



**Climate-related financial disclosures**  
**for the non-monetary policy portfolios of the Bank of**  
**Greece**

June 2024



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## 1 Introduction

Aiming to be a socially responsible and sustainable organisation, the Bank of Greece has systematically dealt with the issues of climate change and sustainability. These issues also feature among the Bank of Greece’s strategic objectives for 2024-2026, in order to promote further actions related to sustainability, climate change, environmental and circular economy considerations.

This report presents the Bank of Greece’s climate-related financial disclosures for the year 2023, regarding its non-monetary policy portfolios (NMPPs), namely the Bank’s own funds portfolio in euro and in foreign currencies.

As a member of the Eurosystem, the Bank of Greece has adopted the Common Stance of the Eurosystem regarding the application of sustainable and responsible investment principles in the euro-denominated non-monetary policy portfolio management by central banks.<sup>1</sup> The euro-denominated portfolios account for the largest share of the Bank of Greece’s NMPPs. In this context, in March 2023, the Bank of Greece, along other Eurosystem central banks, started disclosing on its website data on the climate footprint of its euro-denominated NMPPs.<sup>2</sup> Thereafter, the Eurosystem decided in 2024 to extend the application of sustainable and responsible investment principles to non-euro-denominated NMPPs and to amend the disclosures to also cover these portfolios.

The disclosures follow the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB)<sup>3</sup> in the four categories “Governance”, “Strategy”, “Risk management” and “Metrics and targets”. For the category “Metrics and targets”, the Eurosystem developed a common disclosure framework that defines minimum standards for each Eurosystem member. In developing this reporting framework, the Eurosystem additionally considered the recommendations

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<sup>1</sup> [“Eurosystem agrees on common stance for climate change-related sustainable investments in non-monetary policy portfolios”](#), press release, ECB, 4 February 2021.

<sup>2</sup> [Climate footprint of the euro-denominated non-monetary policy portfolios of the Bank of Greece](#), March 2023

<sup>3</sup> <https://www.fsb-tcfd.org/>



of the Partnership for Carbon Accounting Financials (PCAF)<sup>4</sup> and of the Network for Greening the Financial System (NGFS).<sup>5</sup>

These disclosures mark an important step towards enhanced transparency about the climate-related risks and the environmental footprint associated with the Bank of Greece's NMPP investments. They will be refined over time, in line with increasing availability and quality of climate-related data and growing expertise in estimating climate-related NMPP footprint. Through improving transparency of its own activities, the Bank of Greece aims to contribute to the availability of climate-related data and a better overall understanding of climate-related risks. By so doing, it hopes to reduce its own environmental impact and to foster wider action.

The report is structured as follows: Section 2 summarises the organisational set-up and the decision-making responsibilities underlying the Bank of Greece's NMPPs. Section 3 describes how the Bank of Greece integrates sustainability considerations in NMPPs, and Section 4 explains how the Bank of Greece considers climate risks when managing risks to these portfolios. Section 5 includes relevant quantitative and qualitative metrics and targets.

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<sup>4</sup> <https://carbonaccountingfinancials.com/>

<sup>5</sup> 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.



## 2 Governance

The Bank of Greece is one of the first central banks to respond to the issue of climate change. The journey started in 2009, when the Bank of Greece established the interdisciplinary Climate Change Impacts Study Committee (CCISC), bringing together distinguished experts from various domains of knowledge.<sup>6</sup>

Since then, the Bank of Greece has taken several actions related to climate change and environmental issues, including:

- Publication of flagship research and analysis.
- Advising and contributing to the design and implementation of national adaptation policies and projects.
- Endorsement of the UNEP FI Principles for Responsible Banking (2019) – the first central bank to do so.
- Membership of the NGFS (since 2019).
- Establishment of the Climate Change and Sustainability Centre to coordinate the climate and sustainability actions of the Bank of Greece, provide advice and strategic steering on sustainability issues (2021).
- Contribution to raising awareness and improving climate literacy through various initiatives, such as public events and exhibitions at the Bank of Greece Museum.
- Publication of a pledge in the context of the 2021 United Nations Climate Change Conference (COP 26), to contribute, within its field of responsibility, to the Objective in Article 2.1(c) of the Paris Agreement, “making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (2021).

The pledge includes, among other things, a commitment to apply sustainable and responsible investment principles in the NMPPs of the Bank of Greece and, consistent

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<sup>6</sup> <https://www.bankofgreece.gr/en/the-bank/social-responsibility/sustainability-and-climate-change/ccisc>



with the Common Stance of the Eurosystem, start making annual climate-related disclosures on its non-monetary policy portfolios. The first set of disclosures (only for the “Metrics and Targets” TCFD category and only for euro-denominated portfolios) was published in March 2023, to be followed thereafter by regular disclosures on a yearly basis. In addition, the current report includes disclosures for the remaining TCFD categories, as well as for NMPPs denominated in foreign currency.

In terms of the organisational set-up underlying its NMPPs, the Bank of Greece has integrated the governance of climate-related risks and opportunities in its existing governance structures and investment strategies. Investment strategies incorporating climate change considerations are implemented by the Financial Operations Department. The Risk Management Department develops the risk control framework and strategic benchmark for the NMPPs, which are approved by the Risk Management Committee. The Risk Management Committee reports to the General Council at least annually to enable monitoring of relevant risks and returns, including those related to climate change, and steering towards the sustainability targets. The General Council approves the investment strategies and sustainability targets for portfolios, based on the recommendations of the Risk Management Committee.



### 3 Strategy

The Bank of Greece, 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. The Bank of Greece's approach to its NMPP investment policies is partly guided by the Common Stance of the Eurosystem (see also Section 1: Introduction) for applying climate change-related sustainable investment principles to these portfolios, as well as by the Eurosystem decision to expand the scope of these principles to NMPPs denominated in foreign currency.

The Bank's NMPPs are invested mainly in euro-denominated fixed income assets of high credit quality. They are intended to generate income to help fund the operating expenses of the Bank of Greece other than those incurred in the context of its supervisory tasks. NMPPs include also assets denominated in foreign currency, in particular US dollars (USD) and pound sterling (GBP).

As an asset owner of its NMPPs, the Bank of Greece needs to also assess the 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 risk and market risk).

In order to develop and share knowledge and best practices with peers, the Bank of Greece actively participates in the international discussions on climate-related risks, in committees and technical working groups of the Eurosystem and international organisations (e.g. Network for Greening the Financial System – NGFS, Bank of International Settlements – BIS).

The Bank of Greece's 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 parts of the NMPPs, methodological and data issues



on other asset classes require careful consideration and advances in disclosures and measurements. Section 5 of this report elaborates on the climate-related metrics of the Bank's NMPPs and presents climate-related long-term targets. In addition, the Bank of Greece, in line with Eurosystem actions, will assess further the design and use of intermediate targets and transition plans for gradually decarbonising its NMPPs.

The strategy to include sustainability considerations in the NMPPs is based on actions along different dimensions, considering portfolio-specific objectives and constraints. Over the past few years, the Bank of Greece has been investigating how to integrate sustainability criteria in its NMPPs and has increased its investments in green financial products. The NMPPs are predominantly composed of sovereign bonds. A thematic/green investment strategy is pursued that targets a continuous increase in the share of green bonds by:

- directly purchasing green bonds in secondary markets; and
- investing in green thematic funds such as the USD-denominated green bond fund launched by the BIS in September 2019 (USD BISIP).<sup>7</sup>

The investment strategy for the NMPPs of the Bank of Greece is defined by the Financial Asset Management Committee, in line with the risk management strategy of the Risk Management Committee. The strategy to include climate change considerations is implemented by the portfolio managers of the Bank of Greece, i.e. the Financial Operations Department.

Investments in the Bank's NMPPs, which are managed under its own responsibility, are also guided by the Common Stance of the Eurosystem for applying climate change-related sustainable investment principles to such portfolios.

The Bank of Greece intends to expand the asset classes in which it invests, with a view to introducing greater flexibility in the decarbonisation process of its own funds portfolios. In this regard, the Bank has taken steps towards adding corporate bonds. A

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<sup>7</sup> ["BIS launches green bond fund for central banks"](#), BIS, press release, 26 September 2019.





broader range of investment options, better environmental, social and governance (ESG) data quality and enhanced capability to assess issuers' emissions profile are all expected to substantially reduce the climate footprint of the Bank of Greece's NMPPs and support its green-oriented strategy.



## 4 Risk management

The Bank's growing awareness of climate-related risks is reflected in all aspects of its operations, including NMPPs.

In this regard, the Bank of Greece follows the recommendations and terminology of the TCFD when identifying, assessing and mitigating climate-related risks and actively integrates long-term climate-related risks into the processes governing its NMPPs, while continuing to explore methodological enhancements.

The 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. The Bank of Greece 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<sup>8</sup> 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.

The Bank of Greece is currently focusing its efforts on the following areas:

- **Climate-related data availability:** The Bank of Greece is working to enhance its access to climate-related data, including by participating in the Eurosystem joint procurement process and agreements with two climate-related data providers.
- **Improvements in the risk control framework:** With a view to deepening its understanding of climate-related risks and addressing any need to improve its risk control framework, the Bank of Greece is actively involved in several Eurosystem climate-related workstreams which contribute to the implementation of the ECB's action plan to include climate change considerations in its monetary policy framework. In this context, the possibility is explored of adopting environmental sustainability criteria in the eligibility assessment of assets offered (a) as collateral for monetary policy purposes and (b) for investment purposes ("green" bonds), along with the possibility of building

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<sup>8</sup> Transition risks refer to the likelihood and impact of the economic consequences of the transition to a carbon-neutral economy, for example, through changes in regulation, technology and market preferences.



relevant benchmark portfolios. In the medium term, the Bank of Greece intends to incorporate assessments of climate-related financial risks into its risk management processes.

- Investment limits: These are monitored within the established risk management framework for the NMPPs.
- Climate-related stress testing: The Bank of Greece is participating in the development and implementation of the climate stress tests of the Eurosystem balance sheet, leveraging on the methodology of the ECB's economy-wide climate stress test. Building on the experience gained, the Bank of Greece may consider designing and carrying out its own stress test, targeting specifically its NMPPs.



## 5 Metrics and targets

As a member of the Eurosystem, the Bank of Greece continues its efforts to apply sustainable and responsible investment principles in its NMPPs, actively supporting the green transition and the achievement of the Paris Agreement goals, as well as the European Union's strategic goals and targets of climate neutrality by 2050.

Based on quantitative data from the independent climate data providers selected by the Eurosystem and used by all Eurosystem members<sup>9</sup> and macroeconomic data from the World Bank,<sup>10</sup> climate footprint metrics were calculated for the NMPPs of the Bank of Greece (for a detailed description of the metrics, see Annex 2). These portfolios include mainly sovereign bonds of high credit quality.<sup>11</sup>

The independent climate data providers Institutional Shareholder Services (ISS) and Carbon4 Finance (C4F) supply the Eurosystem with emissions data of the issuers of financial instruments. Whenever possible, the metrics are calculated using data on holdings, emissions and financial data for the same reference year, otherwise the latest available data is used.<sup>12</sup>

The metrics that were calculated in the previous disclosures (2023) have been adjusted, where necessary, in line with revised climate and economic data from the providers and the World Bank's macroeconomic data.

The Bank of Greece may, if necessary and as deemed appropriate, adjust its approach or revise its estimates, in accordance with the Eurosystem's Common Stance. The metrics for the climate footprint may be revised, in line with the increasing availability and

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<sup>9</sup> Institutional Shareholder Services AG, Germany (ISS) and Carbon4 Finance Group Ltd, France (C4F).

<sup>10</sup> <https://data.worldbank.org/>, World Bank (gross domestic product adjusted for purchasing power parity, population, and general government expenditure).

<sup>11</sup> Moreover, they comprise exclusively assets that fall within the Eurosystem framework for climate-related disclosures. Accordingly, investments in short-term deposits, gold, money market instruments (e.g. BIS discount bills), futures contracts, etc. are excluded.

<sup>12</sup> These disclosures include carbon emission metrics for the bonds denominated in euro and foreign currencies (US dollar and pound sterling) in NMPPs for 2023, as well as their evolution over the period 2020-2023. Given that climate data are only available with a lag, the relevant end-2021 data have been used for the metrics of years 2021-2023, while for the metrics of 2020, the data of 2020 have been used. Moreover, macroeconomic data for 2020 and 2021 have been used in the analysis for the years 2020 and 2021, respectively, and data for 2022 in the analysis for the years 2022 and 2023.



quality of climate-related data and growing expertise in estimating climate-related NMPP footprint.

In this year's disclosures, the Bank of Greece, in line with the Eurosystem's Common Stance, has extended the scope of the reported portfolios to cover NMPPs denominated in foreign currency (US dollars and pound sterling). In addition, the range of analysis is expanded by calculating metrics using the production method, excluding and including "Land Use, Land Use Change, Forestry (LULUCF)". Finally, the disclosures also introduce the share of green investments, which is the percentage of green bonds and investments with an environmental objective relative to the total value of the reported portfolio.

The following sections report and discuss climate footprint metrics and targets for the NMPPs, as well as relevant climate-related developments.

Annex 1 reviews the evolution of NMPP metrics for the period 2020-2023. Annex 2 describes the method for calculating the metrics, according to the Eurosystem's common framework. Finally, Annex 3 provides additional information on the methods used for the allocation, normalisation and attribution of carbon emissions.

## 5.1 Climate-related metrics

The four climate footprint metrics reported here are those selected by the Eurosystem as the most appropriate for transparently and accurately reflecting the climate footprint of euro- and foreign currency-denominated NMPPs, and the results are consistent with the methodology and the data available at the time of disclosure.<sup>13</sup> These metrics inform the Bank of Greece's internal decision-making processes and support the design of a sustainable and responsible investment strategy.

### (i) Weighted Average Carbon Intensity (WACI)

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<sup>13</sup> The formulas for calculating the metrics are provided in Annex 2.



The WACI is the key metric of the climate footprint of portfolios under the TCFD recommendations, as it measures a portfolio's exposure to carbon-intensive issuers, and is expressed in tonnes of carbon dioxide equivalent emissions (tCO<sub>2</sub>e)<sup>14</sup> per EUR million PPP-adjusted GDP of the country issuing the government bonds or per EUR million revenue for non-sovereign issuers. It serves as a proxy for a portfolio's exposure to climate transition risks.

**(ii) Total Carbon Emissions (TCE)**

The TCE metric measures the absolute emissions associated with a portfolio and is affected by portfolio size, as issuers' emissions are not normalised by portfolio size. It is expressed in tCO<sub>2</sub>e.

**(iii) Carbon Footprint (CF)**

The CF metric normalises the total carbon emissions (TCE) by portfolio size, thereby facilitating comparability across different portfolios or the same portfolio across different points in time. It is expressed in tCO<sub>2</sub>e per EUR million invested.

**(iv) Carbon Intensity (CI)**

The CI metric is used to measure the absolute emissions associated with a portfolio, normalised by the weighted GDP of the country issuing the government bonds or by revenue for non-sovereign issuers in the portfolio. By using weighted GDP or revenue, the absolute emissions figure is adjusted to measure the carbon efficiency of the issuers relative to their respective output (GDP or revenue, as relevant). It is expressed in tCO<sub>2</sub>e per EUR million GDP or revenue.

Each of the four metrics has been calculated according to three different methods for allocating emissions to sovereign issuers: (a) the production approach ("production"), including and excluding Land Use, Land-use Change and Forestry (LULUCF), whereby carbon emissions are allocated to the country in whose territory the emissions-generating

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<sup>14</sup> Carbon dioxide equivalent (CO<sub>2</sub>e) is used to compare the emissions from various greenhouse gases on the basis of their respective global warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.



production activity takes place; (b) the consumption approach (“consumption”), whereby carbon emissions are allocated to the country within which the products or services are consumed; and (c) the government approach (“government”), capturing carbon emissions from government activities.<sup>15</sup> The metrics for sovereign issuers, as calculated under all emissions allocation methods, cover 100% of the sovereign bonds in the NMPPs. The metrics for non-sovereign bonds have been calculated on the basis of the Scope 1 and Scope 2 GHG emissions of issuers.

The interpretation of the metrics also takes into account specific exogenous factors, which, in various ways each, may influence the results. Therefore, continuous monitoring is required for a holistic understanding of the metrics.

Thus, the evolution of metrics for the period 2020-2023 reflects the recovery of economic activity from the COVID-19 pandemic and its impact on carbon emissions, as well as the macroeconomic data of government issuers during that period. Moreover, the energy crisis and the measures to address it have also affected the metrics. Finally, the lag in climate and macroeconomic data releases affects the size and direction of the results anyway, while data revisions affect the entire range of metrics.

### 5.1.1 Portfolio in euro (EUR)

The size of the overall euro-denominated NMPP portfolio was EUR 17 billion at the end of December 2023; this portfolio includes government bonds issued by EU Member States, as well as bonds issued by supranational organisations and agencies.

Reported below are the climate-related metrics of the euro-denominated NMPP of the Bank of Greece for the year 2023 (Table 1); the evolution of the WACI metric over the period 2020-2023 using all emission allocation methods (Chart 1); and the evolution of the other three metrics (TCE, CF, CI), using the production method, both excluding and

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<sup>15</sup> For the definition of the emissions allocation method, see Annex 3.



including “Land Use, Land Use Change, Forestry (LULUCF)” (Chart 2, panels a and b, respectively).<sup>16</sup>

**Table 1**  
**Climate-related metrics of the euro-denominated NMPP for 2023**

	Sovereign bonds				Supranational and agency bonds
	Production method (excl. LULUCF)	Production method (incl. LULUCF)	Government method	Consumption method	Scope 1 + 2
<b>Portfolio size</b> (in EUR bn)	17.31				0.10
<b>WACI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/government expenditure, or per capita)	154.00	143.20	89.49	8.72	2.13
<b>TCE</b> (tCO <sub>2</sub> e)	2,666,044	2,479,091	314,365	3,143,370	1.44
<b>CF</b> (tCO <sub>2</sub> e per EUR million invested)	154.00	143.20	18.16	181.58	0.01
<b>CI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/ government expenditure, or per capita)	154.00	143.20	88.51	8.38	2.13

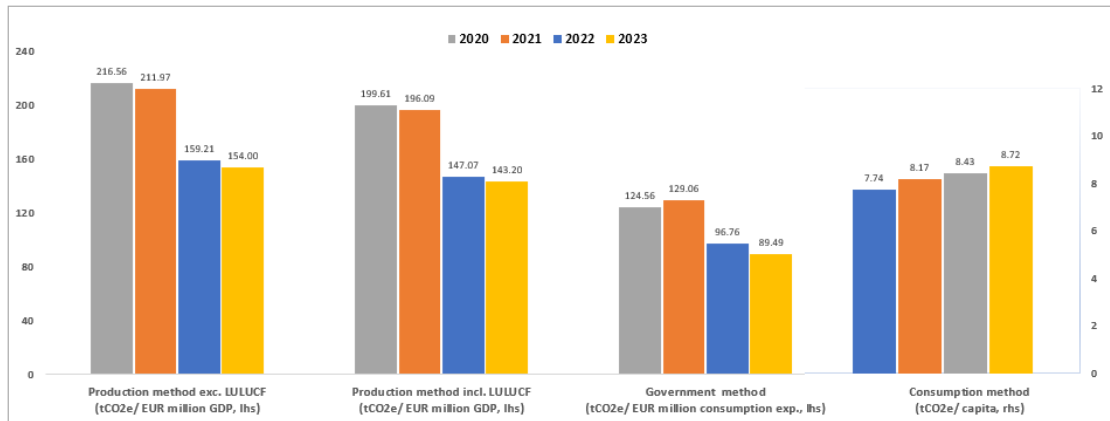
**Sources:** ISS, Carbon4 Finance Group, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The size of the portfolio is expressed in nominal value, in euro billions. WACI and CI metrics are expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP or per EUR million revenue (production method) or per capita (consumption method) or per EUR million government expenditure (government method). TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested. Metrics are calculated using nominal values for bonds. For data availability, see footnote 12.

**Chart 1**  
**Evolution of WACI for sovereign issuers in the euro-denominated NMPP using all allocation methods (2020-2023)**

<sup>16</sup> The evolution of all four metrics over 2020-2023 is reported in Annex 1.





**Sources:** ISS, Carbon4 Finance, World Bank, Bloomberg and Bank of Greece calculations.

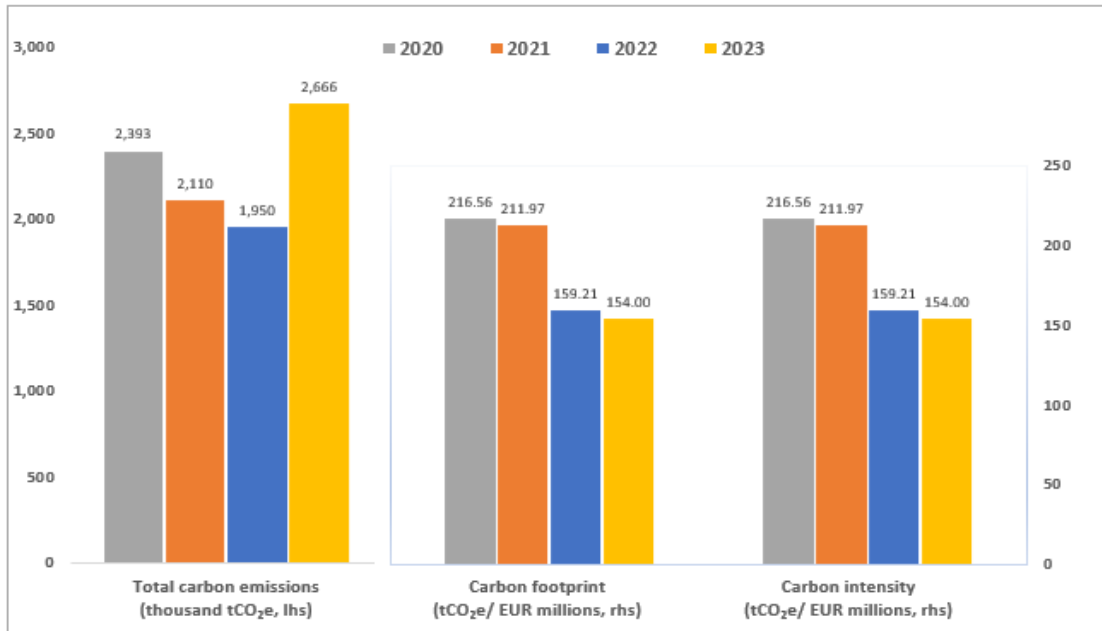
**Notes:** WACI is expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP (production method) or per capita (consumption method) or per EUR million government expenditure (government method). Metrics are calculated using nominal values for bonds. For data availability, see footnote 12.

As shown in Chart 1, during the reporting period the WACI metric decreased under all emissions allocation methods, except for the consumption method, where a slight increase was observed. This increase is attributed to (a) asset reallocation decisions; and (b) changes in consumption emissions associated with each issuer. Due to its design, the TCE is affected by the size of the portfolio, as issuers' emissions are not normalised by portfolio size.

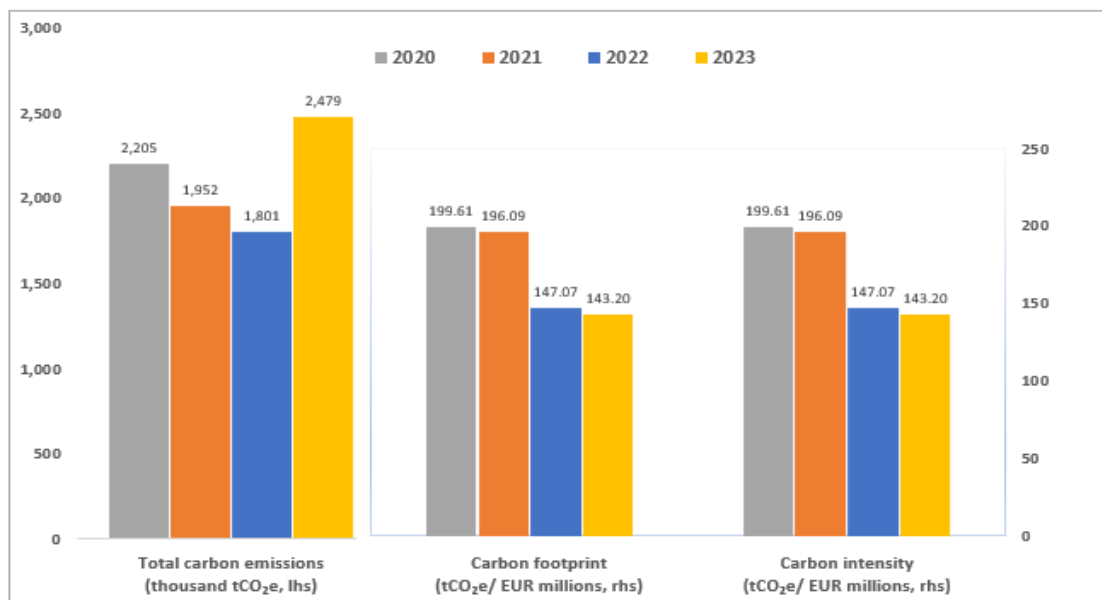
## Chart 2

**Evolution of the Total Carbon Emissions, Carbon Footprint and Carbon Intensity metrics for sovereign issuers in the euro-denominated NMPP, using the production allocation method (2020-2023)**

a. Excluding LULUCF



b. Including LULUCF



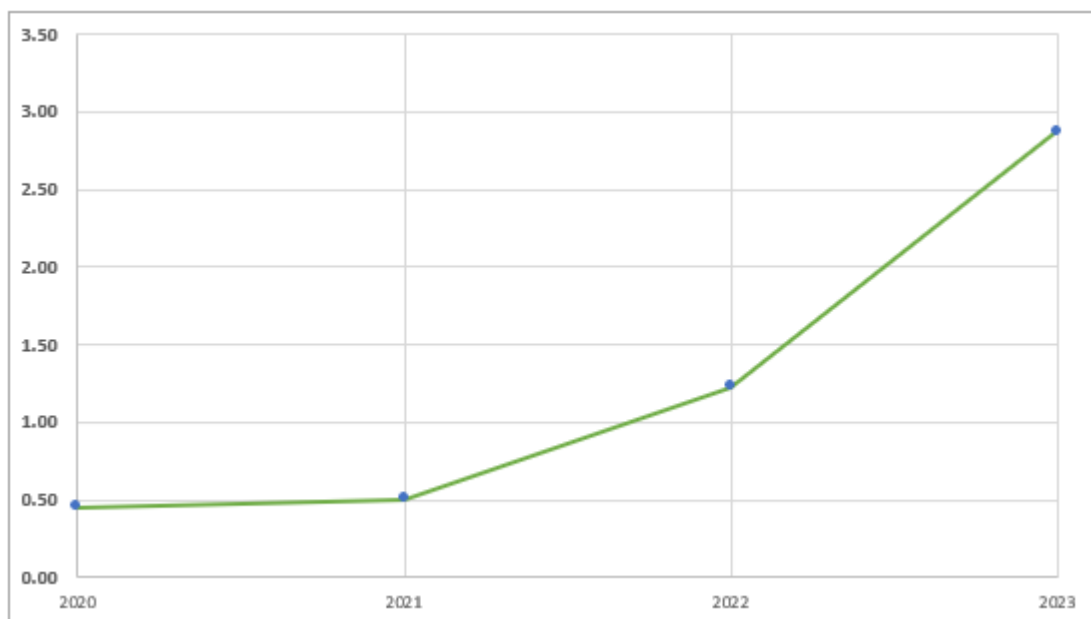
**Sources:** ISS, Carbon4 Finance, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The chart shows the evolution of the TCE, CF and CI metrics using the production method only, both excluding (panel a) and including (panel b) LULUCF emissions. TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested. CI is expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP (production method). Metrics are calculated using nominal values for government bonds. For data availability, see footnote 12.



The chart below shows the green investment share of the euro-denominated NMPP of the Bank of Greece for the period 2020-2023.

**Chart 3**  
**Evolution of the green investment share of the euro-denominated NMPP (2020-2023)**  
*(percentage of total portfolio size)*



**Source:** Bank of Greece calculations.

**Note:** Metric calculated using nominal values for asset holdings.

As seen from the chart, the share of green holdings for the NMPP in euro increased **from 0.5% in 2020 to almost 3% in 2023**.

### 5.1.2 Portfolio in US dollars (USD)

The size of the overall USD-denominated NMPP portfolio was EUR 1.55 billion<sup>17</sup> at the end of December 2023; this portfolio includes US Treasury bonds, as well as bonds issued by supranational organisations and agencies.

Reported below are the climate-related metrics of the USD-denominated NMPP of the Bank of Greece for the year 2023 (Table 2); the evolution of the WACI metric over the

<sup>17</sup> Foreign currency-denominated portfolios are reported in euro after conversion using the exchange rate prevailing at the end of each year, as derived from the [ECB's euro foreign exchange reference rates](#).

period 2020-2023 using all emissions allocation methods (Chart 4); and the evolution of the other three metrics (TCE, CF, CI), using the production method, both excluding and including “Land Use, Land Use Change, Forestry (LULUCF)” (Chart 5, panels a and b, respectively).<sup>18</sup>

**Table 2**  
**Climate-related metrics of the USD-denominated NMPP for 2023**

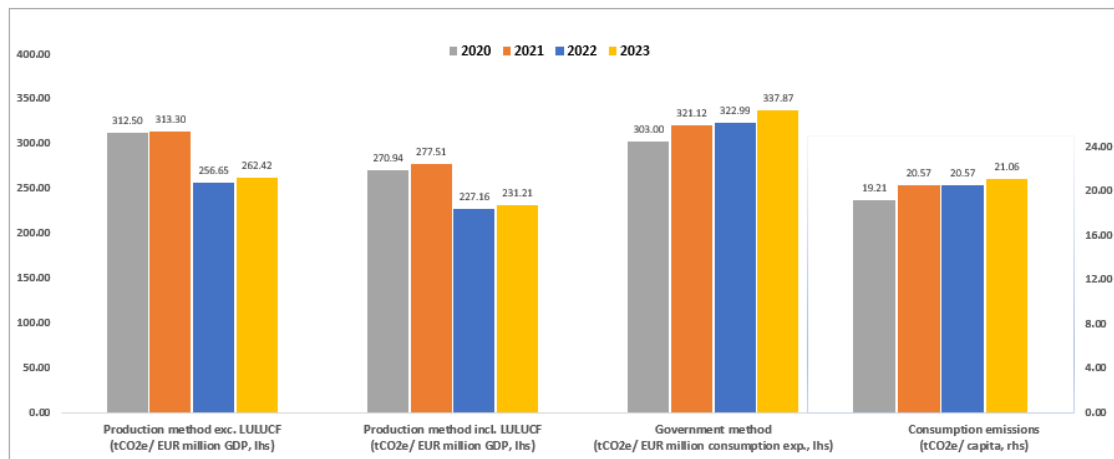
	Sovereign bonds				Supranational and agency bonds
	Production method (excl. LULUCF)	Production method (incl. LULUCF)	Government method	Consumption method	Scope 1 + 2
<b>Portfolio size</b> (in EUR bn)	1.30				0.25
<b>WACI</b> (tCO <sub>2e</sub> per EUR million GDP/revenue/government expenditure, or per capita)	262.42	231.21	337.87	21.06	0.41
<b>TCE</b> (tCO <sub>2e</sub> )	340,318	299,844	51,430	376,822	4.42
<b>CF</b> (tCO <sub>2e</sub> per EUR million invested)	262.42	231.21	39.66	290.51	0.02
<b>CI</b> (tCO <sub>2e</sub> per EUR million GDP/revenue/ government expenditure, or per capita)	262.42	231.21	337.79	21.06	0.47

**Sources:** ISS, Carbon4 Finance Group, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The size of the portfolio is expressed in nominal value, in euro billions (see footnote 17). WACI and CI metrics are expressed in tCO<sub>2e</sub> (tonnes of carbon dioxide equivalent) per EUR million GDP or per EUR million revenue (production method) or per capita (consumption method) or per EUR million government expenditure (government method). TCE is expressed in tCO<sub>2e</sub>. CF is expressed in tCO<sub>2e</sub> per EUR million invested. Metrics are calculated using nominal values for bonds. For data availability, see footnote 12.

**Chart 4**  
**Evolution of WACI for sovereign issuers for the USD-denominated NMPP using all allocation methods (2020-2023)**

<sup>18</sup> The evolution of all four metrics over 2021-2023 is reported in Annex 1.



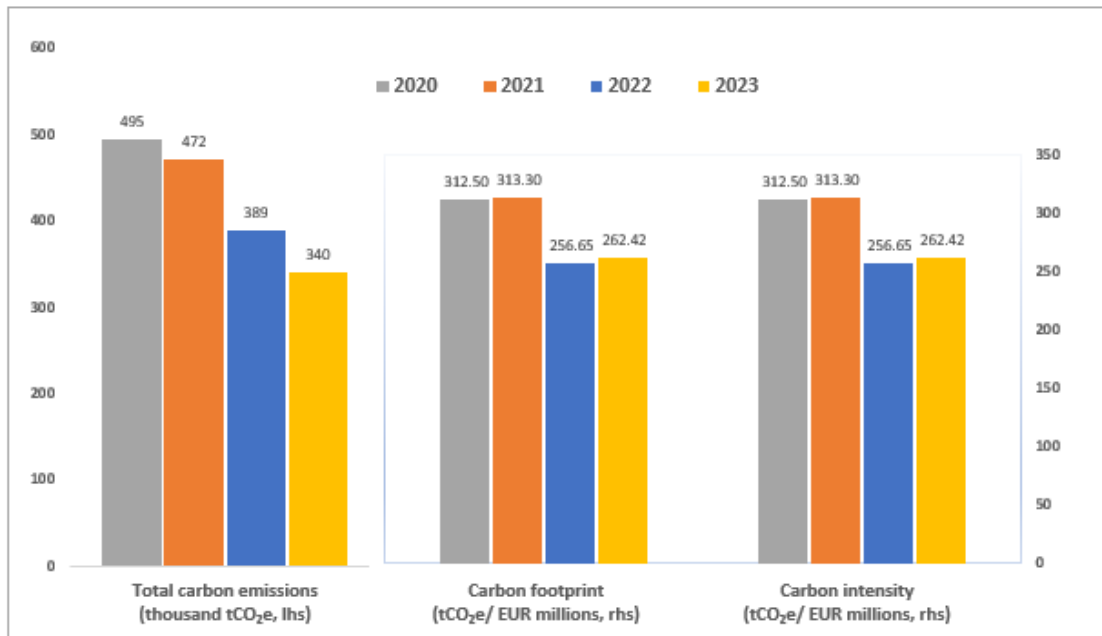
**Sources:** ISS, Carbon4 Finance, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** WACI is expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP (production method) or per capita (consumption method) or per EUR million government expenditure (government method) (see footnote 17). Metrics are calculated using nominal values for bonds. For data availability, see footnote 12.

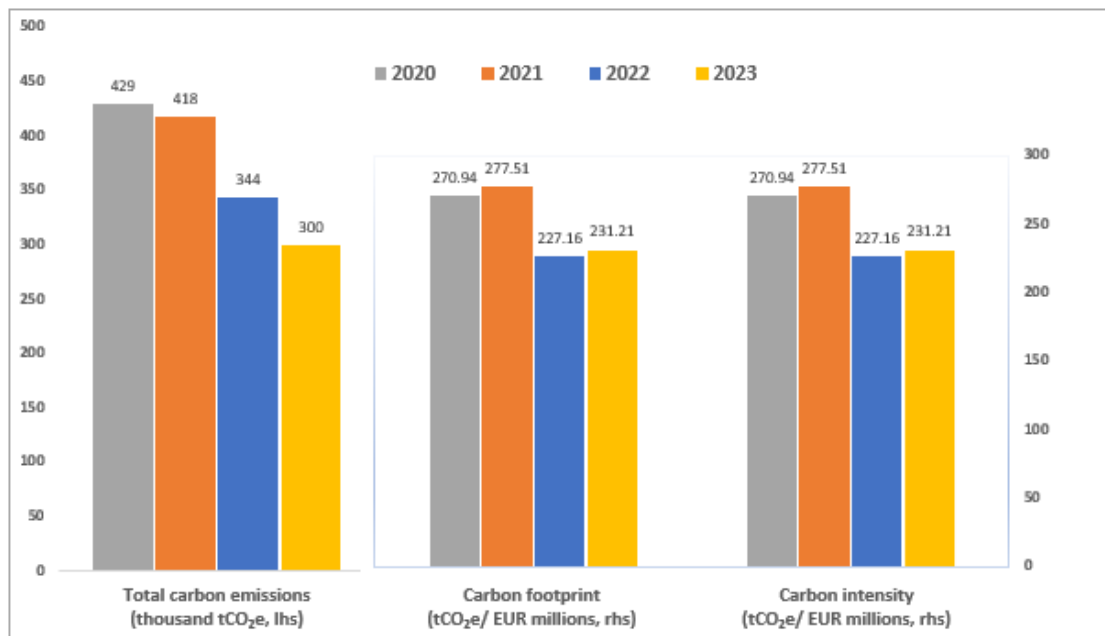
As shown in Chart 4, the WACI decreased under the production allocation method, while for the consumption and government methods, there was a slight increase, due to exchange rate effects. It should be noted that the results are highly dependent on the climate and macroeconomic data of the United States, as the portfolio consists mainly of US sovereign bonds.

#### Chart 5

**Evolution of the Total Carbon Emissions, Carbon Footprint and Carbon Intensity metrics for sovereign issuers in the USD-denominated NMPP, using the production allocation method (2020-2023)**



b. Including LULUCF



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

Notes: The chart shows the evolution of the TCE, CF and CI metrics using the production method only, both excluding (panel a) and including (panel b) LULUCF emissions. TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested (see footnote 17). CI is expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per

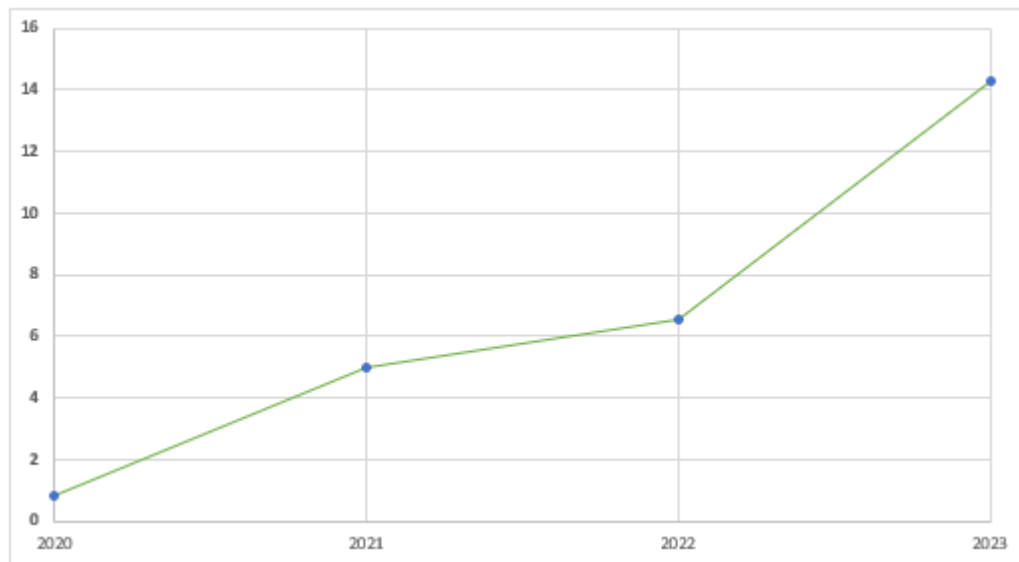


EUR million GDP (production method). Metrics are calculated using nominal values for government bonds. For data availability, see footnote 12.

The chart below shows the green investment share of the USD-denominated NMPP of the Bank of Greece for the period 2020-2023.

#### Chart 6

**Evolution of the green investment share of the USD-denominated NMPP (2020-2023)**  
(percentage of total portfolio size)



**Source:** Bank of Greece calculations.

**Note:** Metric calculated using nominal values for asset holdings.

As seen from the chart, the share of green holdings for the NMPP in US dollars increased **from 1.0% in 2020 to almost 14% in 2023.**

#### 5.1.3 Portfolio in pound sterling (GBP)

The size of the overall GBP-denominated NMPP portfolio was EUR 0.28 billion (see footnote 17) at the end of December 2023; this portfolio includes exclusively government bonds issued by the British government. The Bank of Greece introduced



such bonds in its NMPPs in 2023, therefore historical data for previous periods are not available.

Reported below are the climate-related metrics of the GBP-denominated NMPP of the Bank of Greece for the year 2023.

**Table 3**  
**Climate-related metrics of the GBP-denominated NMPP for 2023**

	Sovereign bonds			
	Production method (excl. LULUCF)	Production method (incl. LULUCF)	Government method	Consumption method
<b>Portfolio size</b> (in EUR bn)	0.28			
<b>WACI</b> (tCO <sub>2</sub> e per EUR million GDP/government expenditure, or per capita)	122.94	123.28	70.57	9.48
<b>TCE</b> (tCO <sub>2</sub> e)	34,670	34,764	4,169	51,227
<b>CF</b> (tCO <sub>2</sub> e per EUR million invested)	122.94	123.28	14.78	181.66
<b>CI</b> (tCO <sub>2</sub> e per EUR million GDPgovernment expenditure, or per capita)	122.94	123.28	70.57	9.48

**Sources:** ISS, Carbon4 Finance Group, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The size of the portfolio is expressed in nominal value, in euro billions (see footnote 17). WACI and CI metrics are expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP (production method) or per capita (consumption method) or per EUR million government expenditure (government method). TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested. Metrics are calculated using nominal values for bonds. For data availability, see footnote 12.

## 5.2 Targets





The Bank of Greece aims to align investments related to NMPPs with the EU's decarbonisation targets and the goals of the Paris Agreement. The EU's targets are set out in its long-term strategy for 2050, aiming for climate neutrality so as to limit the global temperature rise to well below 2°C and step up efforts to limit it to 1.5°C.

The Bank of Greece's success in achieving its above-mentioned aim will depend on the extent to which governments comply with their commitments under the Paris Agreement, given that, due to the nature of the Bank's activities and under the current constraints, most of its own funds are invested in government bonds.

As part of this effort, the Bank of Greece is to set an intermediate decarbonisation target for its own funds portfolios. The specific target will be decided and reported in due course, in line with increasing availability and quality of climate-related data and growing expertise in estimating climate-related NMPP footprint.

However, it should be noted that the path of reducing the CO<sub>2</sub> emissions of the portfolios also depends on international developments and exogenous factors that are outside the direct control of the Eurosystem, such as the alignment of issuers with international standards in accordance with their commitments, bond market conditions and corporate bond issuance standards.

The annual disclosure of the climate footprint of the portfolios enables the Bank of Greece and the Eurosystem to reassess the disclosure framework as a whole and, if deemed necessary, adjust its key parameters, should significant deviations from the initial long-term targets be identified.

## 6 Annexes

### Annex 1

#### Evolution of climate-related metrics of the euro-denominated NMPP, 2020-2023

		Sovereign bonds				Supranational and agency bonds
	Year of reference	Production method (excl. LULUCF)	Production method (incl. LULUCF)	Government method	Consumption method	Scope 1 + 2
<b>Portfolio size</b> (in EUR bn)	2023	17.31				0.10
	2022	12.25				-
	2021	9.95				-
	2020	11.05				-
<b>WACI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/ government expenditure, or per capita)	2023	154.00	143.20	89.49	8.72	2.13
		100%	100%	100%	100%	100%
	2022	159.21	147.07	96.76	8.43	-
		100%	100%	100%	100%	
	2021	211.97	196.09	129.06	8.17	-
		100%	100%	100%	100%	
	2020	216.56	199.61	124.56	7.74	-
		100%	100%	100%	100%	
<b>TCE</b> (tCO <sub>2</sub> e)	2023	2,666,044	2,479,091	314,365	3,143,370	1.44
		100%	100%	100%	100%	100%
	2022	1,949,842	1,801,122	238,986	2,229,562	-
		100%	100%	100%	100%	
	2021	2,109,652	1,951,571	273,043	2,324,063	-
		100%	100%	100%	100%	
	2020	2,392,604	2,205,307	308,865	2,641,398	-
		100%	100%	100%	100%	
<b>CF</b> (tCO <sub>2</sub> e per EUR million invested)	2023	154.00	143.20	18.16	181.58	0.01
		100%	100%	100%	100%	100%
	2022	159.21	147.07	19.51	182.05	-
		100%	100%	100%	100%	
	2021	211.97	196.09	27.43	233.51	-
		100%	100%	100%	100%	
	2020	216.56	199.61	27.96	239.08	-

		100%	100%	100%	100%	
<b>CI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/government expenditure, or per capita)	2023	154.00	143.20	88.51	8.38	2.13
		100%	100%	100%	100%	100%
	2022	159.21	147.07	96.14	8.07	-
		100%	100%	100%	100%	
	2021	211.97	196.09	130.55	7.77	-
		100%	100%	100%	100%	
	2020	216.56	199.61	126.40	7.42	-
		100%	100%	100%	100%	

**Sources:** ISS, Carbon4 Finance, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The size of the portfolio is expressed in nominal value, in euro billions. WACI and CI metrics are expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP or per EUR million revenue (production method) or per capita (consumption method) or per EUR million government expenditure (government method). TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested. Metrics are calculated using nominal values for bonds. For data availability, see footnote 12. Percentages below each metric indicate data availability, calculated as the percentage of investments (relative to the total size of the portfolio), for which all required data (i.e. emissions data and macroeconomic data) are available.

### Evolution of climate-related metrics of the USD-denominated NMPP, 2020-2023

		Sovereign bonds				Supranational and agency bonds
	Year of reference	Production method (excl. LULUCF)	Production method (incl. LULUCF)	Government method	Consumption method	Scope 1 + 2
<b>Portfolio size</b> (in EUR bn)	2023	1.30				0.25
	2022	1.51				0.40
	2021	1.51				0.38
	2020	1.58				0.38
<b>WACI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/government expenditure, or per capita)	2023	262.42	231.21	262.42	231.21	0.41
		100%	100%	100%	100%	97%
	2022	256.65	227.16	256.65	227.16	1.62
		100%	100%	100%	100%	99%
	2021	313.30	277.51	313.30	277.51	3.86
		100%	100%	100%	100%	98%
	2020	312.50	270.94	312.50	270.94	1.73
		100%	100%	100%	100%	100%

<b>TCE</b> (tCO <sub>2</sub> e)	2023	340,318	299,844	340,318	299,844	4.42
		100%	100%	100%	100%	97%
	2022	388,563	343,907	388,563	343,907	8.65
		100%	100%	100%	100%	99%
	2021	472,186	418,246	472,186	418,246	16.85
		100%	100%	100%	100%	98%
2020	494,892	429,074	494,892	429,074	17.90	
	100%	100%	100%	100%	100%	
<b>CF</b> (tCO <sub>2</sub> e per EUR million invested)	2023	262.42	231.21	262.42	231.21	0.02
		100%	100%	100%	100%	97%
	2022	256.65	227.16	256.65	227.16	0.02
		100%	100%	100%	100%	99%
	2021	313.30	277.51	313.30	277.51	0.04
		100%	100%	100%	100%	98%
2020	312.50	270.94	312.50	270.94	0.05	
	100%	100%	100%	100%	100%	
<b>CI</b> (tCO <sub>2</sub> e per EUR million GDP/revenue/government expenditure, or per capita)	2023	262.42	231.21	262.42	231.21	0.47
		100%	100%	100%	100%	97%
	2022	256.65	227.16	256.65	227.16	1.73
		100%	100%	100%	100%	99%
	2021	313.30	277.51	313.30	277.51	2.22
		100%	100%	100%	100%	98%
2020	312.50	270.94	312.50	270.94	0.29	
	100%	100%	100%	100%	100%	

**Sources:** ISS, Carbon4 Finance, World Bank, Bloomberg and Bank of Greece calculations.

**Notes:** The size of the portfolio is expressed in nominal value, in euro billions (see footnote 17 in the main text). WACI and CI metrics are expressed in tCO<sub>2</sub>e (tonnes of carbon dioxide equivalent) per EUR million GDP or per EUR million revenue (production method) or per capita (consumption method) or per EUR million government expenditure (government method). TCE is expressed in tCO<sub>2</sub>e. CF is expressed in tCO<sub>2</sub>e per EUR million invested. Metrics are calculated using nominal values for bonds. For data availability, see footnote 12. Percentages below each metric indicate data availability, calculated as the percentage of investments (relative to the total size of the portfolio) for which all the required data (i.e. emissions data and macroeconomic data) are available.

## Annex 2

### Elements of the Eurosystem disclosure framework for the TCFD category “Metrics and targets”<sup>19</sup>

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 (TCE)	$= \sum_n^i \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \times \text{issuer's carbon emissions}_i \right)$
Carbon footprint (CF)	$= \frac{\sum_n^i \left( \frac{\text{current value of investment}_i}{\text{EVIC or PPP adj. GDP}_i} \right) \times \text{issuer's carbon emissions}_i}{\text{current portfolio value}}$
Portfolio size	Expressed in EUR billions.
Asset classes	All asset classes of the portfolio, with metrics to be shown per asset class.
Data availability	Indicated in brackets as a percentage for each metric and asset class.
Data sources	Such as the name(s) of the (climate) data providers.
Target	At least one broadly defined long-term target covering all euro-denominated non-monetary policy portfolios 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.

In addition to the elements of the Eurosystem disclosure framework, the Bank of Greece discloses the carbon intensity metric, which is defined as:

#### Carbon Intensity

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

<sup>19</sup> 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.



Based on the latest update of the Eurosystem disclosure framework, the Bank of Greece discloses the green investment share, i.e. the percentage of green investments in the total value of investments of NMPPs within the Eurosystem framework, which is defined as:

$$\textit{Green investment share} = \frac{\textit{Total value of green investments}}{\textit{Total value of portfolio}}$$



### Annex 3

## Carbon emissions allocation methods, normalisation factors and attribution factors

### Allocation

Issuer type	Factor	Remarks	Unit
<b>Corporate</b>	Scope 1 & 2 emissions	Scope 1 comprises direct GHG 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 GHG emissions associated with the purchase of electricity, steam, heat, or cooling.	tCO <sub>2</sub> e
<b>Supra &amp; Agency</b>			
<b>Sovereign</b>	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
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<b>Corporate</b>	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
<b>Supra &amp; Agency</b>			
<b>Sovereign</b>	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





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**Attribution**

<b>Asset class</b>	<b>Factor</b>	<b>Remarks</b>	<b>Unit</b>
<b>Sovereign bonds</b>	PPP adj. GDP	See description of “PPP adj. GDP” in normalisation factor.	EUR
<b>Equities</b>	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.	
<b>Supra &amp; Agency bonds</b>			
<b>Corporate bonds</b>			
<b>Covered bonds</b>			