



EUROPEAN CENTRAL BANK

EUROSYSTEM

# Climate-related financial disclosures of the Eurosystem's corporate sector holdings for monetary policy purposes

March 2023



# Contents

<b>Foreword</b>	<b>2</b>
<b>1 Introduction</b>	<b>4</b>
<b>2 Governance</b>	<b>7</b>
<b>3 Strategy</b>	<b>9</b>
3.1 The Eurosystem’s tilting framework for corporate sector purchases	10
<b>Box 1</b> The Eurosystem’s approach to greening the corporate sector portfolios	11
<b>4 Risk management</b>	<b>12</b>
4.1 Overview	12
4.2 Climate scores	12
4.3 Climate stress testing	14
<b>5 Metrics and targets</b>	<b>17</b>
5.1 Metrics	18
5.2 Targets	26
<b>Annexes</b>	<b>28</b>

## Foreword



Combating climate change is one of the greatest challenges of our times. To slash global greenhouse gas emissions to net zero, our economy needs to undergo a fundamental transformation. Finance has a crucial role to play in supporting this transition, and central banks can help, within the limits of their mandates. Even as we at the European Central Bank work to address the urgent day-to-day challenges that require our immediate attention, we must strive to stay on track with our efforts to fight climate change. Therefore we decided in 2021 on a comprehensive action plan to further incorporate climate change considerations into our policy framework.

To this end, in October 2022 we took action by tilting or directing our corporate bond purchases towards issuers with a better climate performance. We did so with a clear target in mind: to reduce the carbon emissions related to Eurosystem holdings on a path aligned with the goals of the Paris Agreement. This report sets out the carbon footprint of these holdings for the first time, helping us to remain transparent and accountable in our efforts. It also describes our overall tilting strategy, the way we decide on climate-related measures and how we manage climate-related risks.

These disclosures mark an important step towards becoming more transparent about the climate-related risks and carbon footprint of our portfolios. They support the European Union's objectives for a climate-neutral economy, without prejudice to our primary mandate of price stability, and help foster a better understanding of climate-related risks in the financial sector. By publishing these disclosures every year, we will also make it easier for others to track our progress in each of these areas, including our path towards a Paris-aligned portfolio.

Beyond this first-time publication, we intend to expand the scope and improve the quality of our disclosures. By focusing first on our corporate bond exposures, we are targeting the asset class for which there is the most readily available and reliable climate-related data. Over time we will expand our reporting to include other asset classes on our monetary policy balance sheet. As climate-related data and regulation improve, our disclosures will follow suit.

We will use our initial experience with the corporate bond tilting framework to consider setting interim targets as a way of benchmarking our progress towards the goals of the Paris Agreement. The annual publication of our disclosures could also provide an occasion for us to adjust key parameters of the framework – as we did when we announced stronger tilting towards issuers with a better climate performance in our monetary policy decision of 2 February 2023 – and to decide on further measures, if necessary and within our mandate.

Time is running out to keep the goals of the Paris Agreement within reach. We need to act now. These disclosures are a critical part of our commitment, together with the Eurosystem, to achieving this. They provide a first concrete overview of the ground we need to cover before we can cross the finish line.

Frankfurt am Main, March 2023  
Christine Lagarde  
President

# 1 Introduction

This report presents the Eurosystem’s first annual climate-related financial disclosures on its corporate securities holdings purchased for monetary policy purposes. The disclosures in this report cover the corporate sector assets held under the corporate sector purchase programme (CSPP) and the pandemic emergency purchase programme (PEPP), hereinafter collectively referred to as “corporate sector portfolios”.

This report aims to improve transparency on the Eurosystem’s activities and contributes to the ongoing work on climate change. This work focuses on three main objectives: managing and mitigating the financial risks associated with climate change and assessing its economic impact; promoting sustainable finance to support an orderly transition to a low-carbon economy; and sharing the Eurosystem’s expertise to foster wider changes in behaviour.<sup>1</sup>

In July 2021 the ECB published an action plan for the inclusion of climate change considerations in its monetary policy strategy.<sup>2</sup> In the action plan, the ECB indicated its commitment to disclose climate-related information on the corporate sector portfolios of the Eurosystem by the end of the first quarter of 2023. With the publication of this report the Eurosystem is delivering upon this commitment. Separately, the ECB and the Eurosystem national central banks are also publishing climate-related disclosures on their euro-denominated non-monetary policy portfolios. Figure 1 provides an overview of the scope of the Eurosystem’s climate-related financial disclosures.

---

<sup>1</sup> See [“Climate change and the ECB”](#) on the ECB’s website.

<sup>2</sup> See [“ECB presents action plan to include climate change considerations in its monetary policy strategy”](#), *press release*, ECB, 8 July 2021.

**Figure 1****Scope of the Eurosystem's climate-related financial disclosures**

Monetary policy portfolios	
Asset purchase programme	Pandemic emergency purchase programme
Corporate sector purchase programme (CSPP)	Corporate bond holdings
	Commercial paper holdings
Public sector purchase programme (PSPP)	Public sector securities holdings
Third covered bond purchase programme (CBPP3)	Covered bond holdings
Asset-backed securities purchase programme (ABSPP)	
ECB's foreign reserves (non-euro denominated portfolios)	
Non-monetary policy portfolios (NMPP)	
ECB's own funds	
ECB's staff pension fund	
NMPPs of Eurosystem national central banks	

Note: Green shading – in scope in this report; orange shading – in scope of the NMPP TCFD reporting; grey shading – not in scope.

The disclosures follow the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board 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 and the Network of central banks and supervisors for Greening the Financial System (NGFS).<sup>3</sup>

The report is structured as follows. Section 2 summarises the governance and decision-making responsibilities for the Eurosystem corporate sector portfolios. Section 3 outlines the strategy used by the Eurosystem to integrate climate change considerations into the portfolios, while Section 4 explains how the ECB considers

<sup>3</sup> See TCFD, “[Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures](#)”, October 2021 and NGFS, “[Guide on climate-related disclosure for banks](#)”, December 2021.

climate risks when managing risks to the portfolios. Section 5 closes with details on the relevant quantitative and qualitative metrics and targets.

The disclosures presented in this report mark an important step towards increased transparency about the climate-related risks and the environmental footprint related to the Eurosystem's corporate sector holdings in the monetary policy portfolios. The information provided in this report is highly dependent on the data sources used. It will therefore be updated over time in line with increasing availability and quality of climate-related data, evolving disclosure practices and growing expertise in the management of climate-related risks.

## 2 Governance

The ECB's Governing Council consists of the six members of the ECB's Executive Board, plus the governors of the NCBs of the 20 euro area countries and is the body responsible for setting the monetary policy for the euro area. Monetary policy is implemented through various instruments, including the conduct of outright purchases of financial assets. The corporate sector assets that have been bought under the CSPP and PEPP are thus part of the Eurosystem's monetary policy portfolios. In the context of 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 monetary policy framework. Following the first comprehensive review of progress made on these measures in June 2022, the Governing Council decided to adjust its corporate sector holdings and collateral framework to incorporate climate risk considerations and introduce climate-related disclosure requirements.

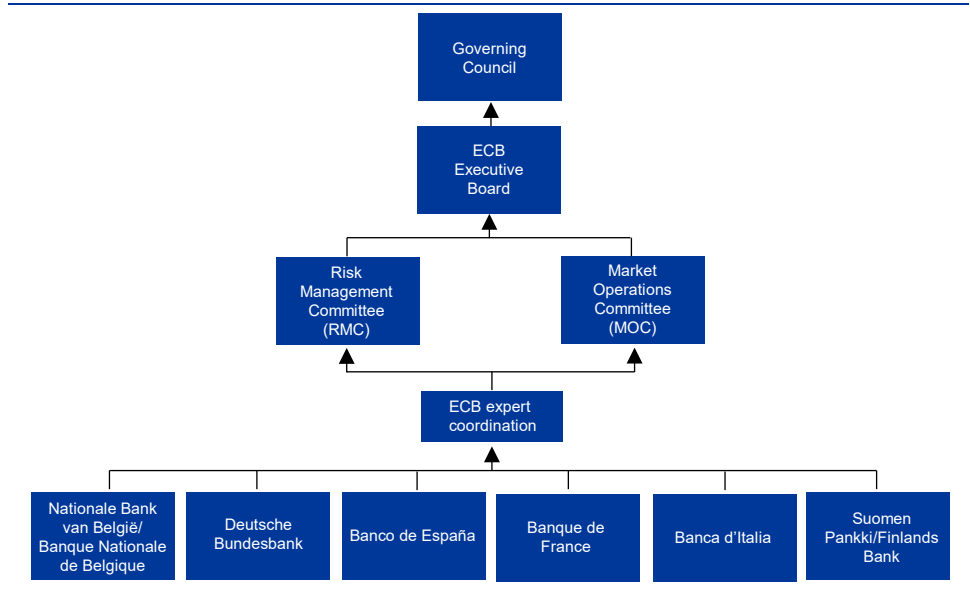
The ECB has adopted an integrated approach for the governance of climate-related risks and opportunities. This means that climate change-related considerations are regularly addressed within its existing governance structures. Furthermore, the ECB has set up a climate change centre to bring together the work on climate issues in different parts of the ECB. This decision reflects the growing importance of climate change for both the economy and the ECB's policy, as well as the need for the ECB to take a more structured approach to its strategic planning and coordination of the risks and opportunities related to climate change.

The ECB's Executive Board, together with the Eurosystem's Market Operations Committee and Risk Management Committee, supports the Governing Council in the oversight of climate-related risks and opportunities for monetary policy-related corporate sector holdings (Figure 2). When developing policy proposals to put forward to the Governing Council, staff at the ECB and NCBs responsible for portfolio and risk management convene in dedicated working groups and taskforces focused on integrating climate considerations into the Eurosystem's asset purchases. Within the ECB, collaboration across business areas enriches the analyses used in the policy recommendations put forward by the Eurosystem committees to the Executive Board. The climate-related work at these various levels contributes to shaping views and building consensus within the Eurosystem. Thanks to such work, a detailed framework for corporate sector asset purchases incorporating climate change considerations now steers the reinvestment purchases conducted by the portfolio management experts of the NCBs, which are coordinated by the ECB.



**Figure 2**

The Eurosystem's governance on climate change considerations related to corporate sector asset purchases






The measures to account for climate change in corporate sector portfolios as decided in June 2022 will be reviewed at the latest one year from their implementation, and regularly thereafter. The Governing Council will assess the effects of these measures and, if necessary, will adapt them: (1) to ensure that they continue to adhere to the monetary policy objectives; (2) to ensure – within the ECB's mandate – that the relevant measures continue to support a decarbonisation path consistent with the goals of the Paris Agreement and the EU's climate neutrality objectives; (3) to respond to future improvements in climate data and climate risk modelling or changes in regulation; and (4) to address additional environmental challenges potentially impacting the ECB's price stability mandate. Accountability towards the public will be provided through the annual publication of the Eurosystem's climate-related financial disclosures.

## 3 Strategy

Climate change and the related transition to a carbon-neutral economy affect price stability – the primary objective of the ECB’s monetary policy. Moreover, the value and risk profile of the corporate sector assets held on the Eurosystem’s balance sheet are also impacted by climate risks.<sup>4</sup> If unaddressed, this could lead to an undesirable accumulation of climate-related financial risks on its balance sheet.<sup>5</sup> The Eurosystem’s strategy in this regard therefore consists of managing risks stemming from climate change and proactively assessing and integrating them into its risk management and asset purchase frameworks.

**Figure 3**  
The ECB’s strategic objectives on climate change

Managing climate-related risks	Supporting the green transition	Fostering wider action
		
We work to better understand, monitor and manage climate-related risks in our monetary policy and investment operations, as well as in the financial system. We also assess the economic impact of climate change and mitigation policies.	We support an orderly transition to a carbon-neutral economy with measures that are within our mandate. This includes promoting the development of sustainable finance and creating incentives for a greener financial system.	We help improve the overall understanding of climate-related risks and work closely with European and international partners on climate and sustainable finance topics. We also work to improve the transparency of our activities and reduce our own environmental impact.

In addition and without prejudice to the primary objective of price stability, the ECB 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. These include working for the sustainable development of Europe, and a high level of protection and improvement of the quality of the environment.

The Eurosystem’s corporate sector holdings are exposed to climate risks, which could lead to adverse outcomes in the event of climate shocks or a gradual worsening of risk factors. A distinction is made between transition risks and physical

<sup>4</sup> See “Climate change and monetary policy in the euro area”, ECB Occasional Paper Series, September 2021.

<sup>5</sup> The Eurosystem 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. The adoption by the Eurosystem of measures designed to circumscribe the risk of financial losses forms part of the definition and implementation of monetary policy, as also reflected in Article 18.1 of the Statute of the European System of Central Banks and of the European Central Bank (hereinafter the “Statute of the ESCB”), pursuant to which the Eurosystem may conduct credit operations with lending based on adequate collateral.

risks. Transition risks concern the likelihood and impact of the economic consequences of the transition to a carbon-neutral economy on corporates' business models and asset valuations. Physical risks, by contrast, concern the likelihood and impact of severe weather events or natural disasters occurring (sometimes also referred to as "acute risks"), as well as the impact of a sustained increase in temperature levels (occasionally labelled "chronic risks") on corporates' business models and asset valuations.

To assess the likely impact of climate-related risk on the financial risk profile of its corporate sector holdings, the Eurosystem uses: 1) a climate scoring tool to assess corporate issuers' performance across multiple climate-related metrics that focus on transition risks; and 2) climate stress testing based on scenarios that are calibrated over a medium to long-term horizon and consider both transition and physical risks.

To mitigate climate-related risks on its balance sheet, the Eurosystem has decided to gradually reduce the carbon emissions related to its corporate sector holdings on a path that is in line with the ECB's climate strategy on monetary policy and consistent with the goals of the Paris Agreement and the EU's climate neutrality objectives.<sup>6</sup> This strategy is expected to also provide incentives for issuers to improve their climate-related disclosures and further reduce their greenhouse gas emissions in the future.<sup>7</sup> Operationally, this is currently enabled by tilting the reinvestment purchases of corporate sector assets towards issuers with a better climate performance (henceforth collectively referred to as the "tilting framework"). The tilted purchases are guided by risk limits that are informed, among other risk factors, by issuers' climate performance as assessed by the corporate sector portfolio climate scoring tool. Furthermore, maturity limits are imposed on long-maturity bonds from issuers with a low climate performance.

### 3.1 The Eurosystem's tilting framework for corporate sector purchases

The Eurosystem's tilting framework for corporate purchases relies on the climate scoring tool to assess eligible corporate sector issuers' climate performance. The tool assigns different climate scores to all eligible corporate issuers in the CSPP and PEPP universe and supports monetary policy-related asset purchase decisions. Climate performance is measured across three dimensions: corporate sector issuers' emission intensities, the level of ambition of their declared emission reduction targets and the quality of their verified climate-related disclosures. Using these dimensions, the Eurosystem aims to balance the provision of incentives for issuers to disclose climate data and set targets for reducing emissions with the need to use data on companies' actual emissions.

---

<sup>6</sup> See "[ECB takes further steps to incorporate climate change into its monetary policy operations](#)", *press release*, ECB, 4 July 2022.

<sup>7</sup> Subsequently, greenhouse gases are referred to as "emissions" and denote the greenhouse gases defined in the [Kyoto Protocol](#).

Tilting means that the share of assets on the Eurosystem’s balance sheet issued by companies with a better climate performance will have purchase limits above those corresponding to neutral benchmark weights, at the expense of the purchase limits for issuers with poorer climate scores. In addition, the tilting framework envisages 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 fulfil stringent criteria and a higher Eurosystem bid in the primary issuance of bonds from issuers with better climate performance.<sup>8</sup>

In developing the climate scoring tool, the Eurosystem focused on metrics that are sufficiently robust for constructing such a tool. The Eurosystem actively maintains and develops its climate risk measures to ensure that they offer sufficient coverage and are up to date and proportionate.





**Box 1**

The Eurosystem’s approach to greening the corporate sector portfolios

The current parameters of the tilting framework for the corporate portfolios are a starting point and will be reviewed in the future. The first review will take place at the latest one year after the start of implementation in October 2022. Thereafter, while ad hoc adjustments are possible, the Eurosystem’s relevant committees will reassess the framework and its effectiveness on a yearly basis and report to the Governing Council accordingly. Such reassessments may lead to, for instance, recalibrating the parameters in view of actual performance compared with targets or reviewing the metrics used in the relevant portfolio projection exercises.

**Figure A**

Overview of the Eurosystem’s framework for incorporating climate considerations into the corporate sector portfolios

Objective 	Aligning the implementation of corporate sector portfolios with the ECB’s objective on climate change
Approach 	<ol style="list-style-type: none"> <li>1. Combination of best-in-class and best-in-universe approaches for assessing carbon intensity <ul style="list-style-type: none"> <li>• Reported scope 1 &amp; 2 greenhouse gas emissions data</li> <li>• Sectoral average scope 3 greenhouse gas emissions data</li> </ul> </li> <li>2. Validation by a third party of the ambitiousness of the greenhouse gas emissions target</li> <li>3. Quality of disclosures: e.g., completeness and third-party verification of emissions</li> </ol>
Tools 	<p>Based on issuers’ climate scores:</p> <ul style="list-style-type: none"> <li>• Purchases guided by tilted benchmark towards issuers with higher climate scores</li> <li>• Maturity limits set for lower scoring issuers</li> <li>• Primary market bid that favours issuers with higher climate scores</li> <li>• Primary market bid that favours eligible issuers’ green bonds that fulfil stringent criteria</li> </ul>
Targets 	Decarbonisation of the portfolio on a path consistent with the goals of the Paris Agreement and the EU climate neutrality objectives.

<sup>8</sup> See “[FAQ on the integration of climate-related considerations into the CSPP](#)” on the ECB’s website.

## 4 Risk management

### 4.1 Overview

The Eurosystem integrates climate change-related risks across the entire risk management cycle. For risk identification and assessment, the Eurosystem expands risk drivers and risk sensitivities to include physical and transition risks, ensuring prudent, forward-looking and data-driven risk measurement. As climate-related data and models improve, the Eurosystem will work on further developing internal risk assessment capabilities, in particular for climate stress testing.

The Eurosystem takes a bottom-up approach in assessing climate risks in the corporate sector portfolios and treats climate-related risks as amplifiers of financial risks. Climate change criteria are incorporated into the due diligence procedure and the tilting framework guiding the allocation of corporate sector purchases, in line with the Eurosystem's primary mandate. The Eurosystem identifies the sensitivity of the corporate sector portfolios to climate risks using several metrics, such as assessments of credit rating agencies, the new climate scoring tool developed in-house and the carbon footprint.

### 4.2 Climate scores

An overall climate score is computed for each eligible issuer. The overall climate score in turn affects each issuer's weight in the reference portfolio via an adjustment based on decarbonisation path parameters. The score ranges from a minimum of zero to a maximum of five and focuses on transition risks estimated based on issuers' recent emissions, climate-related targets and quality of disclosures. Chart 1 shows the distribution of scores as a share of holdings as at December 2022. The higher the score, the better the climate performance of the issuer. An issuer's overall score is a combination of the following three dimensions:

- (i) The backward-looking carbon emission intensity sub-score reflects the past greenhouse gas emissions of an issuer. It encompasses scope 1 and 2 data<sup>9</sup> for the issuer concerned and scope 3 data at sector level (owing to the lower availability and quality of self-reported scope 3 data). The sub-score combines a best-in-class with a best-in-universe approach. The best-in-class approach compares companies against their peers within specific industry sectors, while the best-in-universe approach compares companies across the entire corporate universe. If issuers do not have self-reported emissions data, they are

---

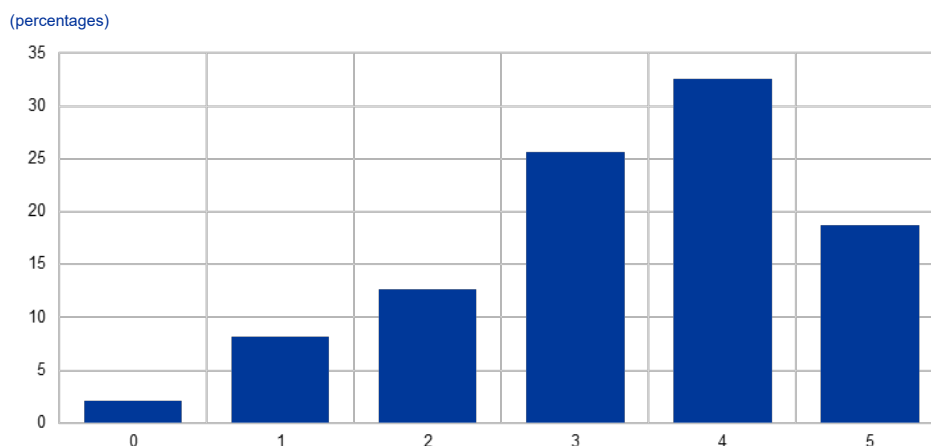
<sup>9</sup> Under the [Greenhouse Gas Protocol](#), scope 1 emissions encompass an entity's direct emissions, and thus its exposure to rising costs from higher carbon taxes. Scope 2 covers indirect emissions from electricity, heat and steam consumption, and therefore reflects an entity's exposure to rising input prices. Scope 3 is defined in the Greenhouse Gas Protocol as including all the indirect emissions of an entity and its products, with the exception of those falling under scope 2, i.e. it includes emissions across the entire value chain.

assigned a lower backward-looking emissions sub-score. This approach incentivises issuers to decrease their emissions using the best data available at issuer level and, at the same time, to adopt a more holistic view of the carbon impact of the sector in which they operate. Issuers' carbon intensity is then calculated by normalising their emissions by their revenues, in order to capture the intensity of emissions generated controlling by the value of economic goods and services produced, rather than their level of absolute emissions.

- (ii) The disclosure sub-score reflects the quality of the emissions data provided by issuers. Issuers achieve the highest scores when their climate-related financial disclosures are verified by a third party. If issuers have no self-reported emissions data, such that only estimates of their emissions produced by third-party data providers are available, they are assigned the lowest sub-score.
- (iii) The forward-looking target sub-score reflects the issuer's expected changes in future emissions. Issuers that are on an ambitious decarbonisation path towards Paris Agreement targets are given a higher score, particularly if the target is science-based and has been validated by a third party. If issuers have no self-reported emissions data, such that emissions reduction targets cannot be verified, they are assigned the lowest sub-score.

### Chart 1

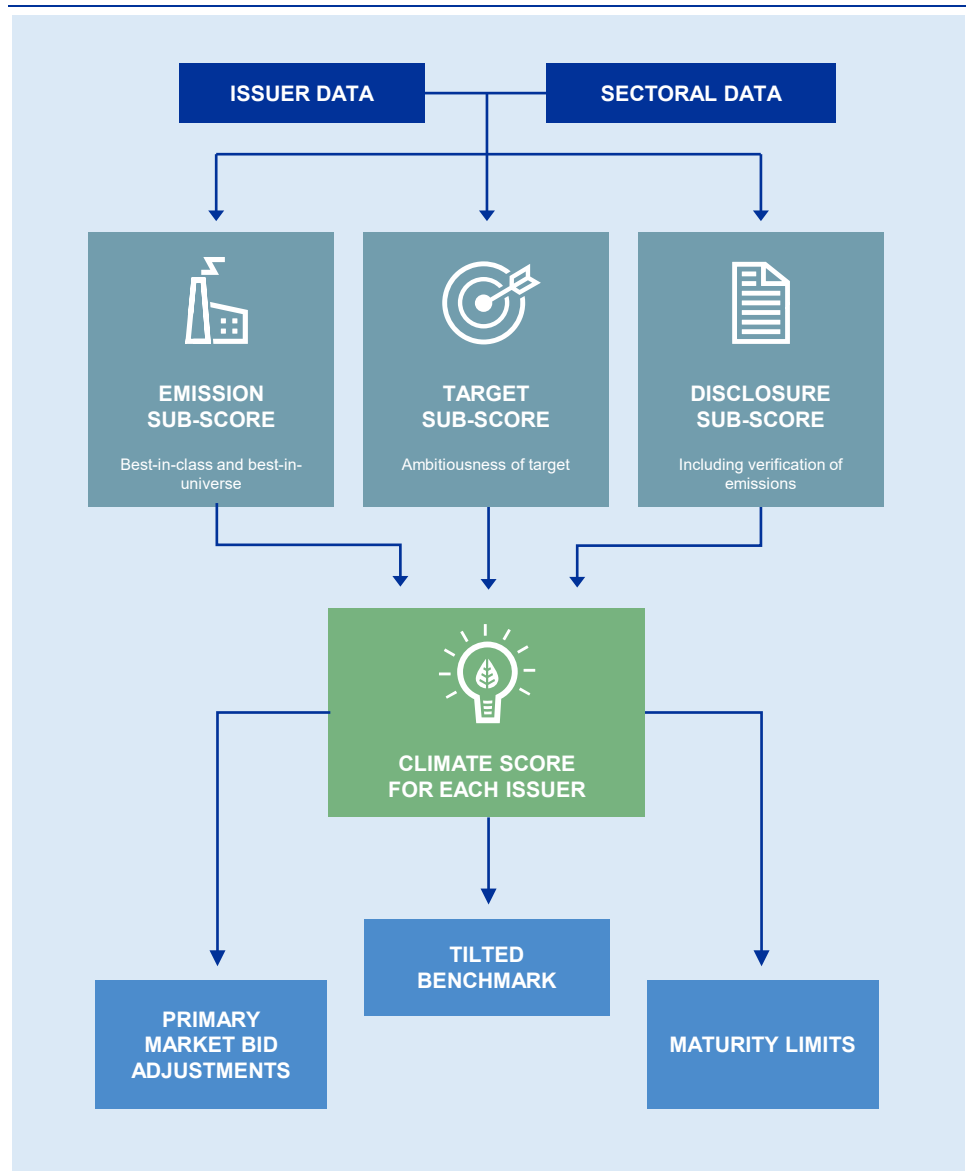
Share of portfolio holdings by issuer score as at 20 January 2023



Sources: ECB calculations and ISS data.

Predefined weights are used to aggregate the three sub-scores into issuer-specific climate scores (Figure 4). These weights, in turn, provide a basis for the rate of benchmark and limit adjustment, i.e. the tilting factor, which steers future purchases and/or reinvestments towards issuers with a better climate performance in the corporate sector portfolios. Tilting the portfolio implies that the share of assets issued by companies with a better overall climate performance (as assessed by the three sub-scores of the climate tool) will generally be at an increased level compared with that of companies with a poorer climate performance.

**Figure 4**  
Overview of the factors and outputs of the climate scoring tool



### 4.3 Climate stress testing

Over the past two years, the Eurosystem has developed a climate stress testing framework which aims to assess the impact of climate risks on the financial risk profile of the Eurosystem’s balance sheet in a consistent manner. The Eurosystem regards climate scenario analysis as a key tool in assessing the implications of climate change for financial risks. Based on that framework, the Eurosystem has conducted a stress test on its balance sheet, covering a range of financial exposures, such as collateralised credit operations and holdings of corporate securities, covered bonds and asset-backed securities, for which both physical and transition risks have been analysed.

The climate stress test leverages the methodology developed for the ECB's economy-wide climate stress test<sup>10</sup> and follows the methodological assumptions underlying the ECB's supervisory climate stress test.<sup>11</sup>

To assess the impact of climate risk on the financial risk profile of the corporate sector portfolios, we use climate stress testing with scenarios that are calibrated over a medium to long-term horizon. The scenarios vary with respect to the assumed timing of the climate policy implementation and resulting implications for climate change and its impact on the global economy. The exercise considers three long-term scenarios developed for the supervisory climate stress test, which are based on Phase II of the NGFS model outputs<sup>12</sup> released in June 2021. The two scenarios relevant for the assessment of climate risk related to the corporate sector portfolios are the "disorderly transition" scenario (which assumes uncoordinated or delayed implementation of climate policy) and the "hot house world" scenario (which assumes no climate policy actions are taken). The results of the assessment are considered in relation to the "orderly transition" scenario – the baseline scenario that assumes immediate policy action is taken to reduce emissions consistent with the Paris Agreement. This analysis was complemented by two short-term scenarios, which are also used in the ECB's supervisory climate stress test. The first reflects the impact of a severe physical hazard (the "flood risk" scenario), and a second represents the frontloading of sharp increases in the carbon price ("short-term disorderly transition" scenario).

The financial risks, expressed as the expected shortfall estimated at the 99% confidence level over a one-year horizon,<sup>13</sup> are computed using the stress testing methodology and then applied in the framework of regular financial risk management, with a cut-off date for the Eurosystem balance sheet and market data set at 30 June 2022.

This exercise indicates that both types of climate risk (transition and physical risk) can have a material impact on the financial risk profile of the outright holdings of corporate securities. This conclusion is based on results showing a significant increase in the risk estimates in both the disorderly transition scenario and the hot house world scenario compared with the orderly transition scenario.

The analysis shows that Eurosystem corporate sector holdings contribute more to the total increase in risk for both transition and physical risk scenarios than the sum of the other exposures in the scope of the exercise.

Furthermore, the exercise highlighted a high degree of concentration for the climate risk impact, whereby transition risk is primarily concentrated in the sectoral dimension. Sectors associated with high vulnerability to transition risk contribute

---

<sup>10</sup> See Spyros Alogoskoufis, S., Dunz, N., Emambakhsh, T., Hennig, T., Kaijser, M., Kouratzoglou, C., Muñoz, M.A., Parisi and L., Salleo, C., "ECB economy-wide climate stress test: Methodology and results", *Occasional Paper Series*, No 281, ECB, September 2021.

<sup>11</sup> See "ECB climate risk stress test", ECB Banking Supervision, July 2022.

<sup>12</sup> For more information, see "Data & Resources Archive (phase II)", NGFS Scenarios Portal.

<sup>13</sup> Expected shortfall at a 99% confidence level is computed over a one-year horizon corresponding to the year representing the peak in terms of climate risk of the different scenarios (e.g. 2035 for the "disorderly transition" scenario and 2050 for the "hot house world" scenario).



substantially to the total increase in the expected shortfall in the short and long-term disorderly transition scenarios, despite constituting a limited share of the total nominal sector holdings. This particularly concerns sectors characterised by high emission intensity.

In contrast, the impact of physical risk is concentrated along a geographical dimension. Assets of issuers whose activity is located in jurisdictions with a high average vulnerability to physical risk exhibit a substantially higher increase in risk estimates and are the main contributors to the total risk increase in the hot house world scenario. This geographical dimension is also present in the short-term flood risk scenario.

The quantitative analysis also shows that the climate risk of the Eurosystem corporate sector holdings as at 30 June 2022 mirrored the risk of the market capitalisation weighted benchmark that guided corporate purchases until October 2022.

**Figure 5**  
Scenario characteristics and related findings for outright holdings of corporate bonds

Scenario	Projections	Horizon	Risk type	Findings
Long-term scenarios	Orderly transition	30 years (2020-2050)	Both transition and physical risk	Material impact of transition and physical risk. Concentration of transition risk along sectoral dimension and physical risk along geographical dimension
	Disorderly transition			
	Hot house world			
Short-term disorderly scenario	Baseline	3 years (2022-2024)	Transition risk	Material impact of transition risk, concentrated along sectoral dimension
	Stress			
Flood risk scenario	Baseline	1 year (2022)	Physical risk	Material impact of physical risk, concentrated along geographical dimension
	Stress			

Source: ECB.

## 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.

[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' 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 stock-takes will assess if current NDCs are on track to achieve the goals of the Paris Agreement.<sup>14</sup>

For the EU, the [European Climate Law](#) implements the Paris Agreement in Union law by setting the goal for Europe's economy and society to become climate-neutral by 2050 and additionally setting the intermediate 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. Experience shows 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).<sup>15</sup> The Eurosystem calls on corporates to set and deliver on decarbonisation targets in line with the goals of the Paris Agreement. The fulfilment of the announced forward-looking commitments by issuers together with corporate disclosures and data on emissions, are important elements for the Eurosystem's tilting strategy to deliver on its climate targets and transparency commitments.

High levels of data availability and quality are essential for calculating reliable and relevant climate metrics. 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 policy makers and climate data providers.

Given the need for a high level of climate data availability and harmonisation within the Eurosystem, the Deutsche Bundesbank led a Eurosystem joint procurement for climate change-related data on sustainable and responsible investment. As a result, two providers (Institutional Shareholder Services Germany AG "ISS" and Carbon 4 Finance "C4F") were selected in spring 2022 to provide the Eurosystem with the

---

<sup>14</sup> See United Nations Climate Action, "[All about the NDCs](#)".

<sup>15</sup> See Eurostat, "[Climate change – driving forces](#)", August 2022.

necessary climate data needed to prepare its first report on climate-related financial disclosures and other climate-related reports.

## 5.1 Metrics

This section provides transparency on the exposure of Eurosystem corporate sector portfolios to climate risks by quantifying the associated emissions financed by its investments. Four key metrics form the foundation of the Eurosystem climate disclosures. These metrics are the weighted average carbon intensity (WACI), carbon intensity, total carbon emissions and the carbon footprint. Annex 1 provides details on how each metric is calculated and outlines the main elements of the common Eurosystem framework developed to harmonise the reporting methodology for its disclosures.

The WACI measures a portfolio's exposure to issuers' carbon intensity and serves as a proxy for a portfolio's exposure to climate transition risks. The WACI for the portfolio is calculated by weighting the carbon intensity score for each issuer by their respective share of holdings in the portfolio. The carbon intensity metric measures the carbon efficiency of a portfolio in financing economic activity. Both metrics are comparable across time and different sized portfolios, as they normalise a portfolio's emissions by its size.

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

The corporate sector portfolios' climate disclosures cover scope 1 and 2 emissions as defined in the Greenhouse Gas Protocol.<sup>16</sup> The metrics used in this report take into account only self-reported scope 1 and 2 emissions data. Self-reported scope 3 emissions are currently too limited to make a consistent and material contribution to the disclosures and are therefore not sufficiently reliable to be included in this report.<sup>17</sup> Inclusion of these data will be reassessed for future climate-related disclosures.

---

<sup>16</sup> The Eurosystem uses market-based scope 2 emissions data if those are available and reliable. Alternatively, location-based scope 2 emissions might be used when market-based reporting isn't available.

<sup>17</sup> For some sectors, however, scope 3 emissions represent the most significant dimension of firms' carbon footprints. For this reason and given the higher reliability of scope 3 sectoral data, the ECB has integrated these emissions at the sector level into the climate scoring tool used to tilt its purchases of corporate sector bonds.

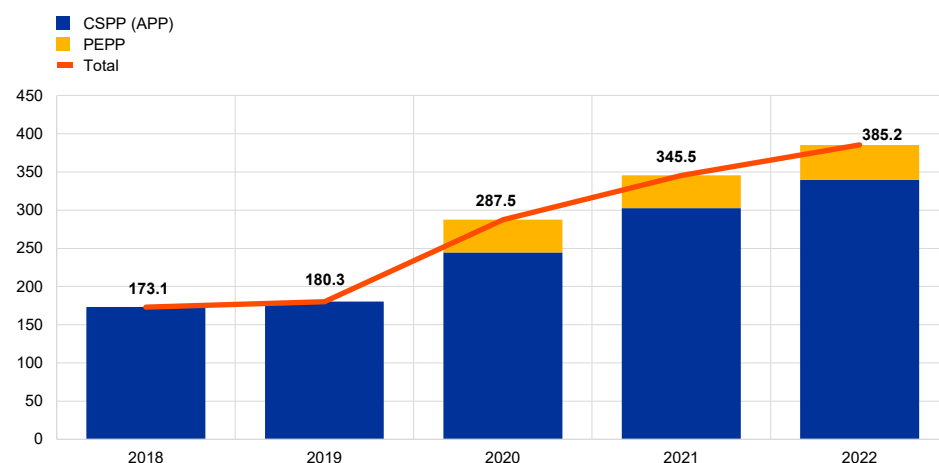
## 5.1.1 Evolution of key climate metrics within the corporate sector portfolios

The volume of corporate sector assets<sup>18</sup> held by the Eurosystem for monetary policy purposes increased substantially over the period covered by climate-related disclosures (Chart 2). The substantial expansion in corporate sector holdings, which more than doubled between 2019 and the end of 2022, had a significant impact on the portfolios' climate metrics, in particular on the non-normalised total carbon emissions. At the end of 2022 the corporate holdings within the asset purchase programme (APP) comprised approximately 88% of the Eurosystem's corporate sector assets held for monetary policy purposes, with PEPP holdings responsible for the remaining 12%.

### Chart 2

Historical evolution of the Eurosystem's corporate sector holdings and portfolio breakdown from 2018 to 2022

(EUR billions, nominal amounts)



Source: ECB calculations.

The Eurosystem has assessed that the quality of climate-related data is sufficient for reporting purposes for issuers of holdings in the corporate sector portfolios from 2018. Prior to that year, data coverage and reliability were lower. This is reflected, for instance, in the lower coverage ratios of reported emission intensities and disclosures. It is only in recent years that corporate issuers have stepped up reporting on their organisations' climate footprints and climate data providers have considerably expanded their data sourcing capacities.

Table 1 and Chart 3 show the evolution in the key climate and financial metrics for the corporate sector holdings.

<sup>18</sup> Portfolio holdings are expressed in nominal amounts throughout the report unless stated otherwise.

**Table 1**

Financial and climate-related disclosure metrics for the Eurosystem's corporate sector portfolios at year-end from 2018 to 2022

Aggregate portfolio (all corporate assets and tenors considered)	CSPP and PEPP corporate asset metrics				
	2018	2019	2020	2021	2022
Portfolio size (EUR billions, nominal amounts)	173.1	180.3	287.5	345.5	385.2
Portfolio size (EUR billions, book value)*	180.3	187.7	297.1	357.4	394.7
WACI (tCO <sub>2</sub> e per EUR million revenue)	372	316	289	267	262
Coverage (percentages)	91%	92%	96%	96%	96%
Total carbon emissions (scope 1 & 2 emissions in mega tCO <sub>2</sub> e)	37	32	47	55	60
Coverage (percentages)	90%	91%	95%	94%	94%
Carbon footprint (tCO <sub>2</sub> e per EUR million invested)	238	195	173	169	166
Coverage (percentages)	90%	91%	95%	94%	94%
Carbon intensity (tCO <sub>2</sub> e per EUR million revenue)	385	332	310	292	284
Coverage (percentages)	90%	91%	95%	94%	94%

Sources: ISS, Bloomberg and ECB calculations.

Notes: The percentages indicated below each metric indicate the data availability, calculated as the percentage of investments for which all required data (i.e. emissions and financial data) are available. For metrics ranging from 2018 to 2021, both climate data (e.g. emissions and intensities) and financial data (e.g. revenue, enterprise value including cash – EVIC)<sup>19</sup> use the end of the year as their cut-off dates (e.g. issuer emissions in 2021 are matched with financial metrics at the end of the same year). To calculate the data for 2022, due to the unavailability of issuer-reported climate data at the cut-off date for this report, climate and financial data for 2021 are matched to the holdings data as at 31 December 2022. Portfolio climate metrics for 2022 are therefore expected to be revised in subsequent disclosure reports to make full use of the year's climate data. Normalised metrics are expressed as tonnes of carbon dioxide equivalent emissions (tCO<sub>2</sub>e) per € million.

\* Book values are also included as a memo item for comparability with other Eurosystem reporting on corporate sector holdings.

## 5.1.2 Evolution of total carbon emissions within the corporate sector portfolios

From 2018 to 2019 the total carbon emissions associated with the corporate sector portfolios were on a downwards trend. This was primarily due to steep decreases in issuers' total emissions and in the share of Eurosystem holdings in their capital structure owing to rising equity prices. Total carbon emissions, however, declined less than normalised metrics during this period, given the increase of €7 billion in holdings (see Table 1).

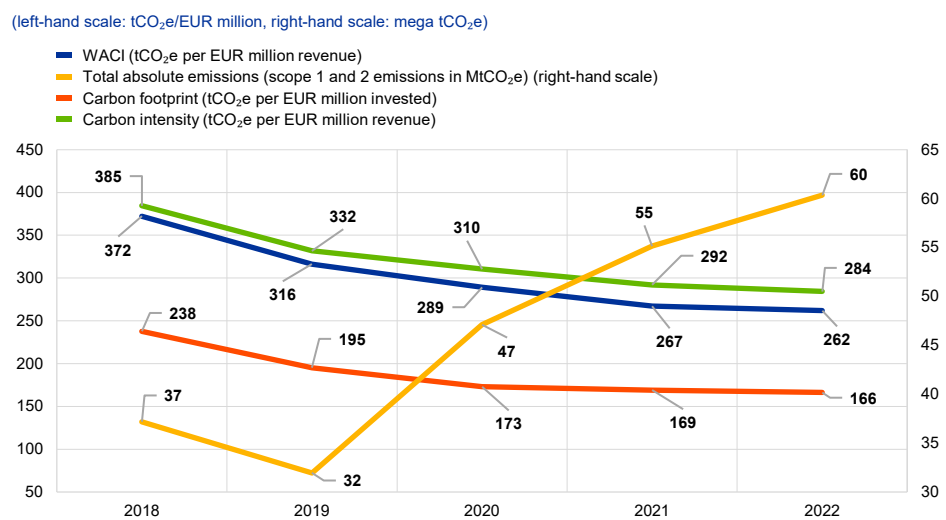
Between the start of 2020 and the end of 2022 the Eurosystem has purchased a nominal total of €159 billion of corporate securities under the APP. Purchases in the PEPP, which the ECB started in March 2020 in response to the monetary policy challenges triggered by the coronavirus (COVID-19) pandemic, amounted to €45 billion. A broadening of commercial paper eligibility within the asset purchase

<sup>19</sup> The enterprise value including cash (EVIC) is an approximation of a company's capital value, equal to the sum of the market value of equity and the value of debt, without subtracting cash (which is typically subtracted when calculating enterprise value).

programmes was an integral part of the policy measures implemented in 2020<sup>20</sup> and accounted for a significant share of corporate assets in the PEPP.

Aggregate corporate sector holdings increased by 114% between early 2020 and the end of Eurosystem net purchases in July 2022. However, scope 1 and 2 total carbon emissions associated with these portfolios rose by only around 89% over the same period. The substantial increase in net holdings was by far the main driver behind the increase in the portfolios' total emissions up until July 2022. The drivers behind the increased carbon efficiency associated with the corporate sector holdings through this period were issuers' decarbonisation efforts, the improvement in financial metrics (for example, revenues and EVIC) and, as of the last quarter of 2022, the introduction of the Eurosystem framework for incorporating climate considerations into corporate sector purchases.

**Chart 3**  
Evolution of climate-related metrics on the Eurosystem's corporate sector portfolios from 2018 to 2022



Sources: ISS, Bloomberg and ECB calculations.  
Note: Climate data for 2022 were not available by the cut-off date for this report. Therefore, 2022 figures only account for changes in holdings and are expected to be revised in subsequent reports in the light of updated climate data.

### 5.1.3 Evolution of normalised emissions within the corporate sector portfolios

Normalised metrics of carbon intensity, such as the WACI for the corporate portfolios, declined significantly between 2018 and 2022. In this period, issuers associated with more than 75% of the portfolios' holdings<sup>21</sup> became more carbon-

<sup>20</sup> See 'The pandemic emergency purchase programme – an initial review', ECB Economic Bulletin, Issue 8/2022.

<sup>21</sup> This figure is calculated on the basis of issuers which reported carbon emissions for the complete five-year period covered in the report. Issuers which didn't disclose climate emissions are considered not to have improved their carbon intensity.

efficient when controlling for revenues or capital structure and constituted the main driver behind the decarbonisation of the portfolios on a normalised basis.

The significant decline in the portfolios' carbon intensity can be broken down into two periods with distinct primary rates of emissions decline. For the period from 2018 to 2020, a steep reduction in the WACI of more than 25% can be attributed primarily to issuers' decarbonisation efforts, which were particularly fruitful in 2019, as well as to changes in their financial metrics. In 2020, however, their emissions intensity increased as a result of the pandemic-related restrictions on operational activities, with transport, utilities, basic materials and chemicals producers being the sectors more prominently impacted. While emissions decreased, revenue decreased even more, leading to a net increase in carbon intensity. Nevertheless, owing to the composition of purchases in 2020, which were concentrated in less carbon-intensive sectors (such as consumer staples and health care), the final net effect was an improvement in the normalised metrics.

In 2021 and 2022 a progressive increase in demand for energy and basic materials and the resumption of economic activity led to a rebound in emissions associated with the operations of most issuers in these sectors. Additionally, the Russian invasion of Ukraine in February 2022 caused a shock to Europe's energy supply and to prices throughout the year, with a significant impact on the funding needs from carbon-intensive sectors such as utilities. The Eurosystem's asset purchase programmes, which for most of this two-year period did not yet incorporate a framework accounting for climate considerations, conducted substantial net purchases of bonds and commercial paper until July 2022. Following higher primary market activity from carbon-intensive issuers, the share of securities in the corporate sector portfolios from issuers impacted by these developments grew, leading to an increase in the portfolios' normalised emissions from the first to the third quarter of 2022. The improvement of the post-pandemic economic environment, however, meant that overall increases in issuers' revenues across economic sectors and an increase in the EVIC (thereby reducing the share of the Eurosystem's debt financing in the capital structure) continued to support a further decrease in portfolios' normalised carbon metrics for the aggregate of the portfolio in 2021-2022.<sup>22</sup>

In October 2022 the Eurosystem started incorporating climate change considerations into its corporate sector purchases. The effect of implementing tilting on the annual climate metrics also contributed to the reduction in normalised carbon intensities and limited the impact of the more carbon-intensive purchases observed in the previous three quarters of 2022. As shown in Chart 4, the WACI for reinvestments conducted in the fourth quarter of 2022 have a significantly less carbon-intensive profile than in the first nine months of the year.

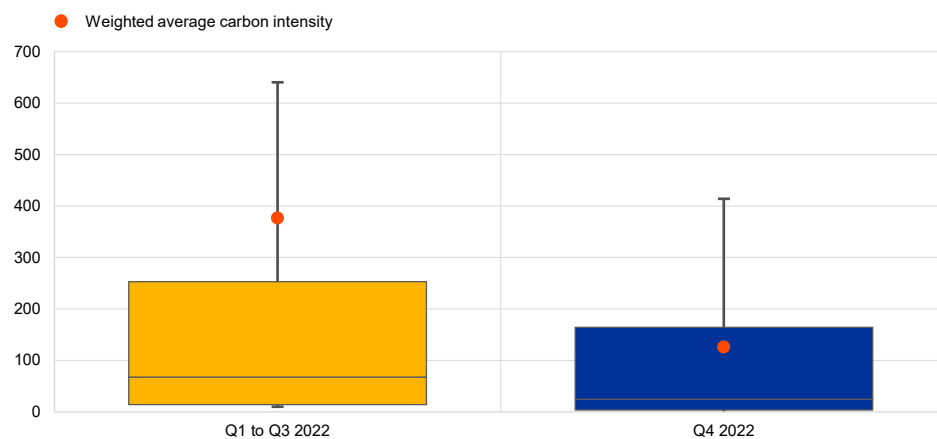
---

<sup>22</sup> The absence of issuer climate data for 2022 up to the cut-off date of this report implies that these figures might be revised, particularly in view of the substitution of less carbon-intensive energy sources (such as renewables and natural gas) by more carbon-intensive ones after the Russian invasion of Ukraine.

#### Chart 4

### Distribution of the carbon intensity of the 2022 corporate purchases before and after incorporation of climate change considerations

(in tCO<sub>2</sub>e per EUR million revenue)



Sources: ISS 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.

The tilting framework caused a significant reduction in the carbon intensity of reinvestments in the first quarter in which it went live, as evidenced by the reduction by more than 65% in the WACI for purchase flows in the fourth quarter of 2022 compared with the first three quarters of the year (Chart 4). While this provides an encouraging initial indication of the tilting framework's potential, the large stock of existing holdings vis-à-vis reinvestments implies that it would take some time for the tilting to have a substantial impact on the overall carbon metrics. By design, however, the tilting framework can adapt to a variety of reinvestment scenarios,<sup>23</sup> while also keeping the Eurosystem on track to meet its climate risk and decarbonisation path targets.

While emission intensities vary significantly across the issuer sectors represented in the portfolios' holdings, the sector-specific climate performance of issuers held in the corporate portfolios shows significant improvement over the reporting period. This is particularly the case for some of the most carbon-intensive sectors, as measured by the respective sectoral WACIs (Chart 5). This trend further reflects existing economy-wide efforts towards decarbonisation that are already showing encouraging initial results.

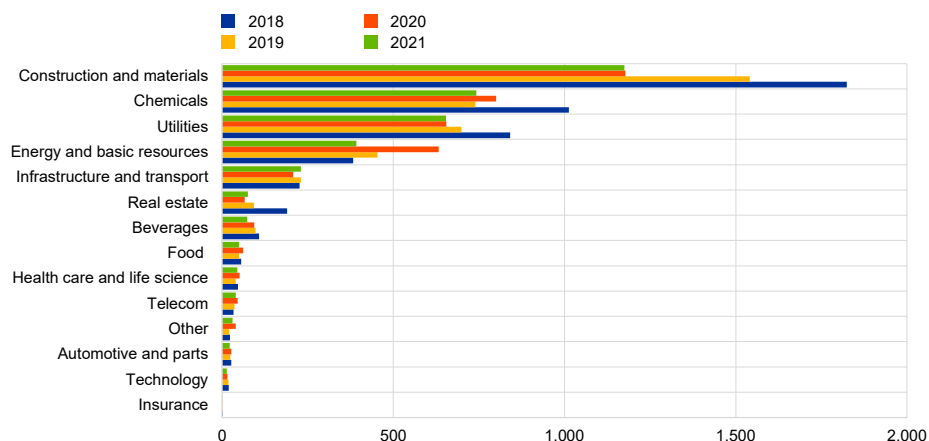
<sup>23</sup> See, for instance, the changes to the tilting parameter decided on by the Governing Council on 2 February 2023, as outlined in "[ECB decides on detailed modalities for reducing asset purchase programme holdings](#)", *press release*, ECB, 2 February 2023.



## Chart 5

### Evolution of average sectoral carbon intensities from 2018 to 2021

(in tCO<sub>2</sub>e per EUR million revenue)



Sources: ISS and ECB calculations.

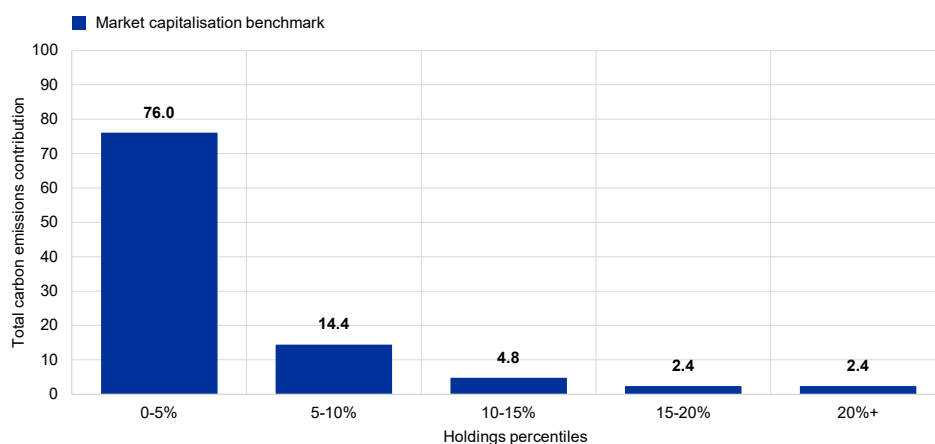
Notes: Average carbon intensities are calculated on the basis of an average (i.e. non-weighted) of eligible corporate sector issuers' scope 1 and 2 total emissions within a sector divided by their aggregate revenues for the same year. Climate data for 2022 were not available by the cut-off date for this report.

The WACI levels observed among the industry sectors present in the Eurosystem's corporate portfolios are driven primarily by the emission intensity of underlying production processes. As can be seen in Chart 5, the construction and materials, chemicals, and utilities sectors are the most emission-intensive when normalised on a revenue basis. By orienting its asset purchases until October 2022 towards the market capitalisation benchmark without taking into consideration climate risks, these wide intersectoral differences were the main driver of the relatively high concentration of the portfolios' carbon emissions within a relatively small share of their securities. The tilting of Eurosystem reinvestment purchases towards issuers with better climate scores is expected to progressively address this issue, gradually improving the portfolios' emission concentration compared with that of the market capitalisation benchmark (Chart 6).

### Chart 6

#### Distribution of total carbon emissions within the corporate portfolios as at December 2022

(percentages of total carbon emissions)



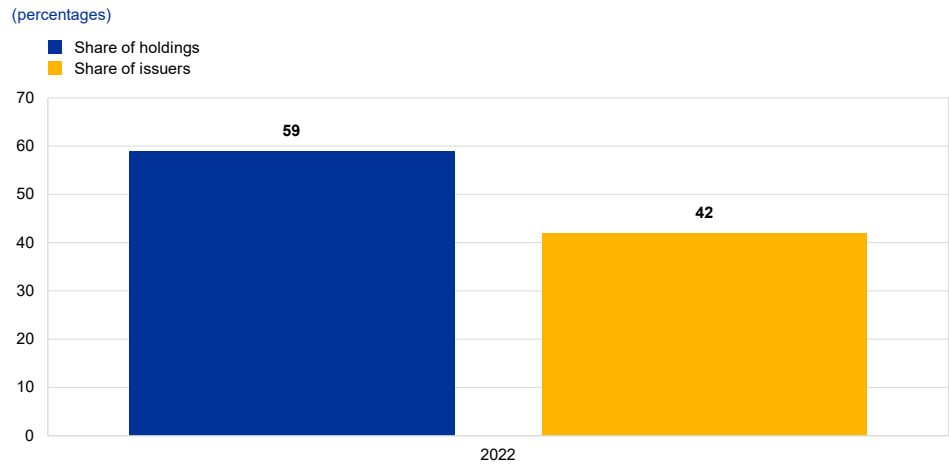
Sources: ISS, Bloomberg and ECB calculations.

With regard to corporates' forward-looking climate targets, as at year-end 2022, 59% of the corporate sector portfolios' financial exposure was invested in assets of issuers with certified science-based carbon reduction targets at the end of 2022.<sup>24</sup> As only 42% of all eligible issuer groups have carbon reduction targets, the portfolios' corporate holdings are skewed towards more ambitious issuers (Chart 7). As EU Member States progress with emission targets and regulation, and investors such as the Eurosystem and others increase their focus on corporates' science-based carbon reduction targets, the portfolios' share of assets associated with ambitious and verified targets are expected to continue to increase.

<sup>24</sup> 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 (SBTi) is a partnership between the CDP, the United Nations Global Compact, World Resources Institute and the World Wide Fund for Nature.

**Chart 7**

Share of holdings and issuers in the corporate sector portfolios with science-based carbon reduction targets as at December 2022



Sources: ISS, SBTi, issuers' annual reports and climate reports, and ECB calculations.

## 5.2 Targets

Targets fulfil an essential forward-looking role in the framework for tilting corporate sector holdings and in the Eurosystem's climate-related disclosures reports. They reflect the Eurosystem commitment to reduce the portfolios' exposure to climate-related risks and their environmental footprint. Importantly, climate-related targets for the corporate portfolios can only be without prejudice to the ECB's monetary policy objectives, being conditional on and thus naturally constrained by monetary policy considerations.

By decarbonising its corporate sector portfolios, the Eurosystem aims to address the financial risks associated with climate change in its monetary policy operations and to achieve alignment with the goals of the Paris Agreement and the EU's climate neutrality objectives. In doing so, the Eurosystem is targeting a decarbonisation trajectory that is consistent with limiting global warming to well below 2° Celsius (while pursuing efforts to limit it to 1.5° Celsius). On its path towards climate neutrality, the Eurosystem intends first to gain further experience with its chosen data sources and their methodologies, as well as with its tilting framework. Following these initial climate-related financial disclosures, it will also consider setting intermediate targets. Moreover, the Governing Council is committed to regularly reviewing the relevant measures in order to ensure, within its mandate, that they continue to support the decarbonisation path to reach the goals of the Paris Agreement and the EU climate neutrality objectives.

However, the expected decarbonisation path of the corporate sector portfolios is conditional on several developments that are ultimately outside of the Eurosystem's control. These include, among other things, issuers' effectiveness in decarbonising their operations as indicated in their plans, corporate bond market conditions and

corporate bond issuance patterns. While certain assumptions are important for the expected trajectory to materialise, the annual review of the performance of the tilting framework for the corporate sector portfolios will allow the Governing Council to reassess and adjust the key parameters of the framework and decide on further measures that could be taken in the event of meaningful deviations. Furthermore, the annual publication of the portfolios' climate-related disclosures will continue to ensure a high level of transparency and accountability towards the public.

# Annexes

**Table A1**

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

Element	Details
Weighted average carbon intensity (in tCO <sub>2</sub> e /EUR million revenue)	$WACI = \sum_n^i \left( \frac{\text{nominal value of investment}_i}{\text{current portfolio value}} \right) \times \left( \frac{\text{issuer's carbon emissions}_i}{\text{issuer's € million revenue}_i} \right)$
Total carbon emissions (scopes 1 and 2 in mega tonnes of CO <sub>2</sub> e)	$\text{Total carbon emissions} = \sum_n^i \left( \frac{\text{nominal value of investment}_i}{EVIC_i} \times \text{issuer's carbon emissions}_i \right)$
Carbon footprint (tCO <sub>2</sub> e per EUR million invested)	$\text{Carbon footprint} = \frac{\sum_n^i \left( \frac{\text{nominal value of investment}_i}{EVIC_i} \right) \times \text{issuer's carbon emissions}_i}{\text{current portfolio value (€ million)}}$
Portfolio size	Expressed in € billions
Asset classes	All asset classes of the portfolio (i.e. corporate bonds and commercial paper), with metrics to be shown per asset class
Data availability	Indicated as a percentage in brackets for each metric and asset class
Data sources	Such as the name(s) of the (climate) data provider(s)
Target	At least one broadly defined long-term target covering all portfolios that is linked to the decarbonisation objectives of the EU

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

**Carbon intensity**

$$= \frac{\sum_n^i \left( \frac{\text{nominal value of investment}_i}{EVIC_i} \right) \times \text{issuer's carbon emissions}_i}{\sum_n^i \left( \frac{\text{nominal value of investment}_i}{EVIC_i} \right) \times \text{issuer's € million revenue}_i}$$

© **European Central Bank, 2023**

Postal address 60640 Frankfurt am Main, Germany

Telephone +49 69 1344 0

Website [www.ecb.europa.eu](http://www.ecb.europa.eu)

All rights reserved. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

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

PDF ISBN 978-92-899-6065-6, ISSN 2811-7026, doi:10.2866/916364, QB-DB-23-001-EN-N