



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

June 2024





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1. Introduction

Climate change-related extreme weather events and the transition towards a low-carbon economy may affect the valuation of financial assets. Consequently, identifying an undesirable accumulation of climate change-related risks is acknowledged as a key element of the management of the BCL's own non-monetary policy portfolios (NMPPs).

The BCL's climate-related financial disclosures¹ of its NMPPs, which comprise the bank's own fund investments and the staff pension fund, reflect the BCL's commitment to transparency on its investments' exposure to climate-related risks and environmental footprint.

In March 2023, the BCL published the first annual disclosures focusing on euro-denominated NMPPs² following the applicable common Eurosystem methodology that is based on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) of the Financial Stability Board (FSB) and the Partnership for Carbon Accounting Financials (PCAF). The BCL has also taken into due consideration the guidance provided for central banks by the Network for Greening the Financial System (NGFS).³ The present publication expands the scope and provides further information on foreign reserve portfolios in an effort towards greater transparency. The methodology for sovereign issuers has also evolved as production emissions are now reported both including and excluding the effects of Land Use, Land-Use Change and Forestry (LULUCF)⁴, while metrics based on emissions related to government expenditures were omitted as redundant.

The information provided in this report is highly dependent on the data sources. The disclosures will be refined over time, in line with increasing availability and quality of climate-related data, enhancements in methodologies and growing practical experience in handling climate-related risks.

The results for the reporting year 2023 show that the BCL's NMPP holdings, both denominated in euro and foreign currency, are gradually decarbonizing across sovereign and non-sovereign asset categories.

¹ Climate-related financial disclosures are from here on simply referred to as "disclosures" to improve readability.

² https://www.bcl.lu/fr/media_actualites/communiqués/2023/03/climate/Climate-related-Financial-Disclosures-of-BCLs-NMPPs-fin.pdf.

³ Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures, TCFD, October 2021 and Guide on climate-related disclosure for central banks, NGFS, December 2021.

⁴ "The rate of build-up of carbon dioxide (CO₂) in the atmosphere can be reduced by taking advantage of the fact that atmospheric CO₂ can accumulate as carbon in vegetation and soils in terrestrial ecosystems. Under the United Nations Framework Convention on Climate Change any process, activity or mechanism which removes a greenhouse gas (GHG) from the atmosphere is referred to as a "sink". Human activities impact terrestrial sinks, through land use, land-use change and forestry (LULUCF), consequently, the exchange of CO₂ (carbon cycle) between the terrestrial biosphere and the atmosphere is altered."
<https://unfccc.int/topics/land-use/workstreams/land-use--land-use-change-and-forestry-lulucf>.



2. Governance

2.1 Overall Governance and organisational structure

The BCL's main task is to participate in the execution of the tasks of the European System of Central Banks (ESCB) / Eurosystem with a view to achieving its objectives.

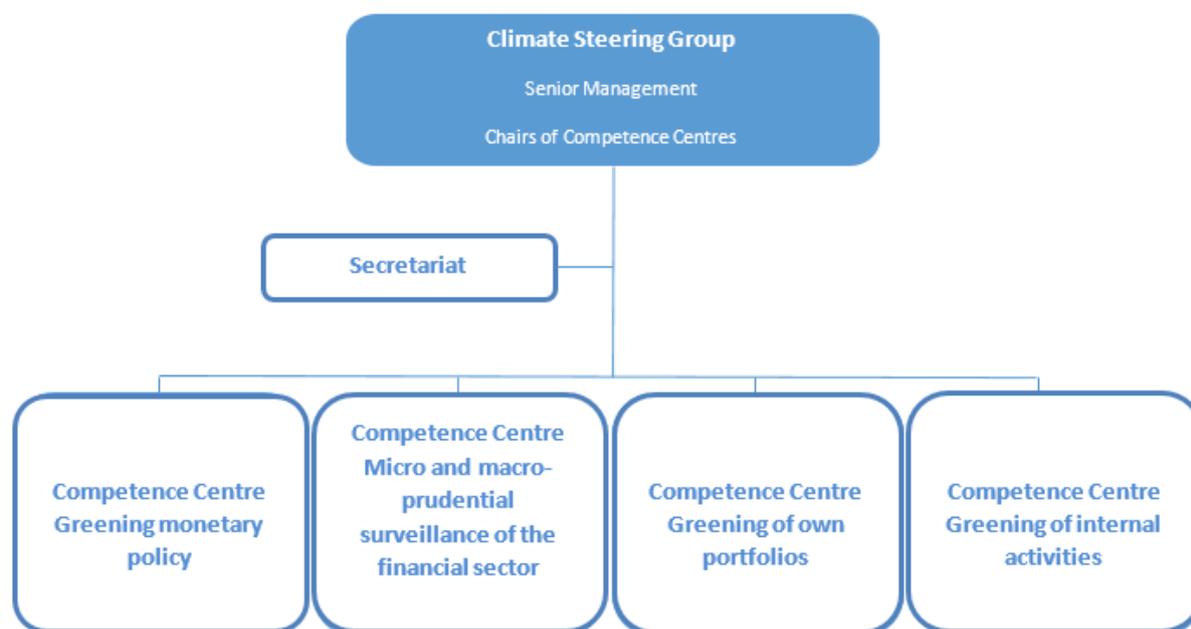
The primary objective of the ESCB / Eurosystem is to maintain price stability. Without prejudice to the objective of price stability, it shall support the general economic policies in the European Union ("Union") with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union.

Climate considerations and related risks are of relevance to the Eurosystem mandate, as reflected in the European Central Bank (ECB) Strategy Review and the climate-related action plan, as endorsed by the ECB Governing Council on 8 July 2021, with the primary objective to maintain price stability taking precedence.

Within the limits of Article 127(5) of the Treaty on the Functioning of the European Union and Article 2(6) of its Organic Law, the BCL shall also contribute to the smooth conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system.

To ensure effective coordination across the bank on climate-related topics, the BCL set up, in its organisation, a Climate Steering Group (CSG) in January 2022. The CSG involves BCL senior management as well as the president and secretary of each Competence Centre reporting to the CSG (see Chart 1). The CSG provides strategic guidance and centralises the work from the four Competence Centres on (1) Greening Monetary Policy, (2) Micro and Macro-prudential Surveillance of the Financial Sector, (3) Greening of own Portfolios, and (4) Greening of Internal Activities.

Chart 1: Climate Steering Group



The Climate Steering Group meets at least every second month and more often if necessary. The aim of this structure is to provide input to the BCL's decision making bodies and coordinate "climate action" in the various fields of the competence centres.

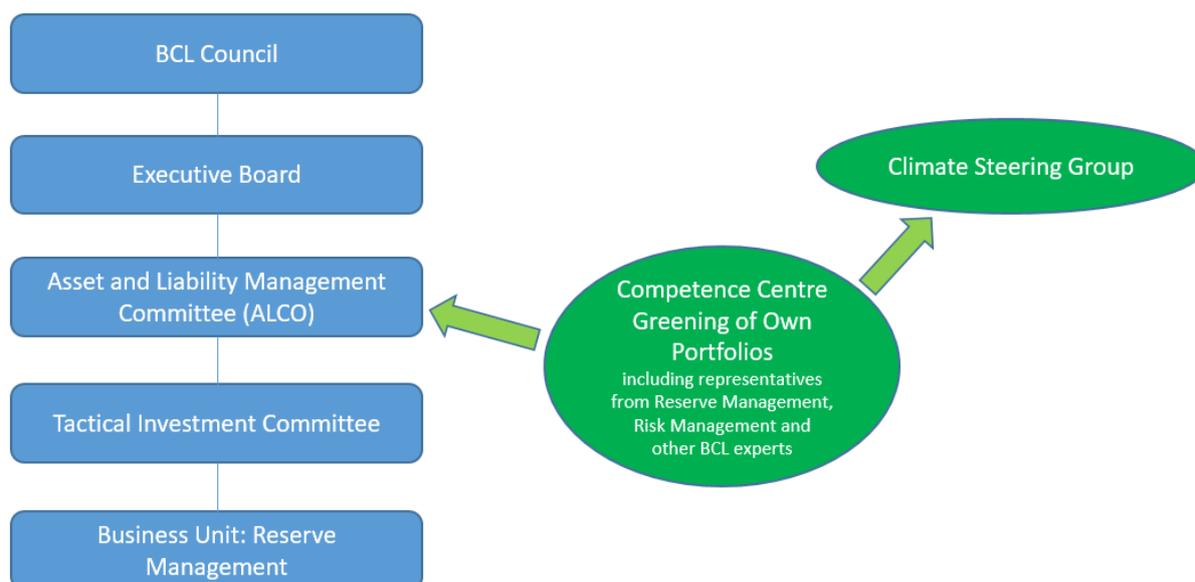
2.2 Governance related to non-monetary policy portfolios

Investments in the NMPPs of Eurosystem National Central Banks (NCB) and the ECB are managed under the responsibility of each NCB and the ECB. The BCL's approach regarding its own investment policies for NMPPs is also guided by the common Eurosystem stance for identifying and monitoring climate-related risks in these portfolios.

In the area of NMPPs, the BCL has adopted an integrated approach for the governance of climate-related risks and opportunities, according to which climate change-related considerations are addressed within its existing governance structures.

Governance of the NMPPs is based primarily on the BCL's asset management framework, which encourages an integrated investment process that supports and is fully aligned with the strategic goals of the central bank. The decision making process related to the financial asset management of the BCL's NMPPs is based on a multiple level structure (see Chart 2). All levels take decisions, within the limits of their responsibilities, on the basis of adequate information and regular reporting.

Chart 2: BCL's Investment governance of NMPPs, integrating sustainability considerations



With regard to the management of the NMPPs, the Council approves the investment policy guidelines, which establish and prioritise general investment principles and outline the approach to implement these principles. The Council also approves the general set-up of portfolios and management guidelines related to the BCL's NMPPs.

The Executive Board defines the general risk management framework for the NMPPs in accordance with the investment policy guidelines. In this respect, it approves the investment limits framework for the management of the NMPPs on an annual basis, which is prepared by the Asset and Liability Management Committee (ALCO).

The ALCO is a strategic investment committee that monitors the balance sheet of the BCL in relation to its investment capacities and examines potential investment opportunities related to the NMPPs and their risk profile (market, credit and liquidity risks, including climate-related risks). The ALCO defines the strategic asset allocation based on the investment universe available and the general risk management framework defined by the Executive Board. In addition, the committee sets strategic benchmarks that reflect the asset allocation. The ALCO receives input from the CSG Competence Centre responsible for the greening of own portfolios.

The Tactical Investment Committee is responsible for contributing to the management of the financial assets at a tactical level. The committee regularly monitors the evolution of the portfolios on a short term basis and may propose deviations to the strategic asset allocation of the relevant portfolios by defining valid tactical benchmarks.

The Reserve Management unit is responsible for the implementation of the investment decisions while the Financial Risk Management is responsible for controlling the risks involved.



The Competence Centre for the greening of own portfolios reports directly to the ALCO, in addition to the CSG, ensuring a holistic integration of the responsible investment considerations into the bank's existing institutional structure for managing its NMPPs. This Competence Centre permanently includes representatives from Reserve Management and Risk Management and meets on a regular basis. The Competence Centre is in charge of reviewing the environmental, social and governance (ESG) characteristics of the BCL's portfolios and considering potential updates to the metrics and methodologies applied. Moreover, it also follows up on the Eurosystem stance regarding climate considerations in NMPPs and liaises with the ESG data providers in order to discuss improvements in data availability and quality. The Competence Centre prepares proposals to the ALCO for enhancing the investment process by incorporating sustainable and responsible investment considerations into the bank's strategic asset allocation for NMPPs. Final approval of the proposals rests with the Executive Board.

3. Strategy

3.1 The BCL's role in European and international fora on climate change

Climate change represents a major challenge, which requires a globally coordinated response. The BCL has been and continues to be supportive of European and international coordination efforts to enhance understanding and consideration of climate-related risks.

The BCL has been a member of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) since September 2018. Established as a coalition of central banks and financial supervisors, the NGFS aims to strengthen collective efforts towards greening the financial system by conducting analytical work and providing common reference frameworks for its members. The NGFS released numerous publications to help public institutions and market participants overcome climate-related challenges on a broad set of topics, ranging from supervisory practices to climate scenarios and transition planning.

The analytical work of the NGFS is currently done in four workstreams, two task forces as well as three expert networks. Currently, the BCL staff participates in three workstreams, notably the workstreams on "Supervision", "Monetary Policy", and "Net Zero for Central Banks". The BCL has also been represented in the expert networks on legal issues and on research.

The BIS Innovation Hub (BISIH) launched its Innovation Network on 19 January 2021 to support BISIH priorities, share knowledge about technology projects and discuss innovative answers to problems relevant to central banks. The Innovation Network currently features six working groups, mirroring the BISIH's thematic priorities: Suptech and Regtech, Next-generation financial market infrastructures, Central bank digital currencies, Open finance, Cyber security, and Green finance. The BCL participates in working group on Green finance, contributing to identification of new technological solutions to existing problems in the field of sustainable finance.



In the context of the 2021 United Nations Climate Change Conference (COP26), the BCL issued an individual declaration⁵, which aimed to highlight the bank's increasing efforts, within its mandate, to incorporate sustainability into its operations.

In February 2021, the ECB announced its decision to start working on disclosures of the NMPPs. In July 2021, the ECB also presented an action plan to include climate change considerations in its monetary policy strategy. Reflections on climate change and environmental sustainability were also of substantial importance in the ECB strategy review of 2020-21. As a member of the Eurosystem, the BCL has actively participated to these preparatory works and action plan.

Within the Eurosystem, the BCL is a member of the Eurosystem Climate Change Forum - a voluntary network promoting effective ways of collaboration within the Eurosystem on climate change-related knowledge and fostering cooperation in research and analysis as well as capacity building.

3.2 Strategy for non-monetary policy portfolios

The main objectives of the investment policy are to generate a stable income and to ensure, over the long term, a return that takes into account capital preservation and liquidity considerations.

Climate change is relevant to the management of the BCL's NMPPs as the physical effects of climate change and the transition to a net-zero economy may create financial risks with adverse economic consequences, which could affect the safety of the bank's own funds' investments.

The BCL follows an integrated approach, monitoring climate risks as part of the overall risk management process, whereby climate risks do not form a new risk category but are assessed as an amplifying factor of existing categories such as credit, market and liquidity risk. As such, environmental sustainability aspects are embedded within the existing investment objectives.

The BCL aims to mitigate climate-related risks by gradually aligning its own investments with the EU's long-term climate neutrality objective in support of the Paris Agreement. Reducing the greenhouse gas (GHG) emissions associated with its NMPPs is the main focus of the BCL's strategy. GHG emissions in tons per million EUR invested is used as reference indicator as it allows for comparisons of portfolios with different sizes over time.

Beyond its support to the fight against climate change, the bank has been increasingly incorporating ESG criteria in its own investment process since 2019.

The BCL's sustainability investment strategy has first concentrated on increasing the share of the so-called green bonds or other sustainable and socially responsible debt instruments, most notably in the foreign reserves portfolios, but also in the staff pension fund portfolio.

⁵ <https://www.bcl.lu/en/Media-and-News/Press-releases/2021/11/declarationcop26/index.html>



Since 2022, equity investments have already been excluding companies found to be involved in any activities related to controversial weapons, in the cultivation or production of tobacco, as well as violators of the United Nations Global Compact principles or the Organisation for Economic Cooperation and Development Guidelines for Multilateral Enterprises. In 2023, the BCL decided to further enhance its sustainable investment strategy by negative screening for a set of pre-defined criteria, applicable across all non-monetary-policy-related corporate bond and equity investments.⁶ The introduced exclusion criteria were inspired by the minimum standards for EU Climate Transition Benchmarks (CTB) and EU Paris-aligned Benchmarks (PAB)⁷. Starting in 2024, the BCL will extend the scope of the negative screening to its own corporate bonds. In addition to the above-mentioned criteria, investments in corporate bonds will also exclude fossil fuel companies in the coal, oil and gas industries, following the requirements of the EU PAB minimum standards, which further supports the decarbonisation strategy.

In collaboration with other Eurosystem central banks and external data providers, the BCL strives to further improve coverage, address data quality concerns and continues its research in this domain. The idea is to gradually expand the responsible investment strategies pursued in the NMPPs with respect to portfolio specific objectives and constraints, thereby adopting a more granular approach to identifying sustainability-related risks and opportunities.

4. Risk Management of non-monetary policy portfolios

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

The bank actively identifies, assesses and manages the exposure of its NMPPs to climate-related risks. Climate risks are integrated into the risk management process in a bottom-up approach where climate risks do not form a new risk category but rather an amplifying factor of existing financial risk categories.

The BCL aims to integrate climate-change related risks of its NMPPs across the entire risk management cycle, ensuring a prudent and data-driven risk measurement. In order to develop a thorough understanding of the potential impact of climate change on its NMPPs, the exposure to climate risk is monitored using specific metrics such as emissions data.

⁶ To implement these exclusions, the BCL relies on the data provided by MSCI.

⁷ Commission Delegated Regulation (EU) 2020/1818 of 17 July 2020 – Article 12 (1)

5. Metrics and Targets

The BCL advocates monitoring and disclosing in line with the best available information and in a transparent way as to spur developments in the field. For that purpose, the Eurosystem has jointly identified common data sources.⁸ The approaches and methodologies described in this report are based on the current best practices for greening central banks' NMPPs, the data available at the moment of the report, along with the relevant framework.⁹ They are subject to further analysis and scrutiny and may evolve in the future in line with any new developments in the field of climate risk and sustainability. The BCL expects data availability and quality to improve over time, while metrics could also be subject to methodological changes in accordance with the common Eurosystem stance.

5.1 Metrics

In 2020, the BCL started monitoring the induced GHG emissions of its own investments. The emissions data consider the total amount of GHG emissions released into the atmosphere as a result of the activities of a particular organisation, community or individual and are measured in carbon dioxide equivalents (CO₂e).¹⁰ In the context of the common stance for climate change-related sustainable investments in NMPPs, three metrics are considered.

- i. The *Weighted Average Carbon Intensity (WACI)* measures a portfolio's exposure to issuers' carbon intensity. The emissions of each issuer are normalized with a measure of economic activity and then weighed by their respective share of holdings in the investment portfolio. The TCFD endorsed this metric in its final recommendations report. Since issuers with higher carbon intensity are likely to be more exposed to carbon related market and regulatory risks, this metric delivers an "outside-in-perspective" (i.e. financial materiality) serving as proxy for a portfolio's exposure to climate transition risk. Data normalization allows for broad comparability relative to other portfolios and benchmarks.
- ii. The *Total Carbon Emissions* measure the absolute emissions associated with a portfolio, expressed in tons of CO₂e. Issuer emissions are allocated to investors based on an ownership approach weighting the investor's contribution to the issuer's total capital structure (e.g. equity, debt, etc.). This metric delivers an "inside-out-perspective" (i.e. environmental

⁸ Institutional Shareholder Services (ISS), Carbon4 Finance (C4F), Worldbank

⁹ The Eurosystem developed a common disclosure framework that defines minimum standards for each member. In developing this framework, the Eurosystem considered recommendations of the Task Force on Climate-related Financial Disclosure (TCFD), the Partnership for Carbon Accounting Financials (PCAF) and the central banks and supervisors' Network for Greening the Financial System (NGFS).

¹⁰ Carbon dioxide equivalent (or CO₂ equivalent) is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.



materiality) and serves as proxy for a portfolio's environmental impact. The metric is widely applied across the financial industry. On the downside, the metrics' cross-portfolio and cross-time comparability is limited due to the absence of normalization regarding portfolio size.

- iii. The *Carbon Footprint* measures the total emissions, as described above, normalized by the portfolio value. Comparability is ensured by dividing by the portfolio's size and expressing the carbon footprint in tons of CO₂e per EUR million invested.

The various asset classes require different treatment in terms of emissions attribution and normalization. Sovereign issuers' emissions are attributed to the government bonds using Purchasing Power Parity (PPP) adjusted Gross Domestic Product (GDP) to evaluate the total carbon emissions and the carbon footprint. To compute the WACI, production¹¹ and consumption¹² emissions are normalized by PPP adjusted GDP and population respectively. The emissions of corporates, supranational and agencies are attributed to the securities based on the issuers' enterprise value including cash (EVIC) for the total carbon emissions and carbon footprint, while they are normalized by revenue for the WACI calculation. Metrics take into account Scope 1 and Scope 2 emissions¹³ as defined by the Green House Gas (GHG) Protocol. The formulas for the three metrics and further information on the applied emissions allocation methods, normalisation and attribution factors are provided in the appendix.

In this year's report, sovereign issuers' production emissions are reported both including and excluding the effects of Land Use, Land-Use Change and Forestry (LULUCF). Plants and soil can serve as a carbon sink by absorbing more carbon from the atmosphere than they emit. Since GHG emissions cannot be entirely eliminated, such carbon removals are essential to reach climate neutrality.

For the interpretation of the trends observed, it is important to consider the following aspects related to the underlying data. Whenever possible, the metrics are calculated using holdings, emissions and financial data for the same reference year. Due to the unavailability of climate data for the more recent cut-off dates, there is a time lag between the portfolio holdings and the underlying data. The respective climate metrics are hence restated in subsequent disclosure reports as the revised data

¹¹ 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.

¹² 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.

¹³ Under the definitions of this protocol, Scope 1 emissions refer to an entity's direct emissions, while Scope 2 refers to their indirect carbon emissions associated with the purchase of electricity, steam, heat, or cooling. Scope 3 is defined in the GHG Protocol as all the indirect emissions of an entity and its products, excluding those falling into Scope 2, i.e. it includes emissions across the entire value chain.

become available, in line with the common Eurosystem methodology. As such, the metrics for 2022 were recalculated with economic, financial and emissions data shifting one year forward across all asset types compared to the figures published last year. The sovereign bond metrics will be recalculated again next year based on updated GHG emissions, while all other asset types are now at their final values for 2022. Among the 2021 figures, only the sovereign bonds' metrics needed to be updated to consider 2021 GHG emissions instead of those from 2020. Although this approach may add to the complexity for the interpretation of the trends observed, it is an essential step to ensure high quality time series of data after several disclosure rounds.

5.1.1 EUR-denominated NMPPs

The table below presents the WACI, the total carbon emissions and the carbon footprint of the BCL's euro denominated NMPPs, including the assets related to BCL's legal pension liabilities (1st pillar of the Luxembourgish pension system), as of 31 December 2023, comprising a mix of sovereign, supranational, agency and corporate bonds, as well as equity holdings. Historical figures since 2020 are available in the appendix.

Table 1: Climate-related metrics of the BCL's EUR-denominated NMPPs for year-end 2023

Euro-denominated NMPPs	Sovereign			Non-sovereign			
	Sovereign and sub-sovereign bonds			Total	Supranational & agency bonds	Corporate bonds	Equities
	Production	Production incl. LULUCF	Consumption				
Portfolio size (€ mn)	679			2 022	1 745	164	113
Weighted average carbon intensity (tCO ₂ e / € mn revenue, GDP, or per capita)	151 (99%)	145 (99%)	13 (99%)	14 (75%)	2 (74%)	108 (67%)	58 (100%)
Total carbon emissions (tCO ₂ e)	103 857 (99%)	99 576 (99%)	129 040 (99%)	9 034 (60%)	48 (57%)	6 870 (67%)	2 116 (100%)
Carbon footprint (tCO ₂ e / € mn invested)	151 (99%)	145 (99%)	187 (99%)	7 (60%)	<1 (57%)	61 (67%)	19 (100%)
Green Bonds Share	1%			18%	17%	33%	N/A
Sustainable Bonds Share	0%			19%	20%	0%	N/A
Social Bonds Share	0%			4%	4%	0%	N/A

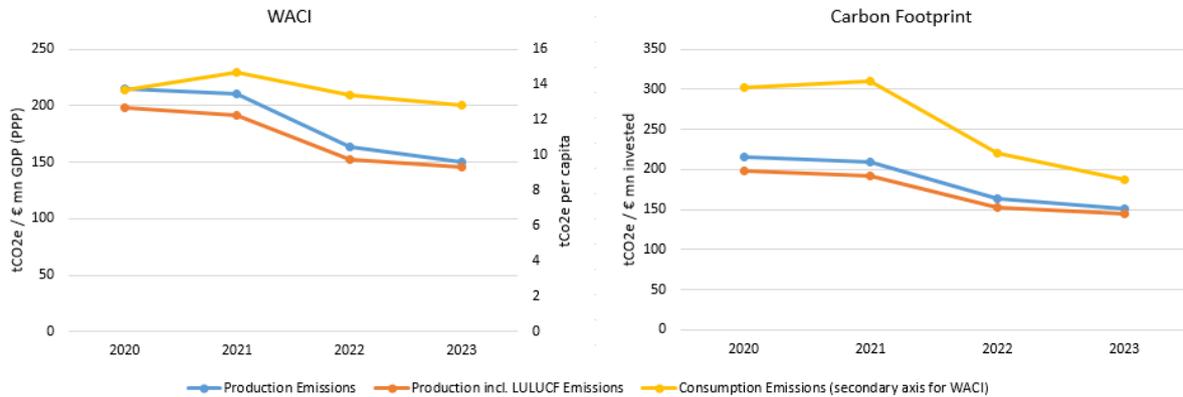
Sources: Institutional Shareholder Services, Carbon4 Finance, Bloomberg, World Bank, BCL calculations

Note: The percentages in the brackets below the metrics represent data availability, calculated as the percentage of investments for which all required data (i.e. emissions data and financial data) is available. The Portfolio size evaluates the investments in line with the accounting rules used in the official annual accounts, whereas the calculations of WACI, total carbon emissions and carbon footprint are based on the nominal value for bonds and on market value for equities. The green, social and sustainable bond shares are also based on nominal amounts.

In 2023, the invested amounts almost doubled from their 2022 levels as a higher yield environment created more attractive investment opportunities in bond markets. The increasing portfolio sizes led to higher carbon emissions in absolute terms for sovereign, supranational and agency bonds. Relative GHG measures, such as the WACI and the carbon footprint, that are independent of portfolio size improved compared to 2022 for nearly all categories as increasing investments to low-emitting issuers overcompensated exposures to issuers with higher emissions.

The carbon footprint of sovereign bond holdings in EUR-denominated NMPPs was ca. 8% lower at year-end 2023 than at end-2022 using production emissions, continuing the decreasing trend observed since 2020. Considering the effects of LULUCF, the 2023 carbon footprint was 4% lower than the 2022 number. The results based on consumption emissions show an annual reduction of the carbon footprint of 15% in 2023. Respective WACI calculations also show a declining evolution as depicted in the chart below.

Chart 3: Sovereign Bonds' WACI and Carbon Footprint Evolution of the BCL's EUR-NMPPs

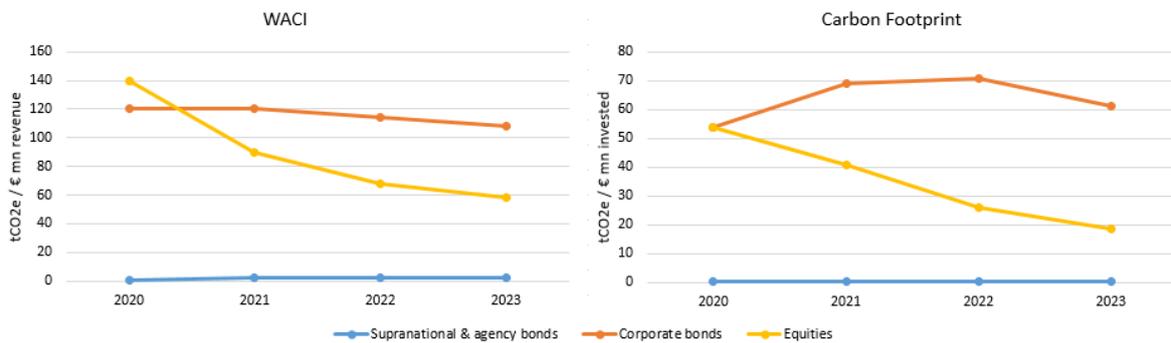


The WACI and carbon footprint of the supranational and government-related agency bonds remained at low levels, typical for this type of issuer. According to the data from specialised providers, the service-oriented business of many supranational entities, agencies and development banks have very low levels of Scope 1 and 2 emissions.

Private sector bonds' WACI and carbon footprint decreased 5% and 14% respectively from end-2022 to end-2023, mostly because of maturing bonds from high GHG emitters.

The equity allocation is fully invested in Exchange Traded Funds (ETFs) that follow predefined ESG principles¹⁴, such as progressive decarbonisation, optimizing ESG ratings, excluding exposures to thermal coal, controversial weapons, tobacco, and other norm-based exclusions. The BCL's equity investments' GHG metrics continued improving with the low carbon specific ETF following its predefined decarbonisation path. The WACI was 14% lower at year-end 2023 compared to 2022, while the carbon footprint dropped 28%.

Chart 4: Non-Sovereign Bonds' WACI and Carbon Footprint Evolution of the BCL's EUR-NMPPs



¹⁴ Based on MSCI Inc. (MSCI) assessment.

Since 2019, the BCL has increasingly invested in green, social and sustainable bonds¹⁵. The chart below shows the evolution of the share of euro-denominated green, social and sustainable bonds within each issuer category.¹⁶ While the presence of such instruments among government bonds remained negligible, 42% of supranational and agency bonds (Snats & Agencies) had either a green, social or sustainable bond label, remaining at high levels despite considerably higher invested amounts in this category. In absolute terms, this represents an increase of € 334 million of green, social and sustainable bonds, almost half of the new investments. About one third of the corporate bond holdings in the BCL's EUR-denominated NMPPs were green bonds as of year-end 2023. The absolute amount of green corporate bonds has remained unchanged in 2023, but the share of the green bonds within the corporate category has slightly declined due to new investments.

Chart 5: Green, Sustainable and Social Bonds Share per Issuer Type in the BCL's EUR-NMPPs



Holding bonds that are labelled green or sustainable does not have an immediate impact on the portfolio's carbon footprint as GHG emissions are collected at issuer level without considering any specific characteristics of a bond's use of proceeds. Nevertheless, such instruments are an integral part of BCL's ESG strategy as they support the transition towards a low-carbon economy by providing targeted financing to projects with positive environmental and social impacts.

¹⁵ The eligible instruments are identified using Bloomberg L.P. (Bloomberg)'s *Green*, *Social* and *Sustainability* bond indicators. Bloomberg's definitions of what constitutes a *green*, *social* or *sustainability* bond are based on the 2021 Green Bond Principles, the 2021 Social Bond Principles, and the 2021 Sustainability Bond Guidelines published by the International Capital Market Association. This assessment is done at issue level, based on the use of proceeds, and does not provide an appreciation of the sustainability of the issuer. *Sustainability* bonds have a combination of green and social activities as eligible projects.

¹⁶ The percentage of green social and sustainable bonds are calculated for each issuer type, independent from the other categories. As an example, an acquisition of a non-green corporate bond will not affect the green bond share of the supranational and agency bonds.

5.1.2 NMPPs denominated in Foreign Currencies (FX)

The BCL's foreign reserves are almost entirely invested in green bonds or other sustainable and socially responsible debt instruments, issued by supranational and government-related agencies. For operational reasons, the remaining part of these reserves are invested in cash and US Federal Government debt securities (Treasury bonds).

Table 2: Climate-related metrics of the BCL's FX-denominated NMPPs for year-end 2023

FX-denominated NMPPs	Sovereign			Non-sovereign	
	Sovereign and sub-sovereign bonds			Total	Supranational & agency bonds
	Production	Production incl. LULUCF	Consumption		
Portfolio size (€ mn)	14			181	181
Weighted average carbon intensity (tCO ₂ e / € mn revenue, GDP, or per capita)	262 (100%)	231 (100%)	21 (100%)	1 (80%)	1 (80%)
Total carbon emissions (tCO ₂ e)	3 919 (100%)	3 453 (100%)	4 339 (100%)	5 (77%)	5 (77%)
Carbon footprint (tCO ₂ e / € mn invested)	262 (100%)	231 (100%)	291 (100%)	<1 (77%)	<1 (77%)
Green Bonds Share	0%			65%	65%
Sustainable Bonds Share	0%			21%	21%
Social Bonds Share	0%			12%	12%

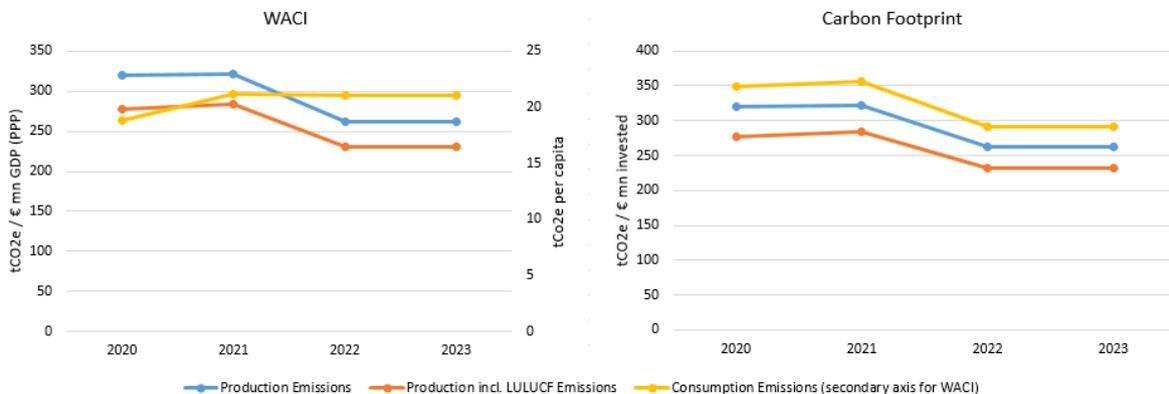
Sources: Institutional Shareholder Services, Carbon4 Finance, Bloomberg, World Bank, BCL calculations

Note: The percentages in the brackets below the metrics represent data availability, calculated as the percentage of investments for which all required data (i.e. emissions data and financial data) is available. The Portfolio size evaluates the investments in line with the accounting rules used in the official annual accounts, whereas the calculations of WACI, total carbon emissions and carbon footprint, as well as the green, social and sustainable bond shares are based on the nominal value.

Since 2020, the carbon footprint associated with the supranational and agency bonds in BCL's foreign reserves portfolio has been less than 1 tCO₂e / € million invested.

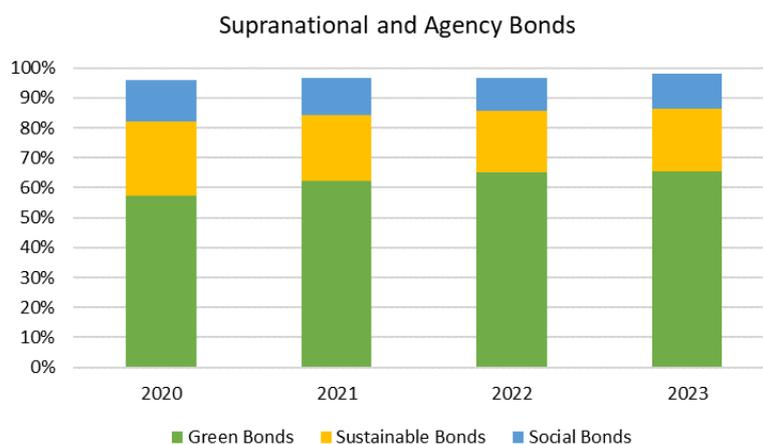
The composition of the sovereign bond allocation has not changed since 2020 and the developments in the GHG metrics have been solely driven by the evolution of the respective GHG emissions and economic fundamentals. At the time of this analysis, the most recent climate data are not yet available. Hence, the climate-related metrics for 2022 and 2023 remain identical, using the same data for the computation. However, the BCL will update the metrics retrospectively and include them in future reports.

Chart 6: Sovereign Bonds' WACI and Carbon Footprint Evolution of the BCL's FX-NMPPs



Similar to previous years, about 98% of the supranational and agency bonds had either a green, social or sustainable bond label.

Chart 7: Green, Sustainable and Social Bonds Share of Supranational and Agency Bonds in FX-NMPPs



GHG metrics as well as the proportion of green, sustainable and social bonds are reported regularly to the bank’s investment committees to inform about the progress on the key elements of the portfolios’ decarbonisation strategies.

5.2 Targets

The 2016 Paris Agreement committed to keep the rise in mean temperatures well below 2°C and aiming for 1.5°C above pre-industrial levels.¹⁷ In accordance with the assessment provided by the Intergovernmental Panel on Climate Change (IPCC), GHG emissions need to be at ‘net zero’ by 2050 to keep global warming at 1.5°C.¹⁸ Net zero refers to achieving an overall balance between GHG emissions produced and those taken out of the atmosphere.

Targets ensure forward-looking integration into the BCL climate risk management for NMPPs and reflect the BCL’s commitment to reduce its investments’ exposure to climate risks and improve its environmental footprint. In this context, the BCL aims to gradually decarbonise its own fund investments and targets an alignment with the objectives of the Paris Agreement to the extent possible.

¹⁷ <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

¹⁸ <https://www.ipcc.ch/sr15/chapter/spm/>

Starting in 2024, the BCL's own investments in corporate bonds will exclude fossil fuel companies in the coal, oil and gas industries, inspired by the definitions and requirements of EU Paris-aligned Benchmarks¹⁹, which further supports the decarbonisation strategy.

The BCL's long-term and intermediary targets will be refined over time, from a qualitative and quantitative perspective, along with the growing experience, better data availability and methodological improvements.

6. Appendix

6.1 Formulas for GHG metrics

Weighted Average Carbon Intensity (in tCO ₂ e / €M revenue, PPP adj. GDP, population)
$WACI = \sum_i^n \left(\frac{\text{current value of investment}_i}{\text{current portfolio value}} \right) \times \left(\frac{\text{issuer's GHG emissions}_i}{\text{issuer's €M revenue or PPP adj. GDP or population}_i} \right)$
Total Carbon Emissions (tCO ₂ e)
$TCE = \sum_i^n \left(\frac{\text{current value of investment}_i}{EVIC \text{ or PPP adj. GDP}_i} \times \text{issuer's GHG emissions}_i \right)$
Carbon Footprint (tCO ₂ e per €M invested)
$CF = \frac{\sum_i^n \left(\frac{\text{current value of investment}_i}{EVIC \text{ or PPP adj. GDP}_i} \right) \times \text{issuer's GHG emissions}_i}{\text{current portfolio value (€M)}}$

¹⁹ Commission Delegated Regulation (EU) 2020/1818 of 17 July 2020 – Article 12 (1)

6.2 Carbon emissions allocation methods, normalization and attribution factor

Allocation					
Issuer type	Factor	Remarks	Unit	Source	
Corporate	Scope 1 & 2 emissions	Scope 1 comprises direct carbon emissions that occur from sources that are controlled or owned by an organisation (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles). Scope 2 comprises indirect carbon emissions associated with the purchase of electricity, steam, heat, or cooling.	tCO ₂ e	ISS	
Supra & Agency					
Sovereign	Production emissions	Emissions produced domestically within a country's physical borders, including domestic consumption and exports. This definition follows the territorial emissions approach adopted by United Nations Framework Convention on Climate Change (UNFCCC) for annual national inventories.			
	Production emissions incl. LULUCF	Production emissions, as defined above, adjusted for the impact of human activities on carbon sinks through land use, land-use change and forestry.			ISS, UNFCCC
	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.			Carbon4 Finance
Normalisation					
Issuer type	Factor	Remarks	Unit	Source	
Corporate	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	ISS, Bloomberg	
Supra & Agency					
Sovereign	Production: PPP adj. GDP	GDP is the sum of gross value added by all resident producers plus any product taxes and minus any subsidies not included in the value of the products. The purchasing power parity (PPP) conversion factor is a spatial price deflator and currency converter that eliminates effects of differences in countries' price levels.		World Bank	
	Consumption: Population	Total population of a country.		People	
Attribution					
Asset class	Factor	Remarks		Unit	Source
Sovereign bonds	PPP adj. GDP	See description of "PPP adj. GDP" in normalisation	EUR million	World Bank	
Equities	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		ISS, Bloomberg	
Supra & Agency bonds					

6.3 Historical GHG metrics

EUR-NMPPs	Sovereign Issuers			Non-sovereign Issuers			
	Sovereign and sub-sovereign bonds			Total	Supranational & agency bonds	Corporate bonds	Equities
	Production	Production incl. LULUCF	Consumption				
Portfolio Size (€ mn)							
2023	679			2 022	1 745	164	113
2022	142			1 236	1 030	122	84
2021	228			441	154	164	123
2020	238			555	268	198	89
WACI (tCO2e / € mn revenue, GDP, or per capita)							
2023	151 (99%)	145 (99%)	13 (99%)	14 (75%)	2 (74%)	108 (67%)	58 (100%)
2022	164 (95%)	152 (95%)	13 (95%)	21 (79%)	2 (75%)	114 (100%)	67 (100%)
2021	210 (100%)	192 (100%)	15 (100%)	83 (85%)	2 (56%)	121 (100%)	89 (100%)
2020	215 (100%)	198 (100%)	14 (100%)	87 (75%)	<1 (48%)	120 (100%)	139 (100%)
Total carbon emissions (tCO2e)							
2023	103 857 (99%)	99 576 (99%)	129 040 (99%)	9 034 (60%)	48 (57%)	6 870 (67%)	2 116 (100%)
2022	22 653 (95%)	20 576 (95%)	30 417 (95%)	11 300 (53%)	35 (44%)	9 070 (100%)	2 195 (100%)
2021	46 300 (100%)	42 350 (100%)	68 292 (100%)	15 597 (81%)	4 (50%)	10 600 (96%)	4 993 (100%)
2020	48 235 (100%)	44 276 (100%)	67 860 (100%)	14 690 (64%)	2 (31%)	9 889 (94%)	4 799 (100%)
Carbon footprint (tCO2e / € mn invested)							
2023	151 (99%)	145 (99%)	187 (99%)	7 (60%)	<1 (57%)	61 (67%)	19 (100%)
2022	164 (95%)	152 (95%)	220 (95%)	16 (53%)	<1 (44%)	71 (100%)	26 (100%)
2021	210 (100%)	192 (100%)	310 (100%)	44 (81%)	<1 (50%)	69 (96%)	41 (100%)
2020	215 (100%)	198 (100%)	303 (100%)	42 (64%)	<1 (31%)	54 (94%)	54 (100%)
Green Bonds Share							
2023	1%			18%	17%	33%	N/A
2022	5%			12%	9%	44%	N/A
2021	0%			27%	19%	34%	N/A
2020	0%			16%	16%	16%	N/A
Sustainable Bonds Share							
2023	0%			19%	20%	0%	N/A
2022	0%			20%	23%	0%	N/A
2021	0%			10%	20%	0%	N/A
2020	0%			9%	15%	0%	N/A
Social Bonds Share							
2023	0%			4%	4%	0%	N/A
2022	0%			7%	7%	0%	N/A
2021	0%			0%	0%	0%	N/A
2020	0%			0%	0%	0%	N/A

FX-NMPPs	Sovereign Issuers			Non-sovereign Issuers	
	Sovereign and sub-sovereign bonds			Total	Supranational & agency bonds
	Production	Production incl. LULUCF	Consumption		
Portfolio Size (€ mn)					
2023	14			181	181
2022	33			190	190
2021	28			178	178
2020	31			151	151
WACI (tCO2e / € mn revenue, GDP, or per capita)					
2023	262 (100%)	231 (100%)	21 (100%)	1 (80%)	1 (80%)
2022	262 (100%)	231 (100%)	21 (100%)	2 (76%)	2 (76%)
2021	322 (100%)	283 (100%)	21 (100%)	4 (78%)	4 (78%)
2020	320 (100%)	277 (100%)	19 (100%)	4 (68%)	4 (68%)
Total carbon emissions (tCO2e)					
2023	3 919 (100%)	3 453 (100%)	4 339 (100%)	5 (77%)	5 (77%)
2022	9 104 (100%)	8 021 (100%)	10 081 (100%)	6 (59%)	6 (59%)
2021	8 945 (100%)	7 881 (100%)	9 905 (100%)	5 (60%)	5 (60%)
2020	9 579 (100%)	8 311 (100%)	10 488 (100%)	7 (67%)	7 (67%)
Carbon footprint (tCO2e / € mn invested)					
2023	262 (100%)	231 (100%)	291 (100%)	<1 (77%)	<1 (77%)
2022	262 (100%)	231 (100%)	291 (100%)	<1 (59%)	<1 (59%)
2021	322 (100%)	283 (100%)	356 (100%)	<1 (60%)	<1 (60%)
2020	320 (100%)	277 (100%)	350 (100%)	<1 (67%)	<1 (67%)
Green Bonds Share					
2023	0%			65%	65%
2022	0%			65%	65%
2021	0%			62%	62%
2020	0%			57%	57%
Sustainable Bonds Share					
2023	0%			21%	21%
2022	0%			20%	20%
2021	0%			22%	22%
2020	0%			25%	25%
Social Bonds Share					
2023	0%			12%	12%
2022	0%			11%	11%
2021	0%			12%	12%
2020	0%			14%	14%

