



EUROPEAN CENTRAL BANK

EUROSYSTEM

The update of the ESCB statistical climate indicators

November 2025 publication

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Overview

- 1 Introduction
- 2 Sustainable finance indicators
- 3 Carbon emissions indicators
- 4 Physical risk indicators
- 5 Publication material and future work

ESCB climate change-related statistical indicators

- Following the [Governing Council action plan](#), the ECB and national central banks (NCBs) have worked together to develop **harmonised statistical indicators for climate-related analysis at the euro area level**.
- This is the third release, following those in January 2023 and April 2024. The sustainable finance indicators had a slightly different release timeline between the first and this latest update (refer to slide 8 for details).



Sustainable finance indicators

- track **issuances and holdings** of sustainable debt securities in the euro area;
- provide information on the funds raised to **finance sustainable projects**, and on the demand for these securities as investment opportunities;
- differentiate securities by assurance levels, particularly those that were externally reviewed with a **second party opinion**.



Carbon emission indicators

- capture financial sector transition risks by measuring the **carbon emissions associated with corporate securities and loan portfolios** of financial institutions;
- help to assess the role of the financial sector in financing **carbon-related activities** and its contribution to the transition towards a net-zero economy over time.

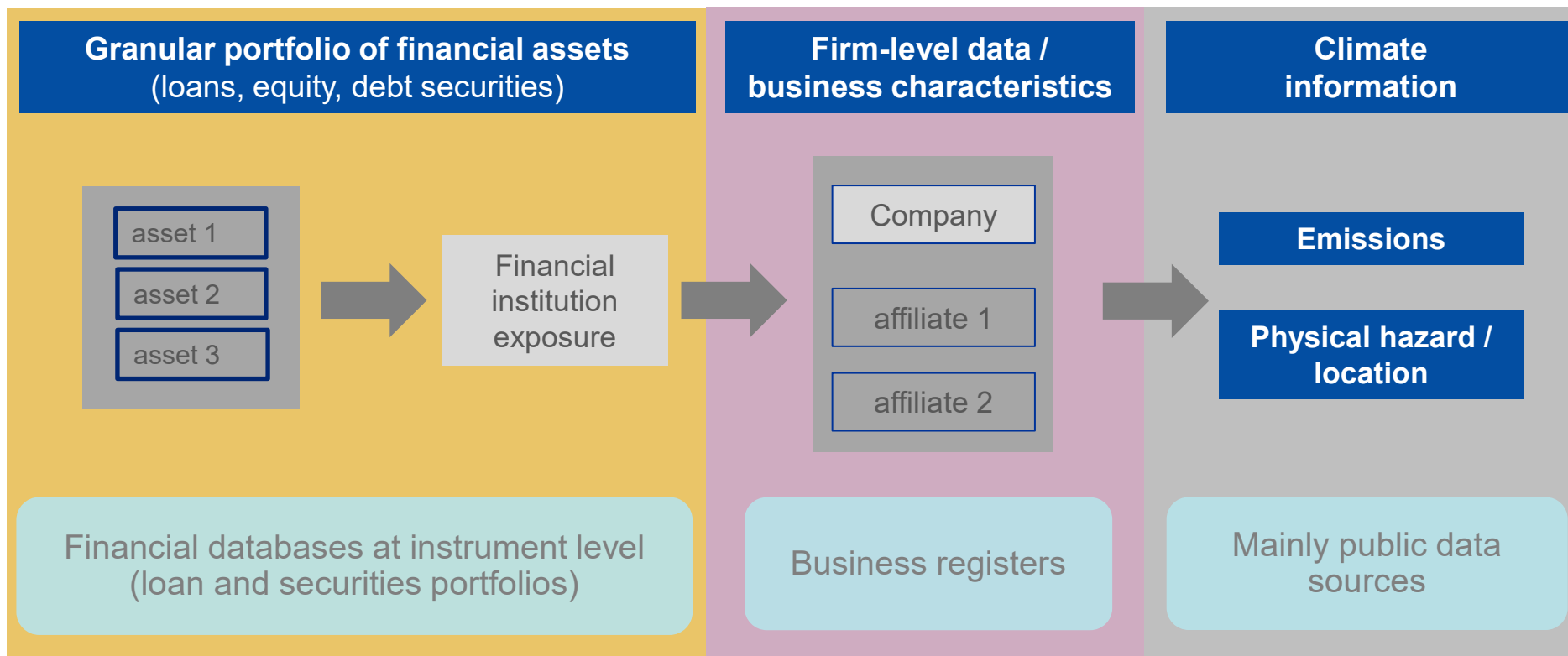


Physical risk indicators

- capture financial sector exposures to companies located in **areas susceptible to natural disasters and chronic physical risks**;
- are compiled for both historical baseline and various **climate scenarios**
- consider **risk mitigation strategies**, such as adaptation measures, collateral, and insurance (subject to data availability).

Indicators depict how climate change can affect the financial sector providing insights for monetary policy, financial stability and banking supervision

Derivation of financial institutions' exposures to climate risks



➔ Flexible framework with transparent methodology – facilitating comparison across countries and various specifications



Sustainable finance indicators

Enhancements and results

Sustainable finance indicators

Indicators on sustainable debt securities

Aggregates on [issuances and holdings of sustainable debt securities](#) in the [euro area](#) (and the [EU](#) for issuances)

Sources

Based on [ESCB data sources](#): Centralised Securities Data Base ([CSDB](#)), Securities Issues Statistics ([CSEC](#)) and Securities Holdings Statistics ([SHS](#))

Sustainability classification

- [Green](#): debt securities where the proceeds are used to finance projects with clear environmental benefits
- [Social](#): debt securities where the proceeds are used to finance projects that address social issues and seek to achieve positive social outcomes
- [Sustainability](#): debt securities where the proceeds are used to finance a combination of both green and social projects
- [Sustainability-linked](#): debt securities for which the financial and/or structural characteristics can vary depending on whether the issuer achieves predefined Sustainability/ESG objectives

Data information

- Time series information on [outstanding amounts](#) and [financial transactions](#)
- Aggregates on [issuances](#) are compiled [monthly](#) while for [holdings](#) [quarterly](#)
- Data available from [December 2020](#) for [issuances](#) and [Q1 2021](#) for [holdings](#)

Enhancements

Sustainable finance indicators

- First publication **January 2023**: all sustainable debt securities considered for the calculation of the aggregates, irrespective of the level of assurance
- **November 2023**: additional aggregates by restricting the universe of sustainable instruments to those externally reviewed with a **second party opinion** (validating the sustainability claims of the issuer)
- **September 2024**: new **cross-country and sector breakdowns by sustainability classification** and aggregates published as **official ESCB statistics**
- **November 2025** new breakdowns on **issuances** of sustainable debt securities by *original maturity, currency of denomination and interest rate type*:
 - offer a more granular view of the market for deeper insights;
 - address the reporting requirements in the context of the [G20 Data Gaps Initiative Recommendation 4 on Climate Finance](#), supporting the availability of comparable data on sustainable finance across the G20 economies.

Results

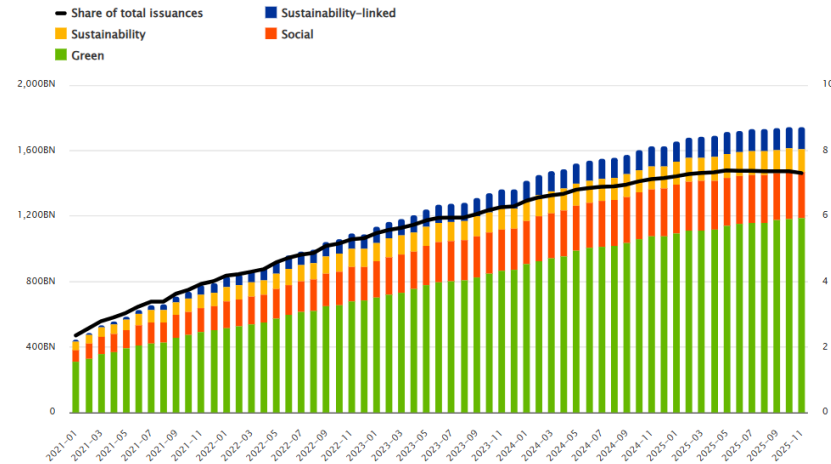


Euro area issuances and holdings of sustainable debt securities

Euro area issuances of sustainable debt securities

All levels of assurance

(Left-hand scale: EUR, outstanding amounts at face value; right-hand scale: percentages)



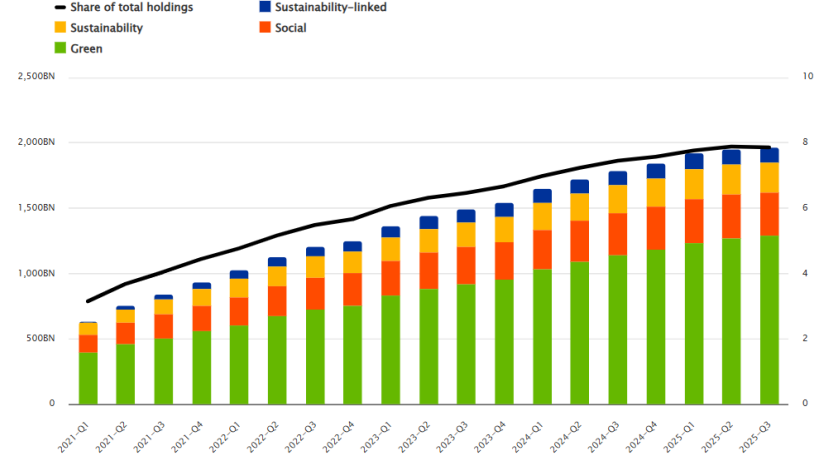
Sources: Centralised Securities Database (CSDB)

Notes: "Share of total issuances" refers to the amount of all sustainable securities as a share of all debt securities issued in the euro area.

Euro area holdings of sustainable debt securities

All levels of assurance

(Left-hand scale: EUR, outstanding amounts at face value; right-hand scale: percentages)



Sources: CSDB and Securities Holdings Statistics (SHS)

Notes: "Share of total holdings" refers to the amount of all sustainable securities as a share of all debt securities held in the euro area.

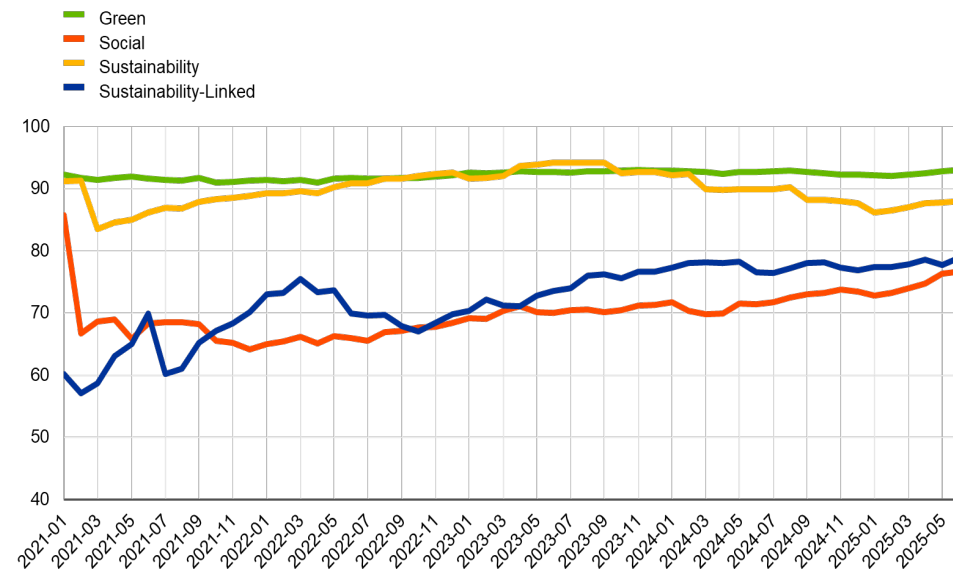
- The **outstanding amount of sustainable debt securities in the euro area** has nearly **quadrupled** over four years, rising from EUR 453 billion in January 2021 to EUR 1.74 trillion in September 2025. However, the growth rate has **slowed recently**, with issuances increasing by 10% in the past 12 months compared with 20% the year prior.
- **Similar trends** are observed in the **holdings of sustainable debt securities**, which grew to EUR 1.96 trillion in June 2025 – a 14% increase from June 2024 but lower than the 20% growth rate recorded the previous year.

Euro area issuances of sustainable debt securities – by currency

Euro area issuances of sustainable debt securities

Currency of denomination EUR

(Percentages)



Source: Centralised Securities Database (CSDB).

Notes: "Share of issuances with currency denomination EUR" refers to sustainable debt securities denominated in EUR as a share of all sustainable debt securities issued in the euro area

- **Most of sustainable debt securities** in the euro area are **denominated in EUR**, but there are notable variations across the different types of sustainable debt securities
- **Green and sustainability bonds** show **higher shares of EUR-denominated issuances**, with 92.7% and 87.2% respectively, comparable to 90% for all euro area debt securities
- **Sustainability-linked and social bonds** have significantly **higher proportions of non-EUR denominated** issuances, with EUR-denominated issuances accounting for only 79.5% and 76.3% respectively



Carbon emissions indicators

Methodological enhancements and results

Carbon emissions indicators

Financed emissions (FE)

- Assess the **amount of emissions** attributable to financial institutions via their financial portfolios
- It is an **absolute** measure in tonnes of CO2 equivalent

Carbon intensity (CI)

- Assess the **intensity of the financial portfolio** in terms of financed emissions over financed revenues
- It is a **relative** measure in tonnes of CO2 equivalent per million euro of revenues

Weighted average carbon intensity (WACI)

- Measures the average carbon emissions intensity of a portfolio by calculating the ratio of **emissions to revenues** for each individual position, weighted by **the position's proportion of the total portfolio value**
- It is a **relative** measure in tonnes of CO2 equivalent per million euro of **revenues**

Carbon footprint (CFP)

- Measures the average carbon emissions intensity of a portfolio by calculating the ratio of **emissions to company value** for each individual position, weighted by **the position's proportion of the total portfolio value**
- It is a **relative** measure in tonnes of CO2 equivalent per million euro of **company value**

Methodological enhancements

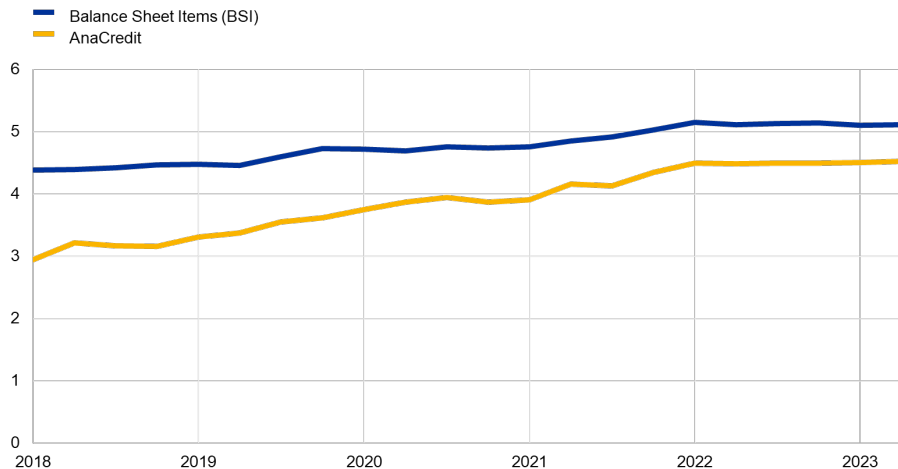
Key improvements in 2025

- **Nowcasting of 2024 data** for securities (for bank loans work in progress): addressing user requests for improved timeliness with respect to the current year (now T-1 vs T-3 previously)
- **Extended time series decomposition** analysis to better isolate drivers of changes in the decarbonisation efforts, such as greening of firms and changes in portfolio positions
- **Improved coverage for loans portfolio** – using BSI data to gross up AnaCredit information
- **Inclusion of S127** (captive financial institutions and money lenders) **amongst debtors and issuers** – highly relevant in some countries (such as NL)
- **Overall higher quality** thanks to more robust validation processes
- **Addition of Croatia**, time series from EA19 (2018-2022) to EA20 (2023-2024)

Example: using Balance Sheet Items (BSI) statistics to gross up AnaCredit information

Loans to the non-financial corporation sector - comparison of AnaCredit and BSI statistics

(Trillions EUR)



Sources: European System of Central Banks (ESCB) calculations based on data from Analytical credit dataset (AnaCredit) and Balance Sheet (BSI) statistics.

Notes: Balance Sheet Items (BSI) statistics and AnaCredit outstanding nominal amounts of euro area banks towards euro area non-financial corporations. For comparison purposes, AnaCredit information is adjusted to align as closely as possible with the BSI statistics, e.g., fiduciary and derecognised loans are excluded.

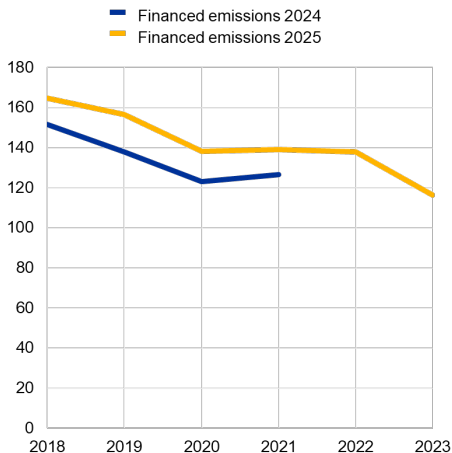
- The aim of our indicators is to capture the exposure in the **economy as accurately as possible**
- AnaCredit is the basis of our loans-based indicators, as it provides **loan by loan information**
- Because of its particular scope (e.g. excluding debtors with loans below EUR 25,000) and undercoverage especially in earlier years, using only AnaCredit would lead to underestimation of loan amounts
- To address this issues aggregated **Balance Sheet Items (BSI) statistics** is used to gross up the loans to non-financial corporations granted by the euro area creditors

Impact of grossing up and adjustment for inflation: loan-based indicators

Carbon emissions indicators on loans portfolios of euro area banks, single entity level, scope 1 emissions

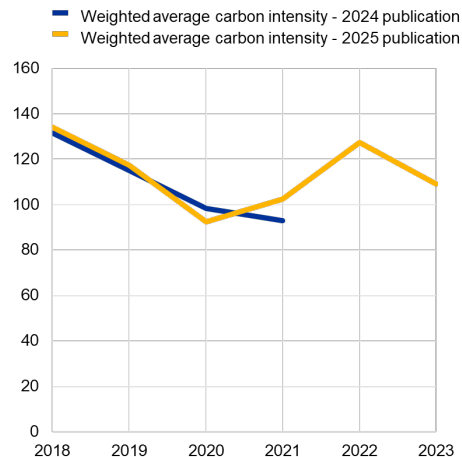
a) Financed emissions

(million tonnes of Scope 1 CO₂ emissions eq)



b) Weighted average carbon intensity

(million tonnes of Scope 1 CO₂ emissions eq)



Financed emissions:
tonnes of GHG emissions
financed by euro area
financial institutions

**Weighted average
carbon intensity:**
tonnes of GHG emissions
per million EUR of revenue
→ proxy for the exposure
of a creditor to climate
transition risks

Sources: ESCB calculations based on data from AnaCredit, RIAD, CSDB, SHSS, Institutional Shareholder Services (ISS), EU ETS, Eurostat Air Emissions Accounts (AEA).

Notes: WACI is adjusted for inflation and exchange rate.

- **Downward trend** over the period could be attributed to diverse impacts of **COVID-19 pandemic** on global economy and/or be driven by other economic factors or a broader time trend
- **New weighted average carbon intensity (WACI) adjusted for inflation** shows increase in the 2020-22 period, stemming from relatively high portfolio exposure to Germany's energy sector, which saw significant price surges, peaking in 2022

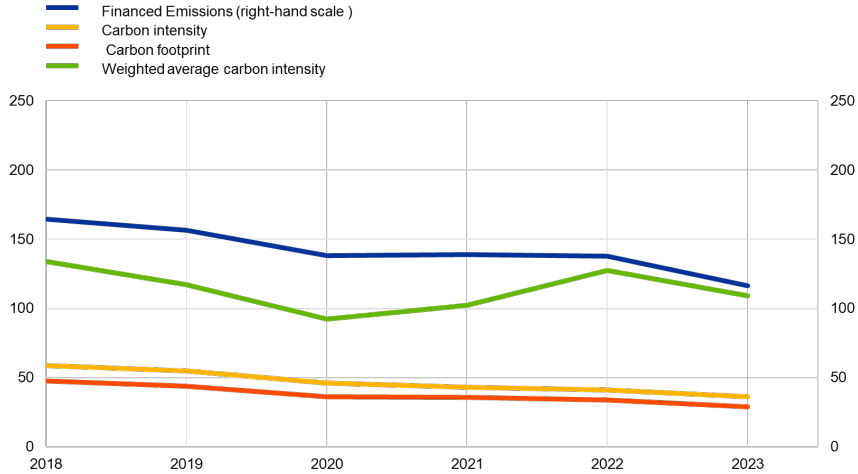
Results



Evolution of the carbon footprint indicators

Carbon emissions indicators on loans portfolios of euro area banks, single entity level.

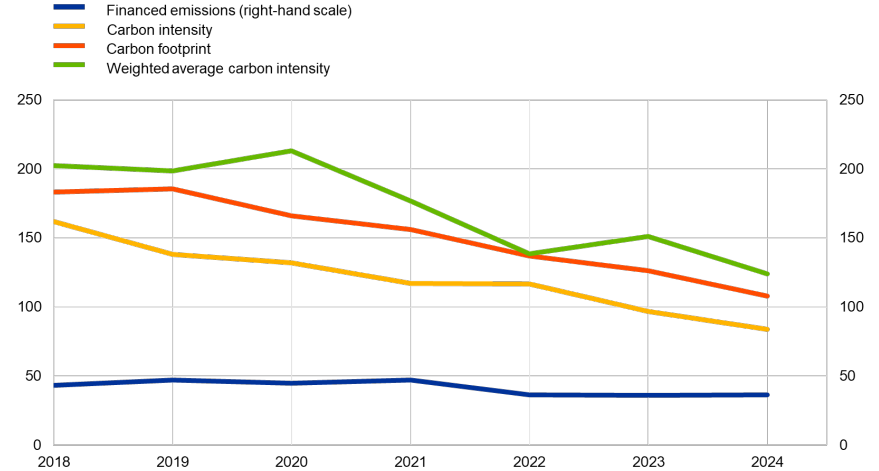
(left-hand scale: tonnes of Scope 1 CO2 emissions eq per million EUR of revenue; right-hand scale: million tonnes of Scope 1 CO2 emissions eq)



Sources: European System of Central Banks (ESCB) calculations based on data from [Analytical credit dataset \(AnaCredit\)](#), [Register of Institutions and Affiliates Data \(RIAD\)](#). WACI is adjusted for inflation and exchange rate.

Carbon emissions indicators on securities portfolios of euro area deposit-taking corporations, corporate group level.

(left-hand scale: tonnes of Scope 1 CO2 emissions eq per million EUR of revenue; right-hand scale: million tonnes of Scope 1 CO2 emissions eq)



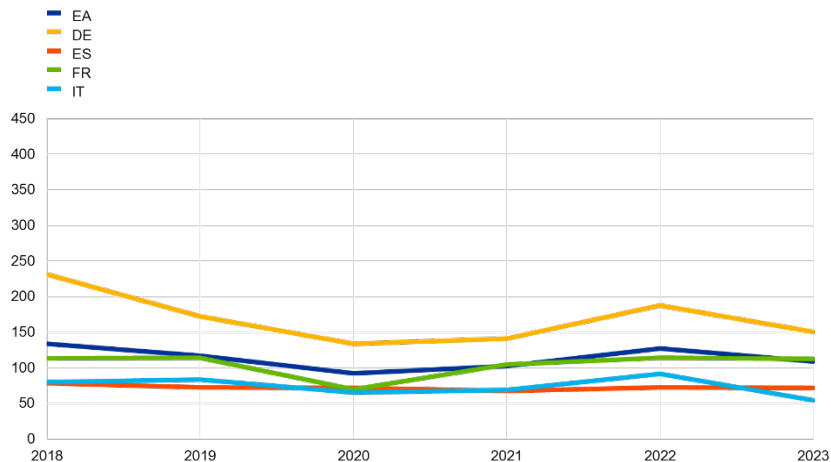
Sources: ESCB calculations based on data from from Register of Institutions and Affiliates Data (RIAD), CSDB, SHSS, Institutional Shareholder Services (ISS), EU ETS, Eurostat Air Emissions Accounts (AEA). WACI is adjusted for inflation and exchange rate.

- Overall decreasing trend of climate exposure and risk in euro area financial institutions portfolios
- The weighted average carbon intensity (WACI) reveals that the securities portfolio is more carbon intensive than the loans portfolio

Weighted average carbon intensity indicator on loans and securities portfolios

Weighted average carbon intensity, on loans portfolios of euro area banks, single entity level, country breakdown.

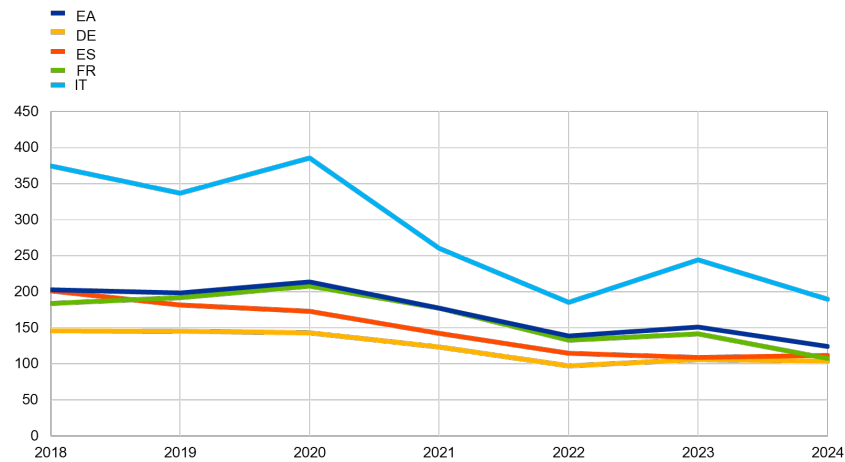
(tonnes of Scope 1 CO2 emissions eq per million EUR of revenue)



Sources: European System of Central Banks (ESCB) calculations based on data from [Analytical credit dataset \(AnaCredit\)](#), [Register of Institutions and Affiliates Data \(RIAD\)](#). WACI is adjusted for inflation and exchange rate.

Weighted average carbon intensity, on securities portfolios of euro area deposit-taking corporations, corporate group level, country breakdown.

(tonnes of Scope 1 CO2 emissions eq per million EUR of revenue)

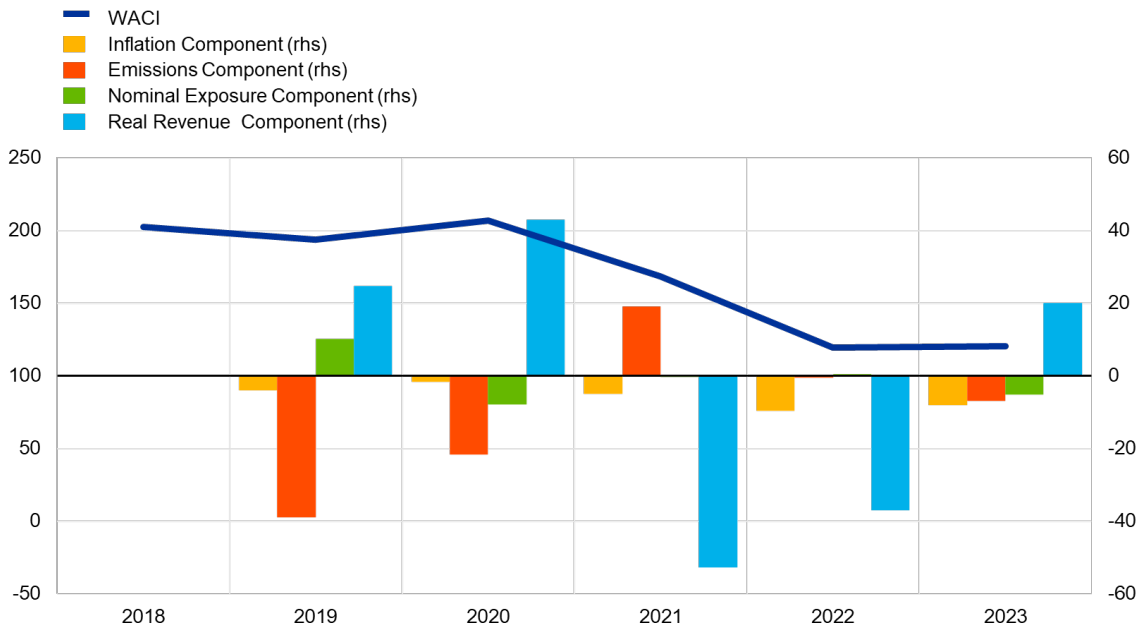


Sources: ESCB calculations based on data from from Register of Institutions and Affiliates Data (RIAD), CSDB, SHSS, Institutional Shareholder Services (ISS), EU ETS, Eurostat Air Emissions Accounts (AEA). WACI is adjusted for inflation and exchange rate.

- Looking at the weighted average carbon intensity (WACI) for the euro area and the four biggest countries shows that the countries driving carbon intensity differ markedly between loan and securities portfolios
- Germany has a more carbon-intensive loan portfolio, while Italy has a more carbon-intensive securities portfolio – relatively more exposures are related to energy sector loans (DE) and energy sector securities (IT)

Breakdown of annual changes in the WACI allows users to identify the key drivers of changes

Breakdown of annual changes in weighted average carbon intensity of securities portfolios of euro area deposit-taking corporations, corporate group level



- The decomposition is available for all four indicators
- **Decrease in emissions and revenue from 2019 to 2020** could be due to disruptions of the economy from pandemic-related restrictions
- **Emissions and revenue increase from 2020 to 2021** could be due to economic recovery following pandemic-related restrictions
- **Inflation** plays a role in driving down WACI, ignoring inflation would lead to underestimation of carbon intensity metrics

Sources: ESCB calculations based on data from AnaCredit, RIAD, CSDB, SHSS, Institutional Shareholder Services (ISS), EU ETS, Eurostat Air Emissions Accounts (AEA).

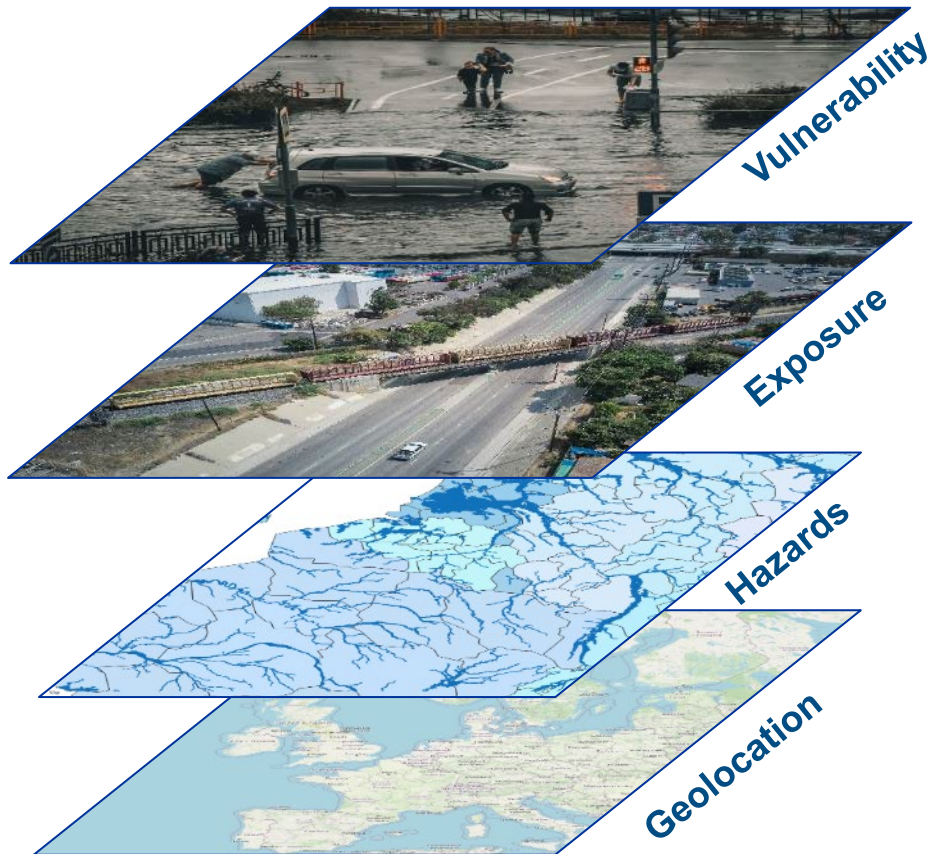
Notes: Securities include listed shares and debt securities of deposit taking cooperations (S122) and are computed at group level. Loans are computed at single entity level. The charts comprise only Scope 1 emissions. A reduction in revenue from one year to the next corresponds to a positive revenue component in the WACI breakdown and vice versa. In other words, when revenue decreases, carbon intensity increases.



Physical risk indicators

Methodological enhancements and results

Physical risk analysis – analytical layers



Degree of damage expected at different intensities of a hazard, including mitigation approaches



Total value of assets exposed to hazards



Hazard data in geospatial format, e.g. flooding



Geo-coordinates of companies
(debtors and issuers)



Loans (AnaCredit)



Securities (SHS)

Physical risk indicators – scores and expected loss-based indicators

Physical risk scores (RS)

- Value and percentage of portfolio associated with debtors located in areas of varying physical risk, on a scale from 0 (no risk) to 3 (high risk)
- Risk scores provide valuable insights for assessing relative risk levels across countries, climate scenarios and variations within the same hazard type

Potential exposure at risk (PEAR)

- Sum of positive risk scores (categories 1-low to 3-high risk), reveals financial exposure to debtors in at-risk areas regardless of hazard's intensity or frequency
- A measure of the prevalence of a natural phenomenon, encompassing all exposures without considering the vulnerability of affected debtors should an event occur

Normalised exposure at risk (NEAR)

- Estimates the expected loss in bank portfolio, attributed to the inability of debtors to fulfil their repayment obligations in the aftermath of a natural disaster
- It is assumed that the company's debt to financial institutions will be impaired in proportion to the expected loss to debtor's physical assets relative to its total assets

Collateral-adjusted exposure at risk (CEAR)

- Based on NEAR but in addition takes into account financial and physical collateral pledged with loan commitment
- Financial protection is included in full amount – however, physical collateral might also decrease in value due to consequences of natural disaster – and this is reflected in the indicator

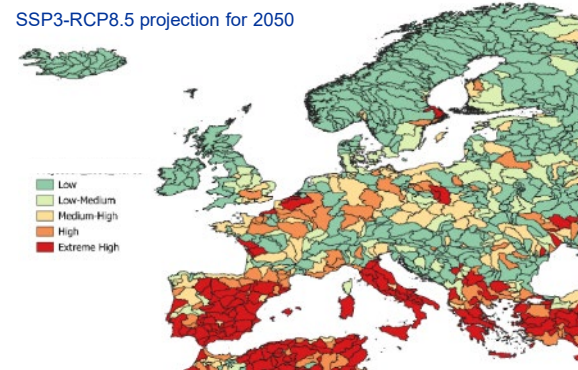
Methodological enhancements

Methodological enhancements and their impact

Dimension	Area of enhancements	Effect
Physical hazards – data updates and modelling	Water stress: Aqueduct 4.0 (vs Aqueduct 3.0) from World Resource Institute (WRI): more recent baseline (1979-2019 vs 1950-2010); higher spatial resolution; upgrade of hydrological model and climate scenarios	↑
	Windstorms: higher spatial resolution; methodological enhancements; shift to a longer continuous dataset extending coverage from just the winter season to year-round	↑

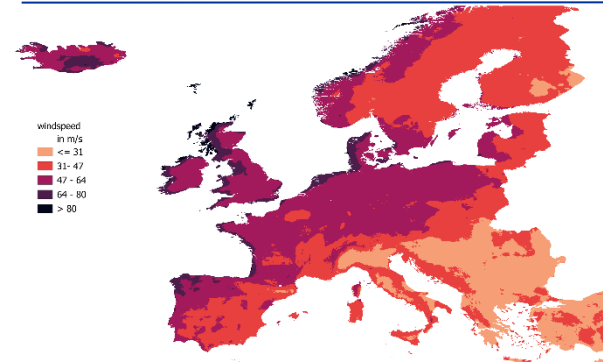
Water stress (ratio of water demand to water supply)

SSP3-RCP8.5 projection for 2050



Source: World Resource Institute (WRI), Aqueduct 4.0.

Windstorms (wind speed, m/s, 100-year return period)

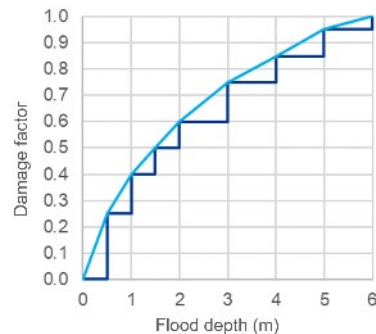


Source: Copernicus EWS, ESCB calculations.

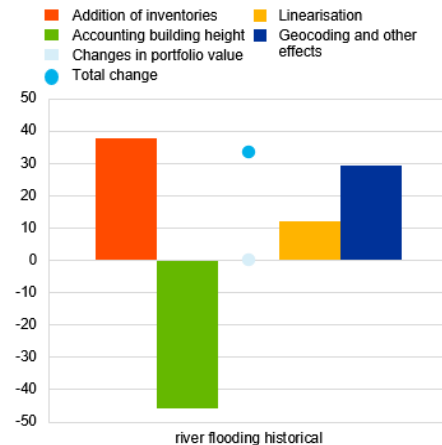
Methodological enhancements and their impact

Dimension	Area of enhancements	Effect
More precise location of debtors and real estate collateral	Geocoding enhancements in close cooperation with NCBs – coordinates at precise address increased from 10% to 55%	~
	Better accuracy of hazard estimates for collateral at entire region (vs area affected) thanks to new method for geospatial computation	↓
Estimation of potential damages	Incorporation of higher quality data on physical assets from national registers and inclusion of inventories (in addition to tangible fixed assets)	↑
	Accounting for building height (for floods)	↓
	Linearisation to better capture especially lower level of damages	↑

Illustration of linear interpolation for flood damage function



Impact of methodological enhancements on annual expected losses (%) – river flooding historical baseline



Source: ESCB own calculations based on AnaCredit, Orbis and national business register data; river flooding data from the Delft University of Technology (TUD) and Joint Research Centre (JRC); building height data from Global Human Settlement Layer (GHSL).

Notes: Impact of 'Geocoding and other effects' is deducted from overall change subtracting impact of all other enhancements.

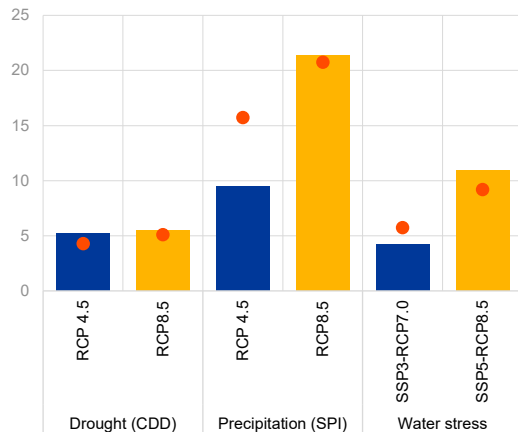
Results

Changes in high-risk category physical under different climate scenarios

Temperature and precipitation-related hazards

y-axis: percentage points difference between share of portfolio in high-risk category

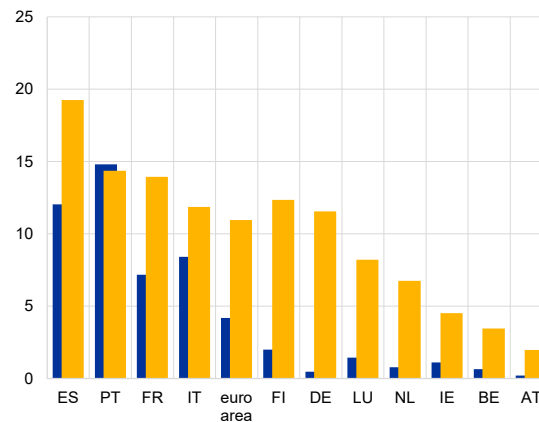
■ end-century change - moderate scenario ● mid-century change
 ■ end-century change - adverse scenario



Water stress by countries; end-century

y-axis: percentage points difference between share of portfolio in high-risk category

■ SSP3-RCP7.0 scenario
 ■ SSP5-RCP8.5 scenario



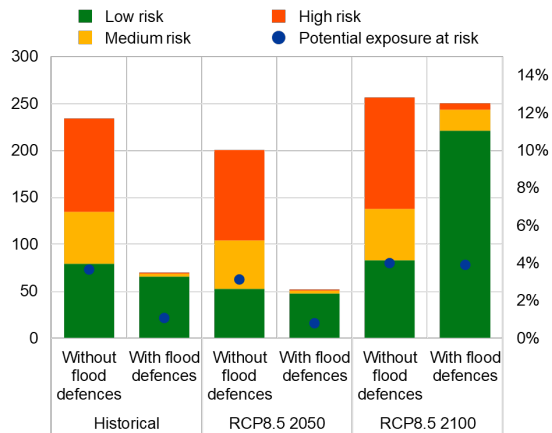
Sources: European System of Central Banks (ESCB) calculations based on data from [Analytical credit dataset \(AnaCredit\)](#), [Register of Institutions and Affiliates Data \(RIAD\)](#), [Securities Holdings Statistics by Sector \(SHSS\)](#), [Intergovernmental Panel on Climate Change Interactive Atlas](#) and [World Resource Institute](#), December 2024 reference period. Notes: Values show the percentage points changes in exposures categorised in the highest risk category (Score 3) compared with the historical baseline for each hazard.. Portfolio exposures cover loans, debt securities and equity portfolios of euro area financial institutions vis-à-vis non-financial corporations.

- The physical risk indicators highlight the growing significance of temperature and precipitation related risks. Consecutive dry days and water stress highlight water scarcity, while standardised precipitation index (SPI) reflects elevated risks of extreme precipitation patterns, including both extreme dry and extreme wet conditions
- Examining water stress, the physical risk indicators reveal substantial differences in exposure to water stress across the euro area with southern European countries the most affected

Effect of adaptation strategies for flooding

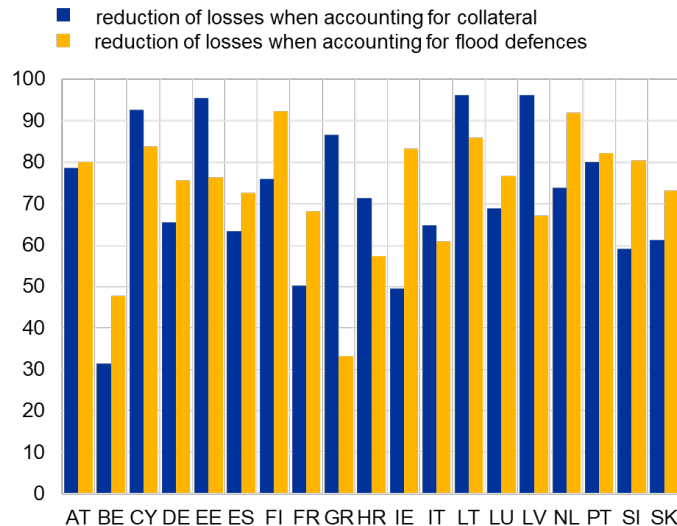
Physical risk scores – coastal flooding

(left-hand scale: EUR billions; right-hand scale: percentage of portfolio)



Expected loss indicators - river flooding, RCP8.5 scenario for 2100

(percentage change)



Sources: ESCB calculations based on data from [Analytical credit dataset \(AnaCredit\)](#), [Register of Institutions and Affiliates Data \(RIAD\)](#), [Securities Holdings Statistics by Sector \(SHSS\)](#), [Delft University of Technology, Joint Research Centre \(JRC\)](#), [Orbis](#), and national business register data. December 2024 reference period. Notes: Panel a) Portfolio exposures cover loans, debt securities and equity portfolios of euro area financial institutions vis-à-vis nonfinancial corporations. Financial institutions include deposit-taking corporations except central banks (S122), non-money market fund investment funds (S124), insurance corporations (S128) and pension funds (S129). Panel b): The data refer to the loan portfolios of euro area financial institutions.

- Risk scores illustrate how flood defences reduce exposures from medium and high risk to low risk across different time horizons and climate scenarios in the euro area
- Both flood defences and collateral are crucial in reducing losses – however, practices vary widely across countries



Publication material and future work

ESCB climate change-related statistical indicators: latest publication

- [Climate change-related indicators](#) website
- [Statistical Paper](#) (April 2024)
- [Technical annex](#) (November 2025)
- [Press release](#) (November 2025)
- [Blog Enhancing climate analysis: new insights through data](#) (January 2026)
- Outreach seminar (January 2026)



Sustainable finance indicators

- Webpage: [Sustainable finance](#)
- [ECB Data Portal for securities issues](#)
- [ECB Data Portal for securities holdings](#)



Carbon emission indicators

- Webpage: [Carbon emission](#)
- [Aggregated data](#) – carbon emission



Physical risk indicators

- Webpage: [Physical risk indicators](#)
- [Aggregated data](#) – physical risk

Climate indicators in the NCBs publications

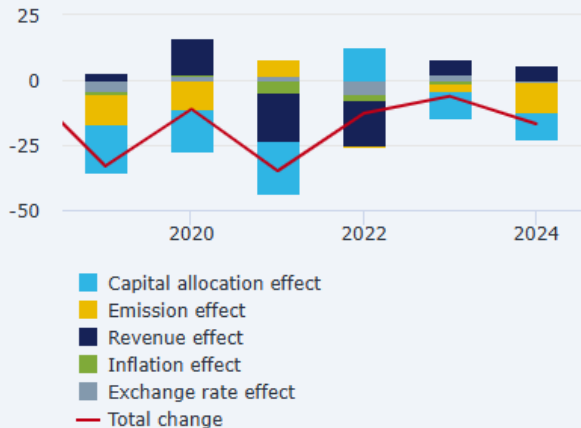
DeNederlandscheBank

EUROSYSTEMEEM

Climate risks for the financial sector

WACI decomposition for investment funds

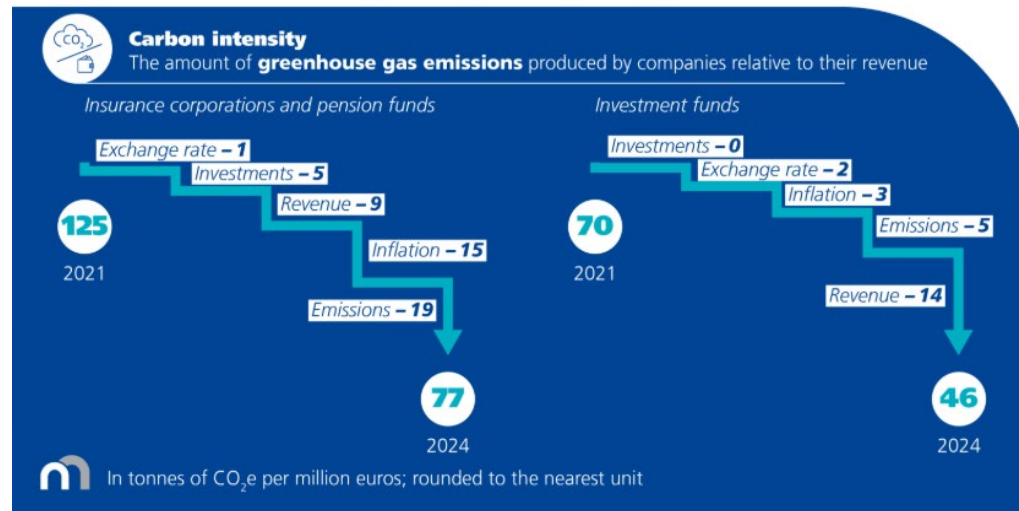
In tonnes of CO₂ per EUR million



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Driving change through data: climate risks in the crosshairs of investors

Decline in the carbon intensity of Belgian investment portfolios



NationalBank
OF BELGIUM

Eurosystem

Climate indicators in the NCBs publications

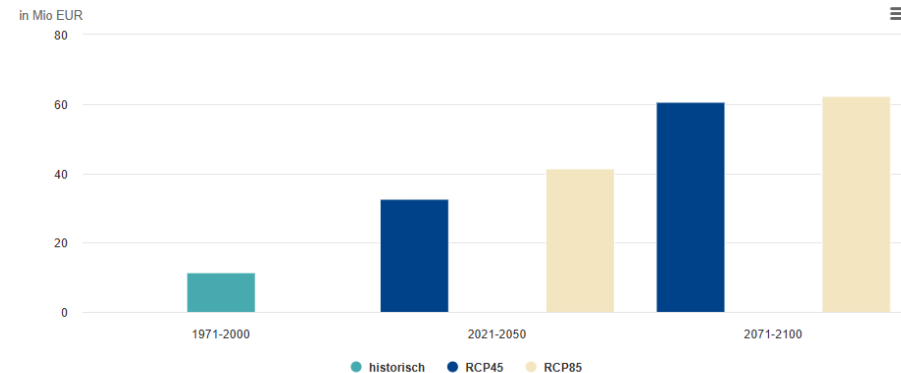
BANCO DE **ESPAÑA**
Eurosistema

Climate change-related indicators



Die klimabezogenen Indikatoren der EZB

Erwartete jährliche Verluste von Banken durch Flussüberschwemmungen



Quelle: EZB

Statistical climate indicators – future work



1. Sustainable finance – aggregates on green listed shares and further breakdowns for sustainable debt securities, e.g., by standards

2. Transition risk – refining the methodology; extending the indicators to indirect emissions and forward-looking metrics

3. Physical risk – further work on hazards, damage estimations and location data for firms' key assets

4. Gather feedback from the users – to incorporate into regular indicators or bespoke research



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Discussion

