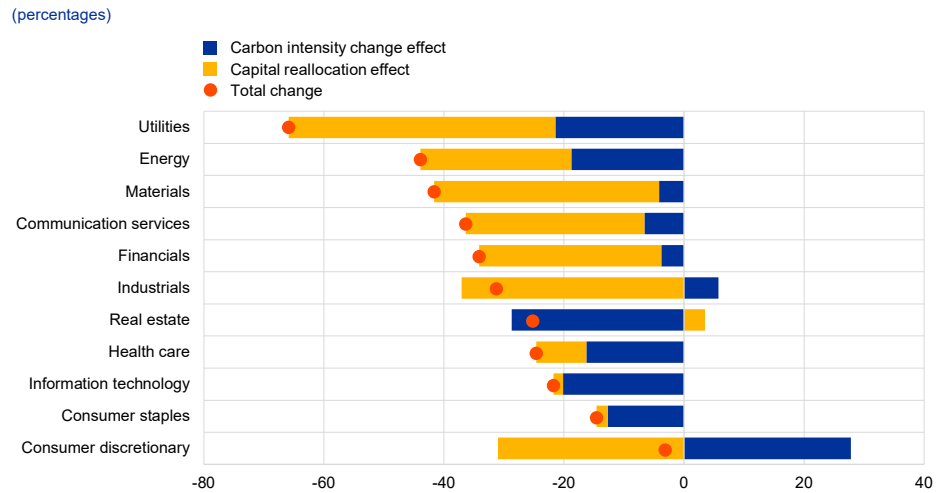
Two factors contribute to changes in the sectoral WACI over time: (i) changes in issuers' carbon intensity, and (ii) benchmark capital reallocation. To estimate the effect of the low-carbon and Paris-aligned benchmarks' best-in-class capital reallocation, we isolate the contribution of both factors in a two-step approach.

In a first step, we model how each sector's WACI would have developed from 2019 to 2022 assuming constant holdings. For that, we apply issuers' most recent carbon intensities to 2019 holdings and calculate a theoretical 2022 WACI for each sector. The difference between sectors' 2019 WACI and the theoretical 2022 WACI based on constant holdings but updated carbon intensities is defined as the "carbon intensity effect". In a second step, we calculate the difference between sectors' theoretical 2022 WACI and the actual 2022 WACI, and attribute it to the "capital

reallocation effect” which covers the reallocation of existing funds and of net cash in- and outflows over time. Results are shown in **Chart 5**.

Chart 5

Attribution of the changes in sectoral corporate WACI between 2019 and 2022 to the carbon intensity effect and the capital reallocation effect



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.
 Notes: The methodology is explained in the main text. The large carbon intensity change effect for the consumer discretionary sector is driven by holdings in three individual issuers whose 2022 carbon intensity is a multiple of their 2019 carbon intensity.

Our analysis shows that the benchmarks’ best-in-class capital reallocation led to a reduction of the sectoral WACI for 10 out of 11 sectors. The capital reallocation effect was most pronounced in the carbon-intensive sectors utilities (-66%), energy (-44%) and materials (-42%). Somewhat surprisingly, reallocation effects have led to small increases in the sectoral WACI for the real estate sector. The effect can be explained by the differences between the carbon intensity as defined in the WACI (emissions per unit of revenue) and the definition applied for the tilting of both benchmarks (emissions per unit of corporates’ enterprise value including cash).

Overall, the best-in-class based capital reallocation of the low-carbon equity benchmarks and the Paris-aligned corporate bond benchmark effectively decarbonises the corporate investments of the staff pension fund.

Achieving the goals of the Paris Agreement requires a significant reduction in absolute emissions emitted into the atmosphere. In the remainder of this section, we therefore link the portfolio analysis to dynamics relevant for the absolute decarbonisation of the real economy.

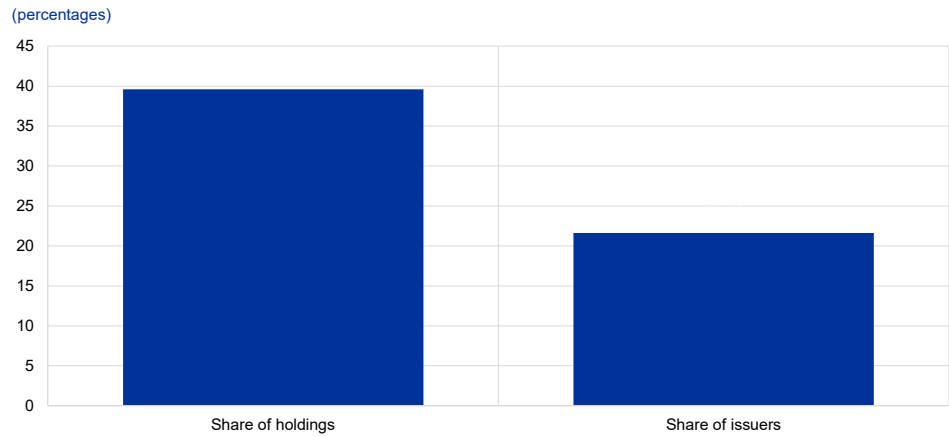
Our analysis of the annual historical absolute emissions paths of the corporate issuers whose securities are held in the pension fund in 2022 shows that, on average, they have decarbonised their operations in absolute terms. In the period from 2017 to 2021 (the latest reference year for which scope 1 and scope 2 emissions data are available), the corporate issuers whose securities are held in the portfolio reduced their absolute scope 1 and scope 2 emissions on average by 2% per year, with the rate varying across sectors. The sector with the sharpest decline in absolute emissions decarbonised at an annual rate of 7%. All in all, our analysis

shows there is more work to do. According to [scientific estimates](#), (corporate) emissions have to fall by 7.6% every year between 2020 and 2030 to get the world on track towards the 1.5 °C temperature goal of the Paris Agreement.

Further reductions in absolute global emissions require issuers to deliver on their self-imposed decarbonisation targets. The staff pension fund allocates a disproportionately large share of its corporate investments to issuers that set science-based targets to decarbonise their operations ([Chart 6](#)). In 2022, 22% of the pension funds' corporate issuers set science-based targets, reflecting 40% of the corporate investments.

Chart 6

Share of holdings and issuers in the staff pension fund with science-based carbon reduction targets in 2022



Sources: ISS and ECB calculations.

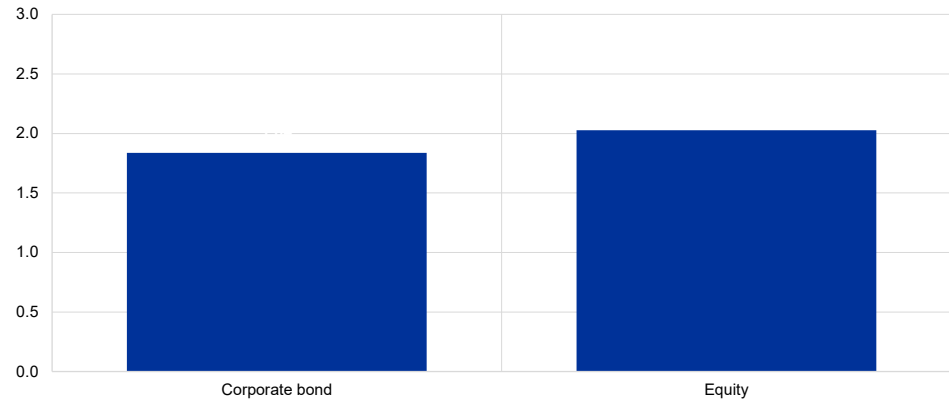
Note: The chart shows the staff pension fund's share of holdings and share of issuers with science-based emissions reduction targets. Metrics are calculated using market values for equities and nominal values for bonds.

Forward-looking analysis based on ISS' proprietary issuer temperature score suggests that the staff pension fund's current corporate investments are roughly in line with a 2 °C global warming scenario ([Chart 7](#)). The indicator is available for 95% of the pension fund's corporate bond investments and 99% of its equity investments. Nevertheless, the results can only serve as an indication, since forward-looking analysis is subject to considerable uncertainty.

Chart 7

Issuer temperature score of corporate investments in the staff pension fund in 2022

(degrees Celsius)



Sources: ISS and ECB calculations.

Notes: The chart shows the investment weighted issuer temperature score of the pension fund's equity and corporate bond investments in 2022. Issuer temperature score data was available for 95% of corporate bond investments and 99% of the equity investments. The forward-looking analysis underlying the score considers the latest International Energy Agency Sustainable Development Scenarios (IEA SDS), projected future emissions and science-based targets. Metrics are calculated using market values for equities and nominal values for bonds.

5.1.2 Staff pension fund – sovereign investments

All sovereign issuers held in the staff pension fund are signatories to the Paris Agreement and have committed to decarbonising their economies. As of 2022, 47% of the issuers held in the pension fund have enshrined their 2050 net-zero target in domestic law, and additionally 35% in domestic policy documentation, according to the [Net Zero Tracker](#).

A look at the evolution of key metrics for sovereign bond investments in the staff pension fund indicates that limited decarbonisation occurred in normalised metrics (**Chart 8**). In the upper panel, the WACI is illustrated for production, consumption and government emissions to enable a holistic view on countries' efforts to decarbonise their territorial emissions, domestic demand and activities directly linked to the government. The lower panel shows total carbon emissions, the carbon footprint and the carbon intensity based on production emissions only, as this emissions allocation method is the global standard for sovereign investments and is targeted in countries' NDCs.

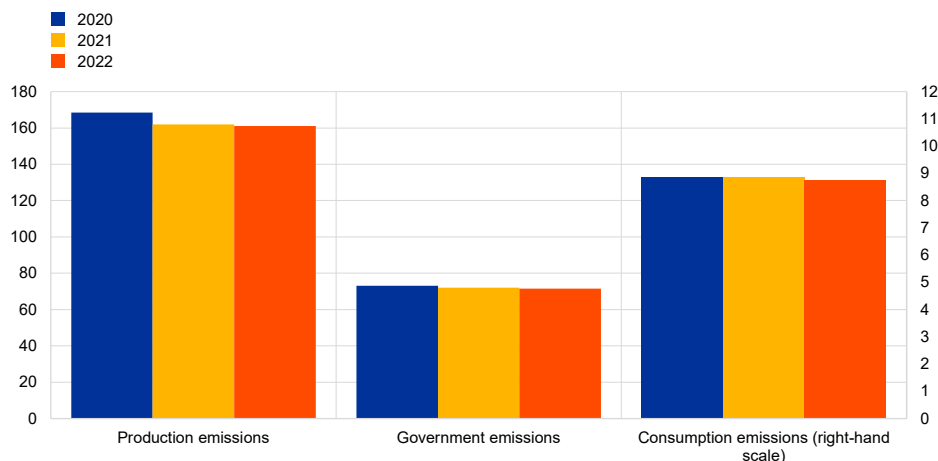
Disregarding the temporary effects of the coronavirus pandemic on country emissions and economic data in 2020, the sovereign investments' WACI, carbon footprint and carbon intensity slightly decreased between 2021 and 2022. By contrast, total carbon emissions increased in line with increasing sovereign bond holdings, stemming from additional investments of regular new cash inflows from paid contributions of pension plan members.

Chart 8

Evolution of key metrics for sovereign bond investments in the staff pension fund

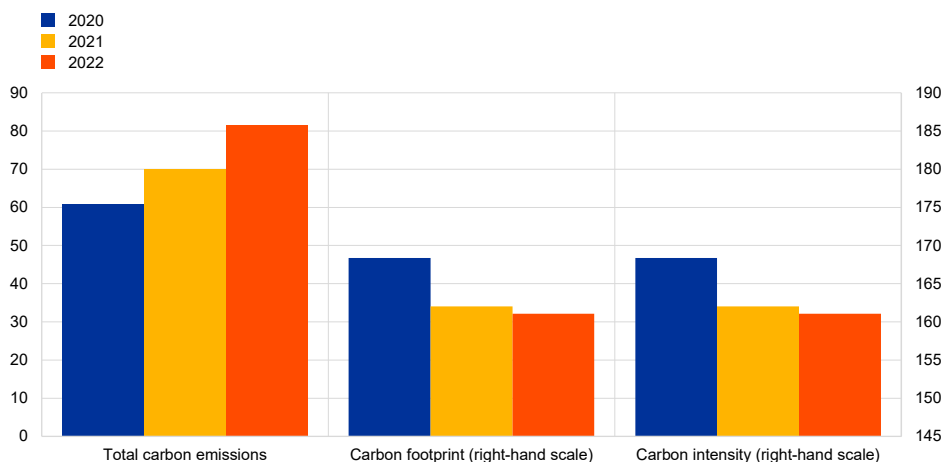
a) WACI

(left-hand scale: tCO₂e/ EUR millions, right-hand scale: tCO₂e/ Population)



b) Production emissions metrics

(left-hand scale: thousand tCO₂e, right-hand scale: tCO₂e/ EUR millions)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg and ECB calculations.

Notes: The chart shows historic values for all key metrics. The WACI is illustrated for production-, consumption-, and government emissions. Total carbon emissions, carbon footprint and carbon intensity are only illustrated for production emissions. In the upper panel, the WACI is denominated in tCO₂e per EUR millions GDP (production emissions), tCO₂e per EUR millions government consumption (government emissions) and tCO₂e per capita (consumption emissions). In the lower panel, total carbon emissions are denominated in tCO₂e, the carbon footprint is denominated in tCO₂e per EUR millions invested, and the carbon intensity is denominated in tCO₂e per EUR millions GDP. Metrics are calculated using bonds' nominal values.

In their submitted NDCs, sovereigns target a reduction of territorial production emissions. An analysis of the annual historical absolute emissions paths of sovereign issuers held in the pension fund in 2022 shows that, on average, they have decarbonised their economies in absolute terms. Between 2017 and 2020 (the latest available reference year for which sovereign emissions data is available), sovereign issuers reduced their production emissions on average by 4% per year. Future data releases will show the extent to which this trend was driven by the temporary effects of the outbreak of the coronavirus pandemic.

In addition to the natural stabilisation due to a delay in data releases again visible for the years 2021 and 2022, another aspect should be considered in the interpretation

of results. In contrast to the metrics for corporate investments, changes in metrics for sovereign investments are random from a portfolio management perspective due to the absence of a defined capital reallocation mechanism that incorporates climate considerations. As a result, sovereign metrics solely fluctuate with changes in countries' absolute emissions, economic fundamentals and portfolio reallocation based on risk and return characteristics.

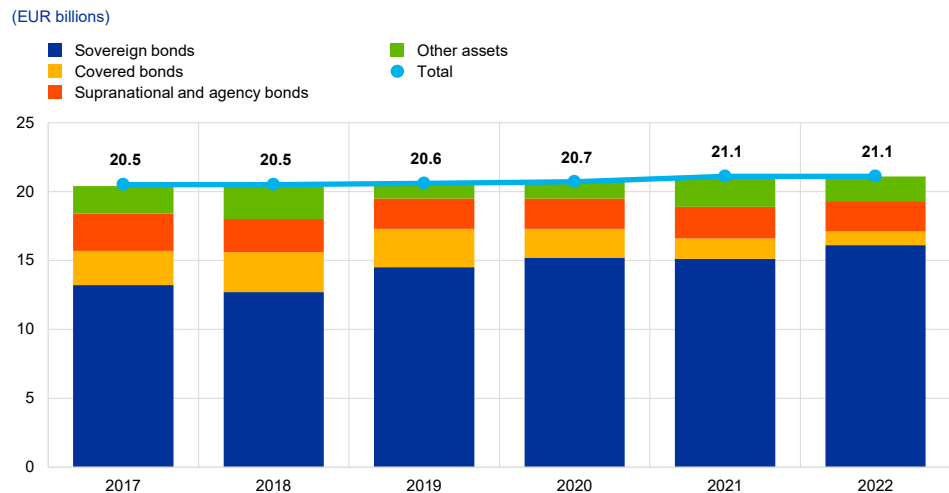
5.2 Own funds portfolio

- Impact investment strategy based on green bonds provides funding for the low-carbon transition and climate solutions.
- Green bond share increased from <1% in 2019 to 13% in 2022.

The ECB own funds portfolio value was €21 billion at year-end 2022, of which 76% was invested in sovereign bonds, 10% in supranational and agency bonds, 5% in covered bonds and 9% in other assets which include cash and cash-equivalents (**Chart 9**). Year-on-year changes in the portfolio value reflect investment performance as well as capital injections. The own funds portfolio is predominantly invested in the euro area.

Chart 9

Portfolio value and asset allocation of the own funds portfolio



Source: ECB calculations.

5.2.1 Own funds – green bond investments

The own funds portfolio provides funding for the low-carbon transition and climate solutions that contribute to a decarbonisation of the real economy by gradually increasing its investments in green bonds. Since the launch of this impact investing strategy, the allocation to green bonds has increased from <1% in 2019 to more than 13% in 2022 (**Chart 10**).

The ECB's Executive Board determines annually year-end green bond target ranges for the portfolio that consider factors such as expected issuance, liquidity conditions, redemptions and portfolio risk constraints. Throughout the year, the green bond share is increased via secondary market purchases during the monthly portfolio rebalancing and via investments in the BIS euro-denominated green bond investment fund for central banks.

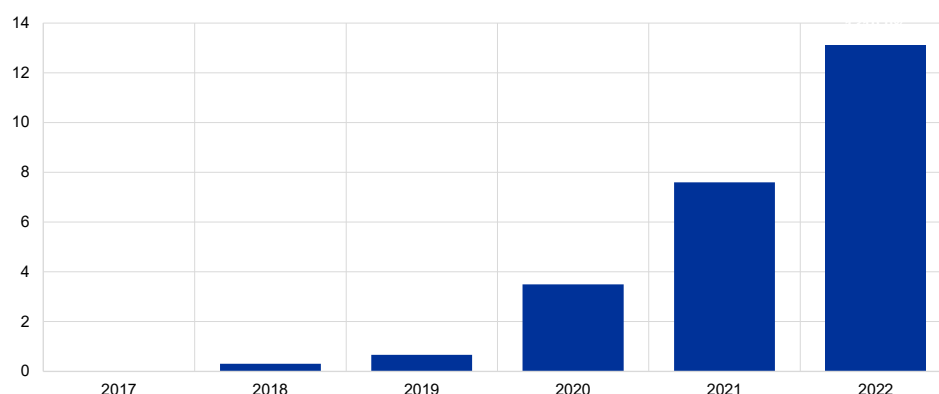
Green bonds contribute to the low-carbon transition by providing additional funding and creating a funding advantage for issuers when compared to funding via conventional bonds. The funding advantage is referred to as “green bond premium” or “greenium”. For the green bonds held in the own funds portfolio, the ECB's internal analysis shows a time-varying but persistent green bond premium of a few basis points, which is evident in lower green bond yields compared with yields of respectively similar conventional bonds.

The ECB supports the development of the [European Union's Green Bond Standard \(EUGBS\)](#), which is expected to become a leading standard for green bonds, enabling companies and public bodies to raise large-scale financing more easily for climate and environmentally friendly investments, while protecting investors from greenwashing.

Chart 10

Historical evolution of the green bond share in the own funds portfolio

(percentages)



Sources: ICMA, Bloomberg, ECB calculations.

Notes: The chart shows the share of green bonds in the own funds portfolio over time. To identify green bonds, the ECB relies on the labelling of the International Capital Market Association (ICMA) that is available via Bloomberg. The calculation is based on bonds' nominal values.

5.2.2 Own funds – metrics

Considering the own funds emissions, [Table 2](#) summarises the key metrics for the portfolio in 2022. Sovereign bonds account for the largest part of the portfolio's associated emissions and its exposure to climate risks. The reason for this dominant role of sovereigns, and the different magnitude of metrics between sovereign and non-sovereign investments is twofold: sovereign bonds account for by far the largest portfolio share and scope 1 and scope 2 emissions of supranational, agency and

covered bond issuers are comparably low due to the service-oriented nature of their business. A comprehensive overview covering five years of key metric history is available in **Annex 4**.

Table 2
Key climate-related metrics in ECB's own funds portfolio for year-end 2022

	Sovereign issuers			Other issuers		
	Sovereign and sub-sovereign bonds			Total	Supra and agency bonds	Covered bonds
	Production	Consumption	Government			
Portfolio value (EUR billions)	16.4			3.0	2.0	1.0
WACI	163	9	70	1.9	2.1	1.6
Total carbon emissions	2,782,959	3,598,092	261,515	175	49	126
Carbon footprint	163	211	15	0.1	0.0	0.2
Carbon intensity	163	9	69	1.3	1.0	1.5

Sources: ISS, Carbon4 Finance, World Bank, Bloomberg, ECB calculations.

Notes: The table shows key metrics for the own funds portfolio per asset class. For sovereign bonds, metrics are separately provided for the production, consumption- and government emissions. For supranational bonds, agency bonds and covered bonds, metrics are provided on asset class and aggregate level ("Total"), based on issuers' scope 1 and scope 2 emissions. Portfolio value is expressed in € billion market value. The WACI and carbon intensity are expressed as tCO₂e (tonnes of carbon dioxide equivalent) per € million revenue (other issuers), PPP-adjusted GDP (sovereign issuers, production emissions), per capita (sovereign issuers, consumption emissions), or final consumption expenditure (sovereign issuers, government emissions). Total carbon emissions are expressed as tCO₂e. Carbon footprint is expressed as tCO₂e per € million. Metrics are calculated using market values for equities and nominal values for bonds.

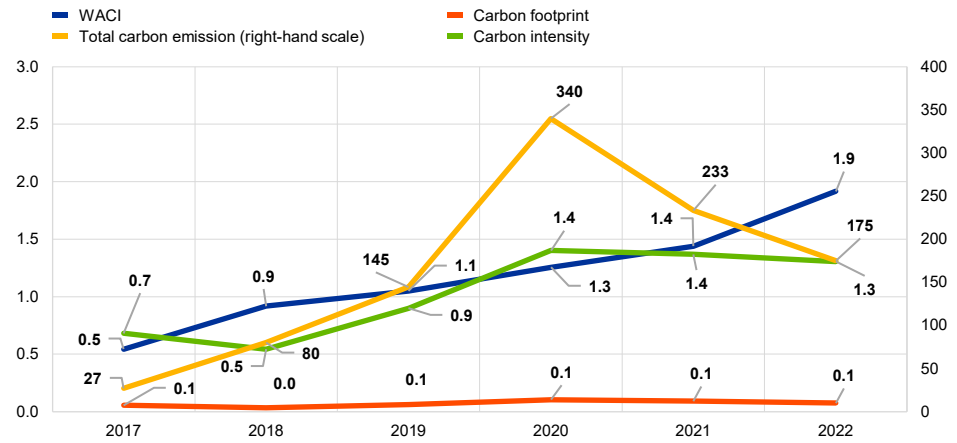
Own funds – supranational-, agency and covered bond investments

The ECB's internally calculated own funds' benchmark guides the monthly portfolio rebalancings and currently does not incorporate climate considerations. As a result, the key metrics for supranational, agency and covered bond investments paint a mixed picture (**Chart 11**) in which the WACI gradually increases, total carbon emissions fluctuate with changes in the allocation to supranational agency and covered bond issuers, the carbon intensity is recently on a declining trend and the carbon footprint is broadly stable. The effects underlying these metrics reflect a passive investment process that, beyond the green bond investments, does not yet incorporate climate change considerations.

Chart 11

Evolution of key metrics for supranational-, agency and covered bond investments in the own funds portfolio

(left-hand scale: tCO₂e/ EUR millions, right-hand scale: tCO₂e)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg, ECB calculations.

Notes: The chart shows historic values of the four key metrics for the own funds' supranational-, agency and covered bond investments based on issuers' scope 1 + 2 emissions. Metrics are calculated using bonds' nominal values. Emissions normalisation in the WACI and the carbon intensity is based on revenue (in € millions); and in the carbon footprint based on the investment amount (in € millions).

5.2.3 Own funds – sovereign investments

All sovereign issuers held in the own funds portfolio are signatories to the Paris Agreement. As of 2022, 69% of the issuers held in the portfolio have enshrined their 2050 net-zero target in domestic law, and additionally 31% in domestic policy documentation, according to the [Net Zero Tracker](#).

The historical evolution of key metrics for sovereign bonds held in the own funds portfolio presents a mixed picture (**Chart 12**). While the WACI based on production, and government emissions declined, it increased when calculated for consumption-based emissions. Total carbon emissions, carbon footprint and carbon intensity declined from 2020 to 2021 but increased in 2022.

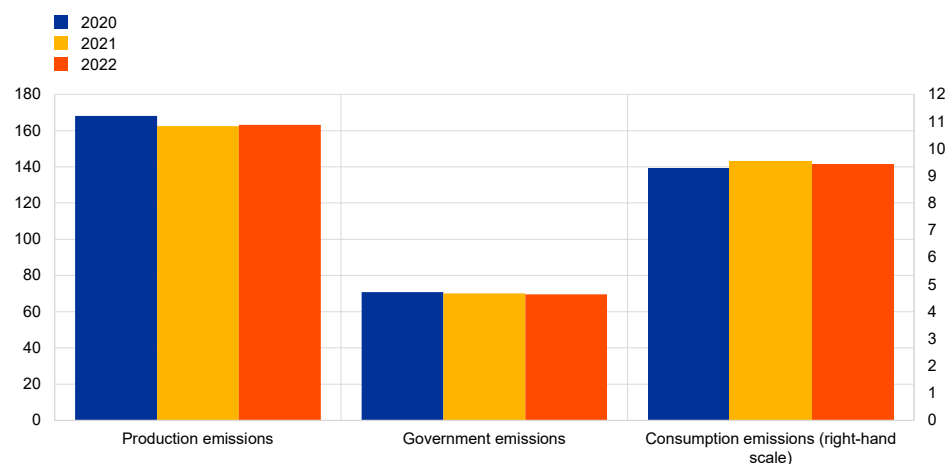
The results should be interpreted with caution, as the temporary distorting effects of the pandemic, the two-year delay in the release of sovereign emissions data, and the absence of a self-decarbonisation method mean the metrics move in a rather arbitrary manner.

Chart 12

Evolution of key metrics for sovereign bond investments in the own funds' portfolio

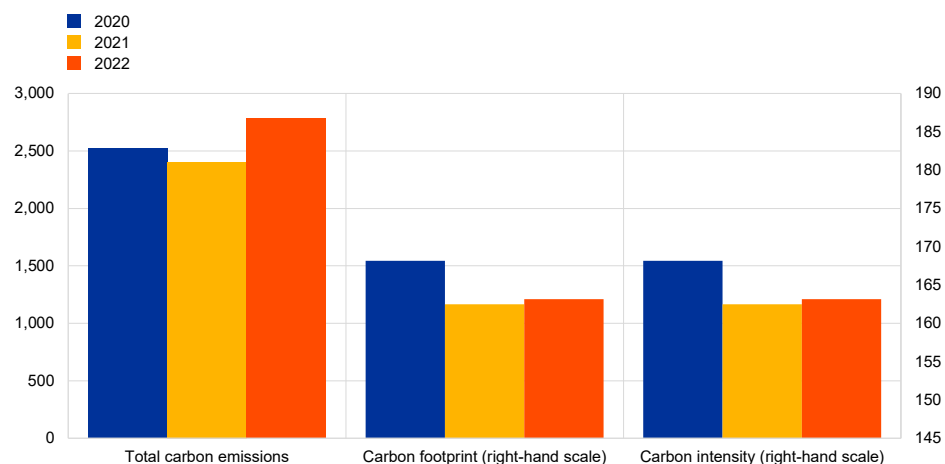
a) WACI

(left-hand scale: tCO₂e/ EUR millions, right-hand scale: tCO₂e/ Population)



b) Production emissions metrics

(left-hand scale: Thousand tCO₂e, right-hand scale: tCO₂e/ EUR millions)



Sources: ISS, Carbon4 Finance, World Bank, Bloomberg, ECB calculations.

Notes: The chart shows historic values for all key metrics. The WACI is illustrated for production, consumption, and government emissions. Total carbon emissions, carbon footprint and carbon intensity are only illustrated for production emissions. In the upper panel, the WACI is denominated in tCO₂e per EUR millions GDP (production emissions), tCO₂e per EUR millions government consumption (government emissions) and tCO₂e per capita (consumption emissions). In the lower panel, total carbon emissions are denominated in thousand tCO₂e, the carbon footprint is denominated in tCO₂e per EUR millions invested, and the carbon intensity is denominated in tCO₂e per EUR millions GDP. Metrics are calculated using bonds' nominal values.

Like the sovereign investments held in the staff pension fund, the own funds portfolio currently decarbonises in line with its sovereign issuers delivering on their commitments to decarbonise their economies in line with the goals of the Paris Agreement. All sovereign issuers held in the own funds portfolio in 2022 are signatories to the Paris Agreement. Between 2017 and 2020 (the latest available reference year for which sovereign emissions data is available), these issuers reduced their production emissions on average by 5% per year.

5.3 Targets

The TCFD recommends disclosing **targets** that are set to manage climate risks. Emissions reduction targets help to reduce portfolios' exposure to climate risks and to decrease portfolios' environmental footprint over time.

The ECB aims to decarbonise its staff pension fund and its own funds portfolio in line with the goals of the Paris Agreement and EU climate neutrality objectives as defined in the [European Climate Law](#). The Law's goal is for Europe's economy and society to become climate-neutral by 2050 and to limit the global temperature increase to well below 2°C and to pursue efforts to keep it to 1.5°C in line with the Paris Agreement. The ECB is committed to regularly reviewing its approach in order to ensure, within its mandate, that it continues to support the decarbonisation path to reach the goals of the Paris Agreement and the EU climate neutrality objectives.

For future TCFD reports, the ECB aims to work towards portfolio-specific, quantitative interim decarbonisation targets for the staff pension fund and the own funds portfolio that leverage on the Eurosystem's growing experience with climate-related financial disclosures, and also consider evolving climate-science and the portfolio-specific objectives and constraints.

In the meantime, the ECB aims to further step up its funding of the low-carbon transition by increasing the share of green bonds held in the own funds portfolio. By the end of 2023, the ECB aims for green bonds to comprise at least 15% of the nominal value of the portfolio.

Annexes

Annex 1

Elements of the Eurosystem disclosure framework for the TCFD category “Metrics and targets”

Element	Details
Weighted average carbon intensity (WACI)	$= \sum_n^i \left(\frac{\text{current value of investment}_i}{\text{current portfolio value}} \right) \times \left(\frac{\text{issuer's carbon emissions}_i}{\text{issuer's revenue, PPP adj. GDP, population, or final consumption expenditure}_i} \right)$
Total carbon emissions	$= \sum_n^i \left(\frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \times \text{issuer's carbon emissions}_i \right)$
Carbon footprint	$= \frac{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \right) \times \text{issuer's carbon emissions}_i}{\text{current portfolio value}}$
Portfolio size	Expressed in € 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.
Data sources	Such as the names of the (climate) data providers.
Target	At least one broadly defined long-term target covering all euro-denominated NMPPs under management control of the central bank, that is aligned with the goals of the Paris Agreement and the EU's climate neutrality objectives. Targets can be set at portfolio level, central bank level, or a combination of both. Targets should ideally be quantitative, and long-term targets should ideally be enriched by interim targets.

Notes: TCFD formulas are provided [here](#). For the Eurosystem disclosure framework, they have been adjusted where necessary to reflect latest PCAF guidance and cover additional asset classes.

In addition to the elements of the Eurosystem disclosure framework, the ECB publishes the **carbon intensity** metric, which is defined as:

Carbon Intensity

$$= \frac{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \right) \times \text{issuer's carbon emissions}_i}{\sum_n^i \left(\frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \times \text{population, or final consumption expenditure}_i \right)}$$

Annex 2

Carbon emissions allocation methods, normalisation factors and attribution factors

Allocation			
Issuer type	Factor	Remarks	Unit
Corporate Supra & Agency	Scope 1 & 2 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.	tCO ₂ e
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 United Nations Framework Convention on Climate Change (UNFCCC) for annual national inventories.	
	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.	
	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.	

Normalisation			
Issuer type	Factor	Remarks	Unit
Corporate Supra & 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 million
Sovereign	Production: PPP adj. 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 million
	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 million

Attribution			
Asset class	Factor	Remarks	Unit
Sovereign bonds	PPP adj. GDP	See description of "PPP adj. GDP" in normalisation factor.	EUR
Equities Supra & Agency bonds Corporate bonds 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.	

Annex 3

Climate-related TCFD metrics of the ECB's pension fund for 2017 to 2022

Pension fund	Sovereign issuers			Corporate issuers		
	Sovereign and sub-sovereign bonds			Total	Corporate bonds	Equities
	Production	Consumption	Government			
Portfolio value (EUR million market value)						
2022		479		1,331	119	1,212
2021		502		1,482	121	1,361
2020		433		1,204	103	1,101
2019		402		1,070	97	973
2018		343		813	81	732
2017		323		825	76	749
WACI (tCO₂e/ EUR million revenue, GDP, consumption exp., or per capita)						
2022	161	9	72	102	108	101
	100%	100%	100%	100%	96%	100%
2021	162	9	72	98	153	93
	100%	100%	100%	99%	93%	100%
2020	168	9	73	118	174	112
	100%	100%	100%	99%	96%	100%
2019	174	10	119	213	214	213
	100%	100%	100%	96%	63%	99%
2018	196	10	133	243	147	250
	100%	100%	100%	95%	60%	100%
2017	201	10	136	238	158	244
	100%	100%	100%	95%	60%	99%
Total carbon emissions (tCO₂e)						
2022	81,503	104,267	7,968	52,846	5,528	47,318
	100%	100%	100%	99%	92%	100%
2021	70,040	89,683	6,835	54,849	8,308	46,541
	100%	100%	100%	98%	86%	100%
2020	60,876	78,247	5,942	50,870	7,798	43,072
	100%	100%	100%	99%	90%	100%
2019	59,334	75,134	8,094	110,627	7,764	102,863
	100%	100%	100%	95%	62%	99%
2018	59,678	75,860	8,129	107,393	6,408	100,984
	100%	100%	100%	95%	59%	100%
2017	55,786	68,872	7,631	94,538	4,550	89,988
	100%	100%	100%	92%	54%	97%

Pension fund	Sovereign issuers			Corporate issuers		
	Sovereign and sub-sovereign bonds			Total	Corporate bonds	Equities
	Production	Consumption	Government			
Carbon footprint (tCO₂e per EUR million invested)						
2022	161	206	16	41	41	41
	100%	100%	100%	99%	92%	100%
2021	162	207	16	39	78	36
	100%	100%	100%	98%	86%	100%
2020	168	216	16	44	82	41
	100%	100%	100%	99%	90%	100%
2019	174	221	24	111	119	111
	100%	100%	100%	95%	62%	99%
2018	196	249	27	144	114	146
	100%	100%	100%	95%	59%	100%
2017	201	248	27	128	97	130
	100%	100%	100%	92%	54%	97%
Carbon intensity (tCO₂e / EUR million revenue, GDP, consumption exp., or per capita)						
2022	161	9	71	110	121	109
	100%	100%	100%	99%	92%	100%
2021	162	9	71	112	200	104
	100%	100%	100%	98%	86%	100%
2020	168	9	73	124	212	115
	100%	100%	100%	99%	90%	100%
2019	174	9	116	256	288	254
	100%	100%	100%	95%	62%	99%
2018	196	10	130	275	254	277
	100%	100%	100%	95%	59%	100%
2017	201	10	133	259	243	260
	100%	100%	100%	92%	54%	97%

Sources: ISS, C4F, World Bank, Bloomberg and ECB calculations.

Notes: Percentages below each metric indicate data availability, calculated as the percentage of investments (i.e. market value of investments/market value of portfolio) for which all required data (i.e. emissions data and financial data) are available. Additionally, in all tables, the portfolio value "Total" includes all assets, also those excluded from reporting such as cash and derivatives. As such, its value may deviate from the sum of the portfolio values of the reported asset classes.

Annex 4

Climate-related TCFD metrics of the ECB's own funds portfolio for 2017 to 2022

Own fund	Sovereign issuers			Other issuers			
	Sovereign and sub-sovereign bonds			Total	Supra and agency bonds	Covered bonds	
	Production	Consumption	Government				
Portfolio value (EUR billion market value)							
2022		16.1		3.2	2.2	1.0	
2021		15.1		3.8	2.3	1.5	
2020		15.2		4.3	2.2	2.1	
2019		14.5		5.0	2.2	2.8	
2018		12.7		5.3	2.4	2.9	
2017		13.2		5.2	2.7	2.5	
WACI (tCO₂e / EUR million revenue, GDP, consumption exp., or per capita)							
2022		163	9	70	1.9	2.1	1.6
		100%	100%	100%	85%	82%	91%
2021		163	10	70	1.4	1.4	1.5
		100%	100%	100%	87%	83%	91%
2020		168	9	71	1.3	0.6	1.9
		100%	100%	100%	93%	91%	96%
2019		175	10	111	1.1	0.5	2.1
		100%	100%	100%	59%	95%	32%
2018		203	11	134	0.9	0.8	1.2
		100%	100%	100%	61%	92%	38%
2017		204	11	134	0.5	0.5	0.7
		100%	100%	100%	52%	84%	20%
Total carbon emissions (scope 1 and 2 in tCO₂e)							
2022		2,782,959	3,598,092	261,515	175	49	126
		100%	100%	100%	73%	76%	67%
2021		2,403,071	3,153,426	226,980	233	54	179
		100%	100%	100%	71%	75%	67%
2020		2,524,497	3,306,705	240,136	340	13	327
		100%	100%	100%	83%	83%	84%
2019		2,452,845	3,180,528	312,682	145	26	118
		100%	100%	100%	51%	95%	19%
2018		2,489,253	3,254,265	323,789	80	22	58
		100%	100%	100%	51%	89%	22%
2017		2,594,384	3,376,176	344,791	27		27
		100%	100%	100%	10%	0%	20%

Own fund	Sovereign issuers			Other issuers		
	Sovereign and sub-sovereign bonds			Total	Supra and agency bonds	Covered bonds
	Production	Consumption	Government			
Carbon footprint (tCO_{2e} per EUR million invested)						
2022	163	211	15	0.1	0.0	0.2
	100%	100%	100%	73%	76%	67%
2021	163	213	15	0.1	0.0	0.2
	100%	100%	100%	71%	75%	67%
2020	168	220	16	0.1	0.0	0.2
	100%	100%	100%	83%	83%	84%
2019	175	228	22	0.1	0.0	0.2
	100%	100%	100%	51%	95%	19%
2018	203	266	26	0.0	0.0	0.1
	100%	100%	100%	51%	89%	22%
2017	204	266	27	0.1		0.1
	100%	100%	100%	10%	0%	20%
Carbon intensity (tCO_{2e} / EUR million revenue, GDP, consumption exp., or per capita)						
2022	163	9	69	1.3	1.0	1.5
	100%	100%	100%	73%	76%	67%
2021	163	9	70	1.4	1.1	1.5
	100%	100%	100%	71%	75%	67%
2020	168	9	71	1.4	0.3	1.7
	100%	100%	100%	83%	83%	84%
2019	175	10	109	0.9	0.2	2.2
	100%	100%	100%	51%	95%	19%
2018	203	10	131	0.5	0.2	1.0
	100%	100%	100%	51%	89%	22%
2017	204	11	132	0.7		0.7
	100%	100%	100%	10%	0%	20%

Sources: ISS, C4F, World Bank, Bloomberg and ECB calculations.

Notes: Percentages below each metric indicate data availability, calculated as the percentage of investments (i.e. market value of investments/market value of portfolio) for which all required data (i.e. emissions data and financial data) are available. Additionally, in all tables, the portfolio value "Total" includes all assets, also those excluded from reporting such as cash and derivatives. As such, its value may deviate from the sum of the portfolio values of the reported asset classes.

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

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