Climate Dashboard

Compiled by the National Bank of Belgium Climate Hub

Spring 2024

Banque Nationale Bank
DE BELGIQUE VAN BELGIË
Eurosystem

What is the Climate Dashboard?

Process

- The dashboard was created by the Bank's Climate Hub, the group within the NBB responsible for coordinating activities related to climate change and sustainable finance.

- The Climate Hub facilitates cooperation and the exchange of information between departments in these areas.

- The purpose of the Climate Dashboard is to provide the broader public with more information on the consequences of climate change and the transition to net zero emissions for the economy and the financial system.

Main messages

- By means of this initiative, the National Bank underscores its focus on climate change and the resulting challenges. It should be noted that the NBB also analyses climate-related risks in the financial sector and monitors the management thereof.

- Its four key messages are:

1. **Global greenhouse gas emissions are still rising, making it unlikely for the world to limit warming to 1.5°C.**

2. **A carbon price is crucial to change relative prices.**

3. **The macroeconomic cost of the transition toward climate neutrality is manageable**.

4. **Energy inefficiency of real estate is most important source of transition risk for Belgian financial sector**.

Overview

Greenhouse gas emissions trends

1. Global economy
2. Belgian economy
3. Energy efficiency of Belgian housing stock

Wider climate policy context

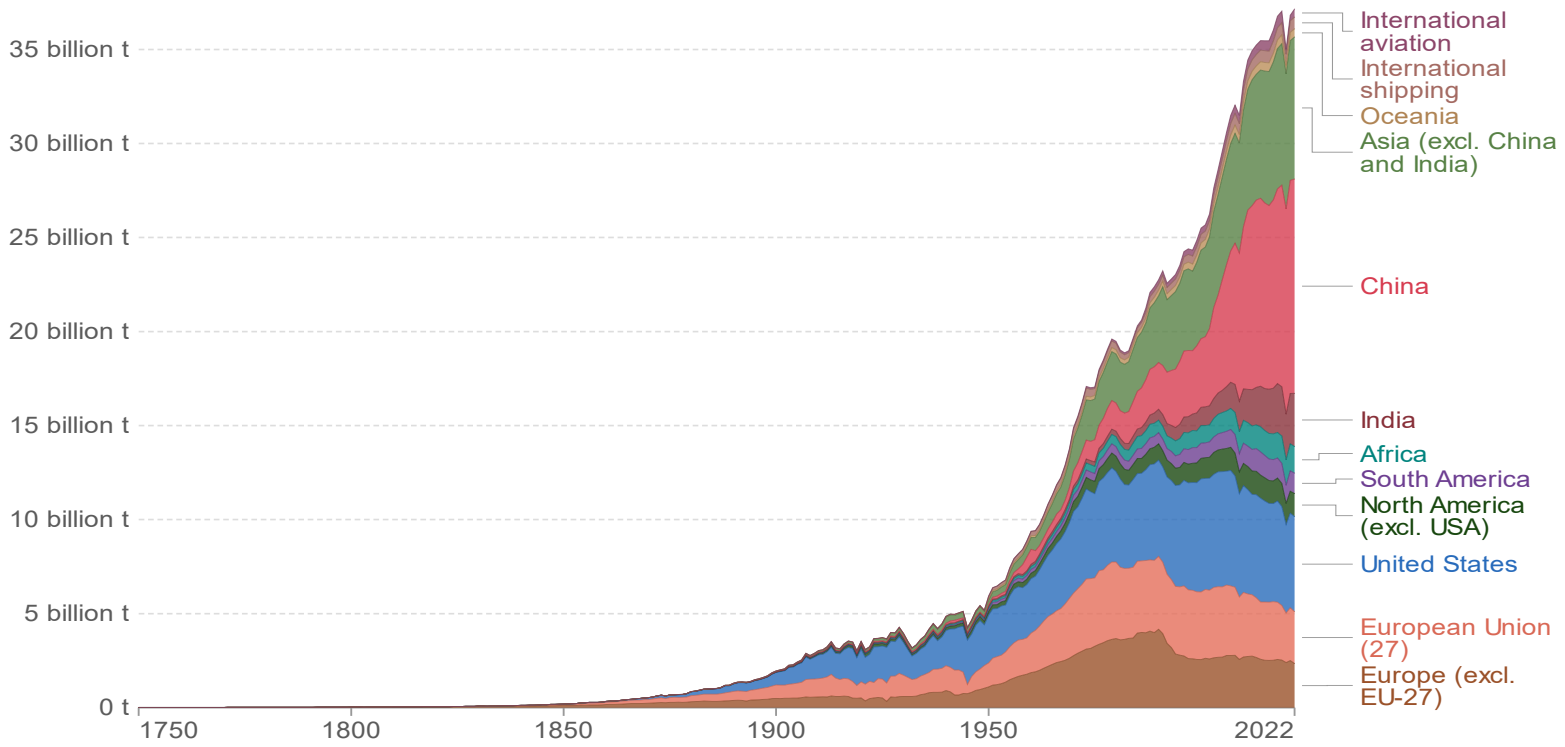
4. Current energy context
5. Competitiveness of renewables
6. Carbon pricing and climate policy instruments

Financial sector analysis

7. Sustainable finance market
8. Physical risk in the Belgian financial sector
9. Transition risk in the Belgian financial sector

1. Greenhouse gas emissions trends: Global economy

Global greenhouse gas emissions are still rising, making it unlikely for the world to limit warming to 1.5°C: less than ten years at current emissions consume the remaining 1.5°C carbon budget.



Source: Adapted from Our World in Data based on Global Carbon Budget (2023). 1 billion t = 1 Gt.

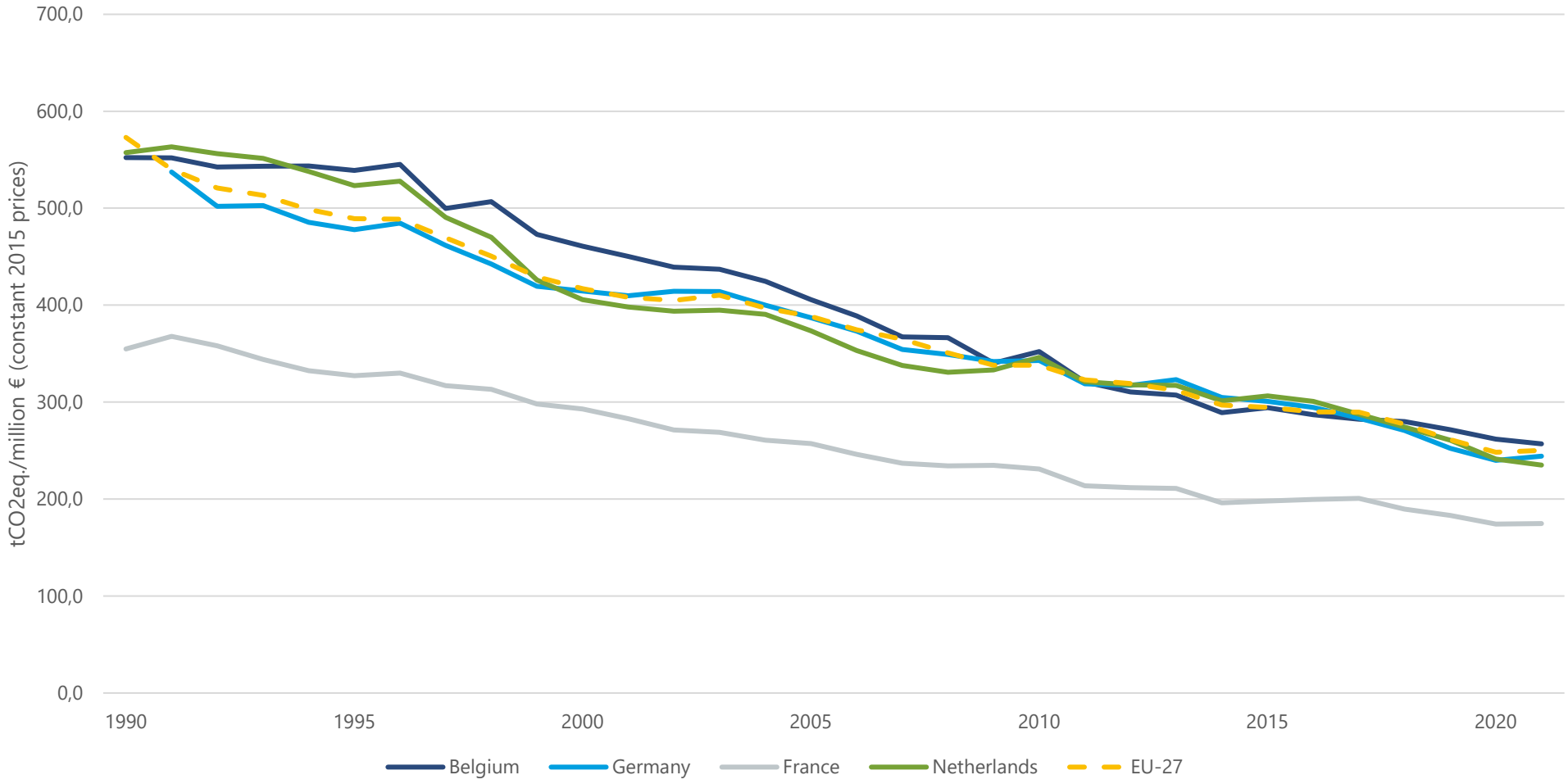
Remaining carbon budget

- = "the maximum amount of cumulative net global anthropogenic carbon dioxide (CO_2) emissions that would result in limiting global warming to a given level with a given probability[...]"
- For a 50% likelihood of limiting global warming to
  - 1.5°C: ~200 Gt CO2
  - 2.0°C: ~1150 Gt CO2
  - Changes to non-CO2 greenhouse gas emissions can add or subtract ~220 GtCO2eq

Source: Based on Lamboll et al. (2023): "Assessing the size and uncertainty of remaining carbon budgets", *Nature Cliamte Change*, **13**: 1360-1367.

2. Greenhouse gas emissions trends: Belgian economy

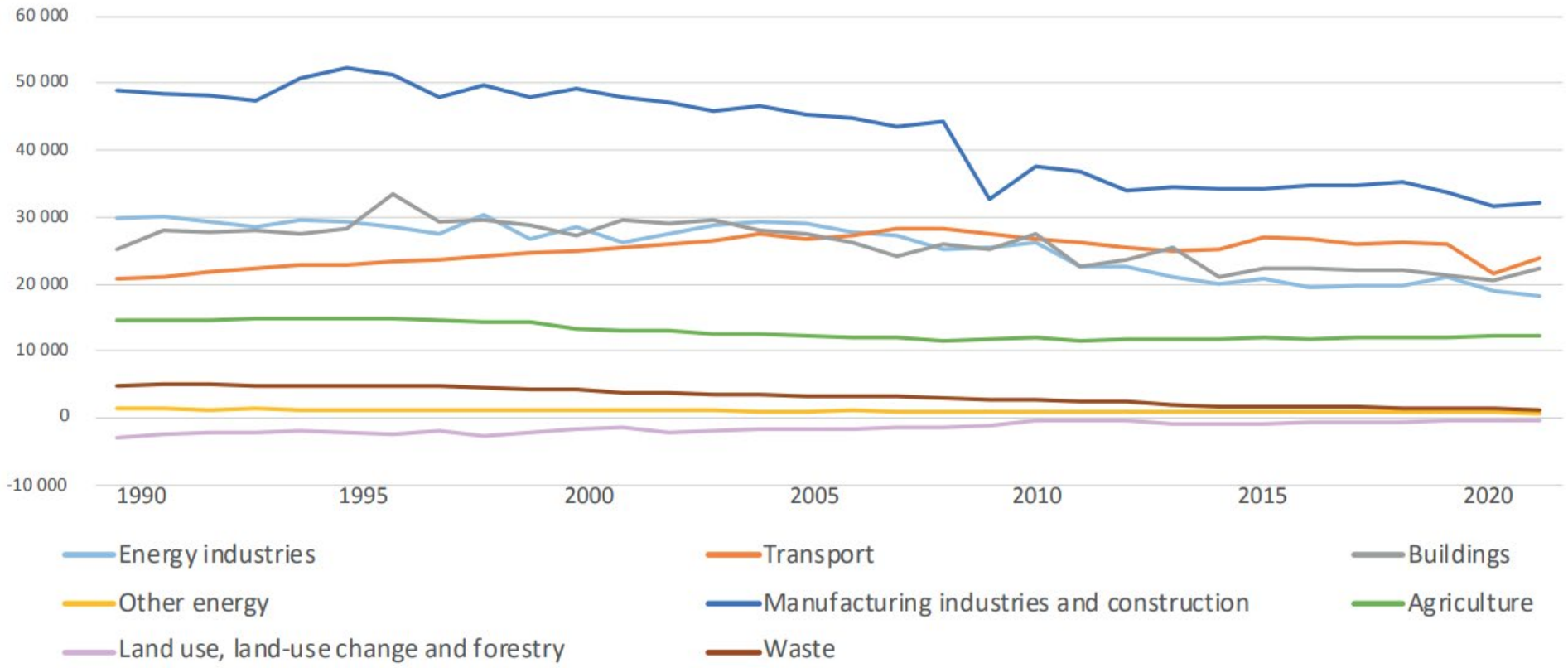
Belgium's carbon intensity is declining at a similar pace as the carbon intensity of its neighbours and the European Union more widely



Source: Adapted from Greenhouse Gas Data Viewer, European Environment Agency.

While Belgian greenhouse gas emissions have fallen in the last decades…

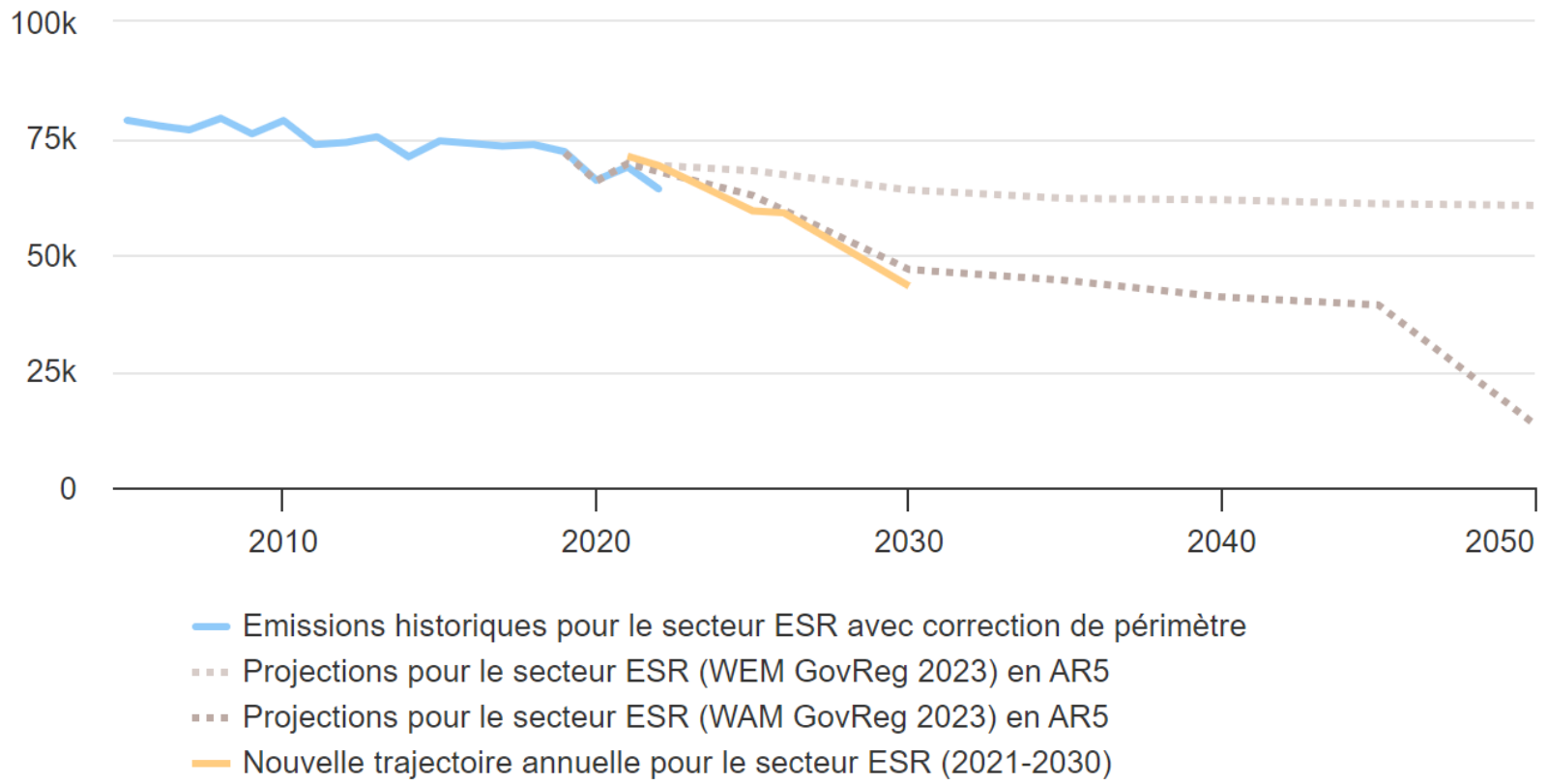
Evolution of Belgian greenhouse gas emissions by sector (kt CO2eq.)



Source: klimaat.be

…faster decarbonisation is required to reach Belgium's 2030 emissions reductions target under the EU Effort Sharing Regulation.

Evolution and projections for Belgian greenhouse gas emissions for sectors under the EU Effort Sharing Regulation (kt CO2eq.)



Source: climat.be

Attention towards climate change in Belgian news articles has increased markedly over the course of the last decade.

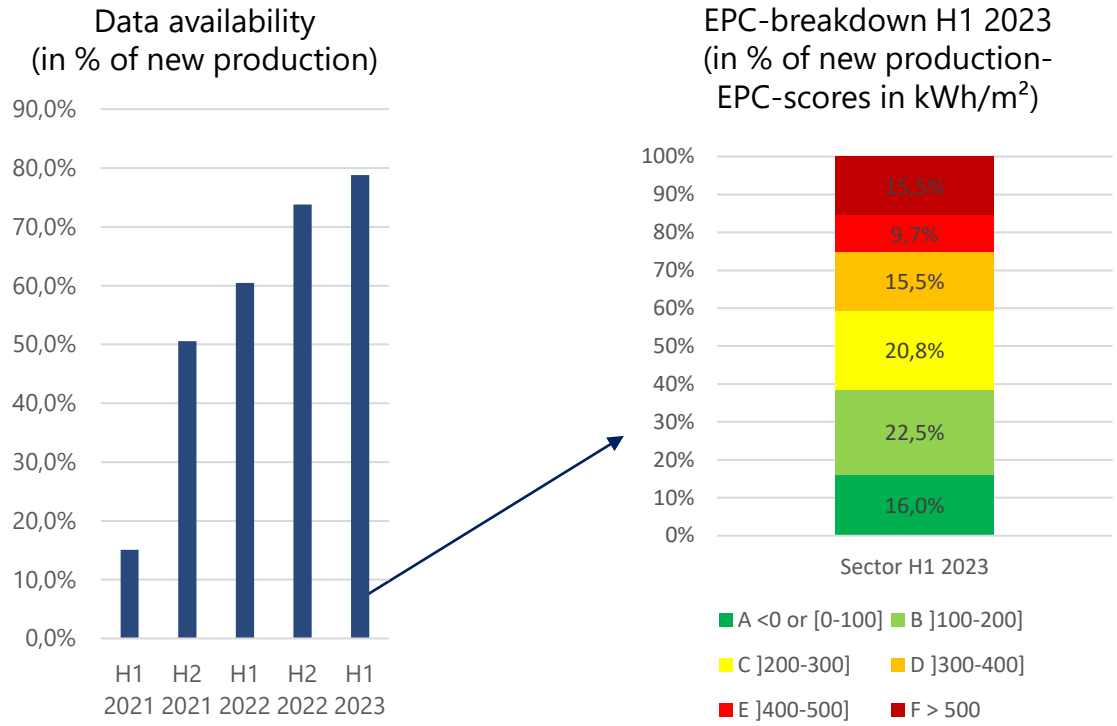
Sentometrics Climate Attention Indicator based on Belgian newspapers

Source: sentometrics.com

3. Energy efficiency of Belgian housing stock

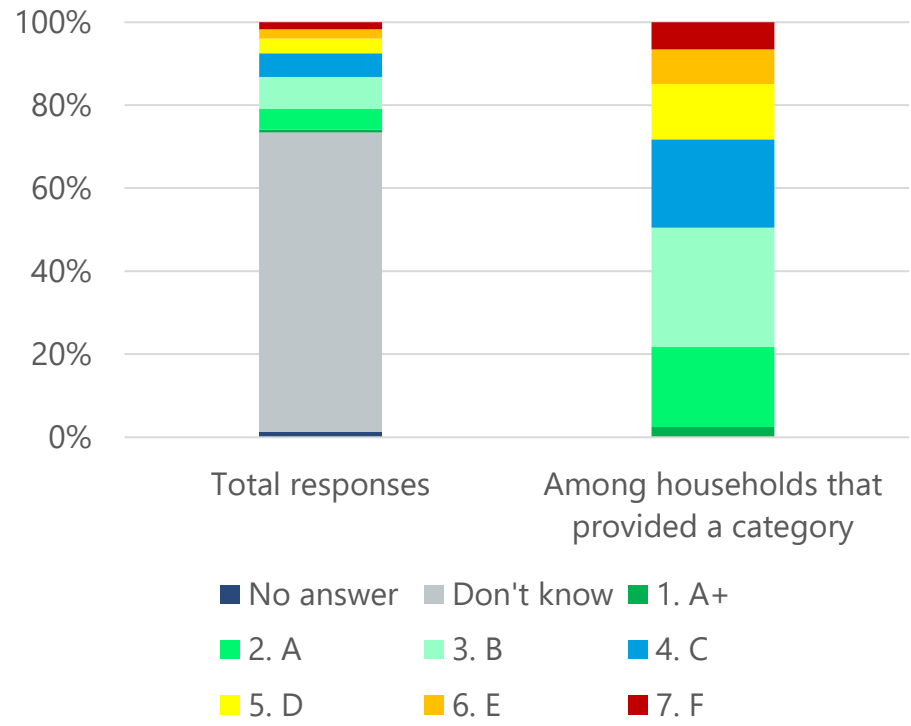
Financial institutions cannot yet fully gauge the energy performance of their real estate exposure. Most households are also unaware of the energy performance of their homes

EPC new production residential mortgage loans



NB: Banks did not need to report EPC labels for refinancings (not real new loans).
Classification according to Flanders label.

Energy performance certificate status of homes (%)

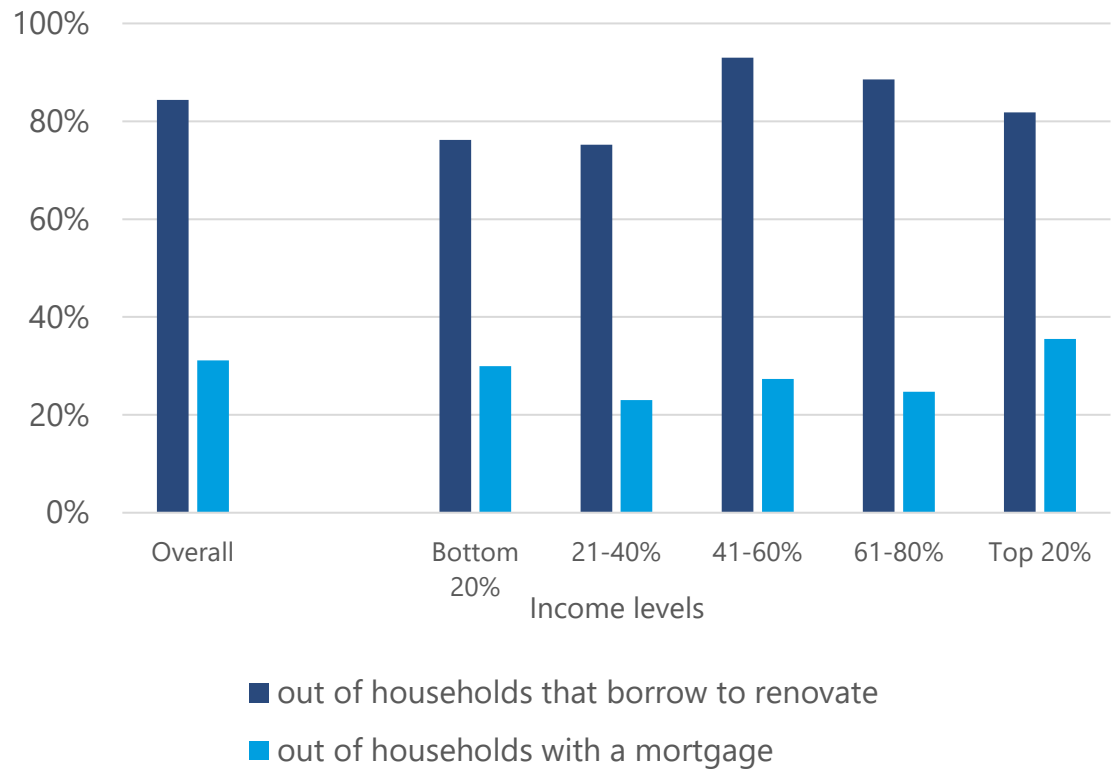


(HFCS, 4th wave , June 2020-June 2021). EPC labels refer to the Flemish standard.

Source: NBB

Only around one third of households with a mortgage on their home intended to improve its energy efficiency. This is similar across income groups.

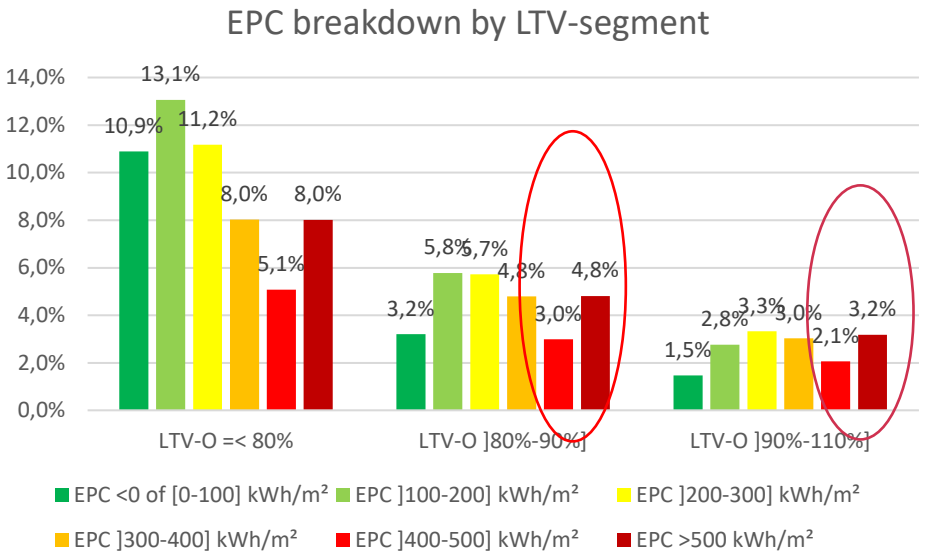
Households borrowing to improve energy efficiency (%; mortgages on the main residence)

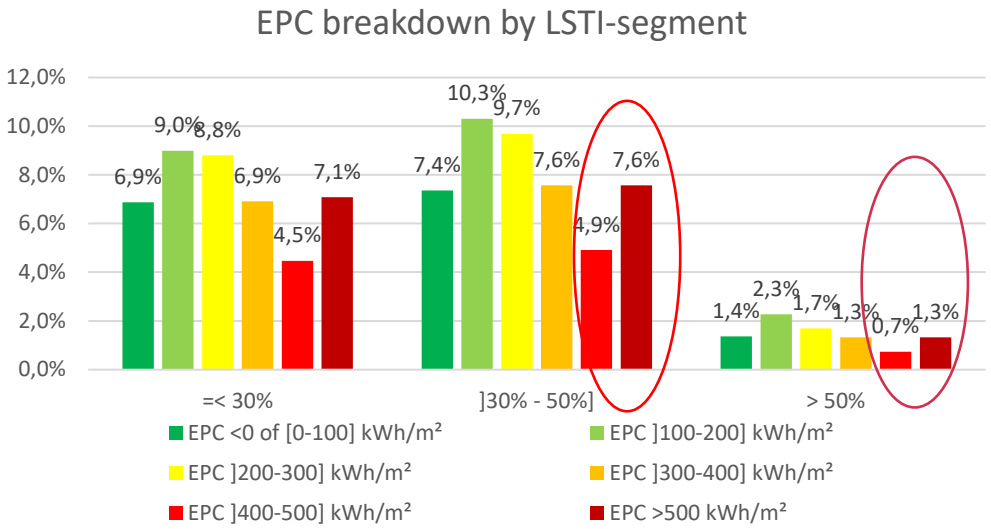


Source: NBB (HFCS, 4th wave, June 2020-June 2021)

Mortgages associated with weaker lending standards and energy inefficient dwellings are more vulnerable for increased energy prices and shocks in the housing markets

EPC new production residential mortgage loans H1 2023-BE banks
(in % of total portfolio)





A significant proportion of households with a **higher** loan compared to the value of the dwelling (Loan to value-**LTV**) tend to purchase houses with **lower energy efficiency scores**

= double vulnerability

A significant proportion of households with **higher** debt payments compared to the income (higher loan service to income-**LSTI**) tend to purchase dwellings with **lower energy efficiency scores**

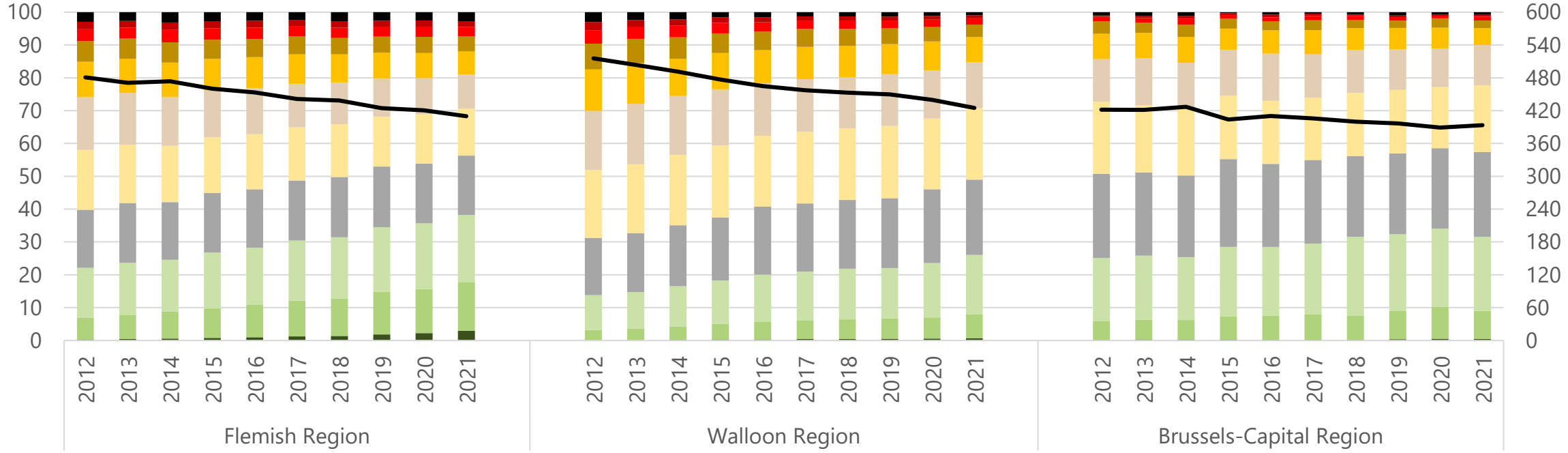
= double vulnerability

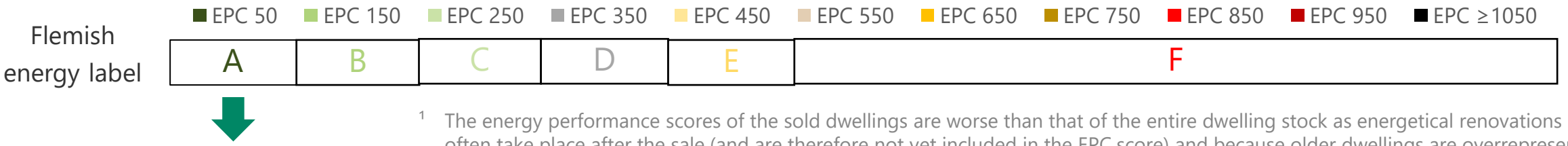
Source: NBB

Energy performance of the sold houses has improved over the past decade, but it will need to improve significantly more to reach the 2050-goal of label A

Energy efficiency EPC-score of the sold **houses**[1]

(in % of houses sold (left-hand axis); average EPC in kWh/m²y (right-hand axis))





2050 target = EPC 100

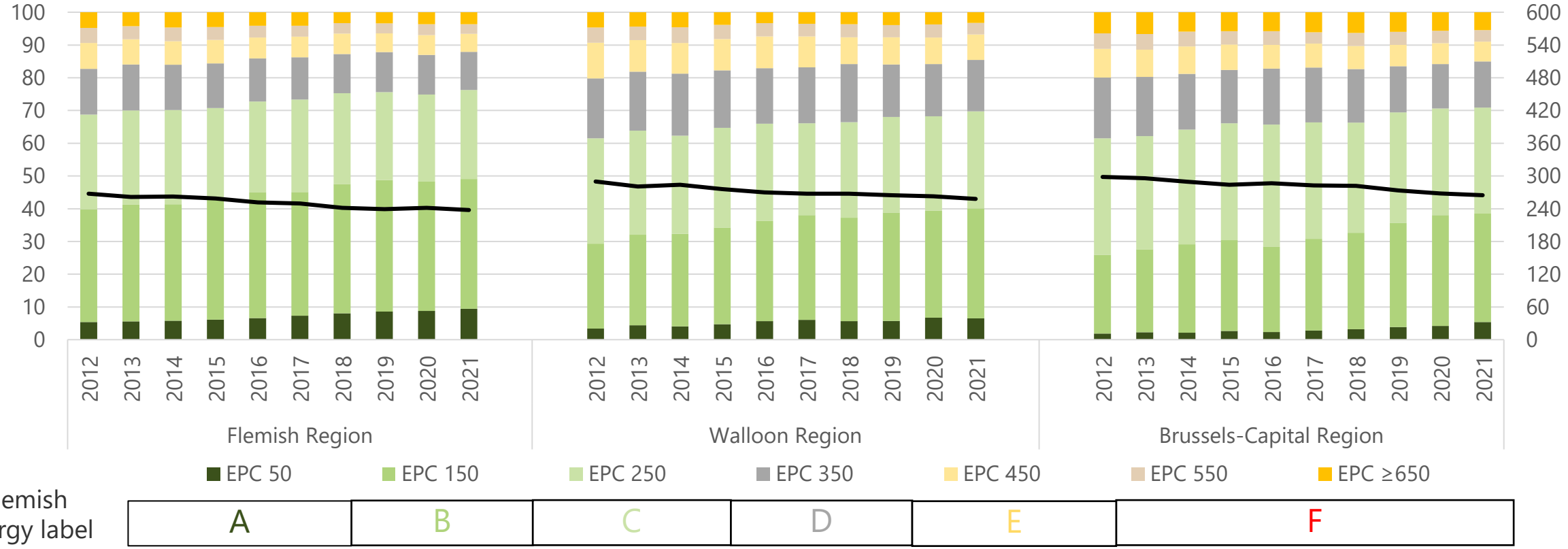
[1] The energy performance scores of the sold dwellings are worse than that of the entire dwelling stock as energetical renovations often take place after the sale (and are therefore not yet included in the EPC score) and because older dwellings are overrepresented in the transaction dataset (Vastmans, 2020).

Source: FPS Finance, VEKA, SPW Wallonie, Leefmilieu Brussel, own calculations

The average EPC of the sold apartments is better than that of houses. Energy efficiency will also need to improve markedly to reach the 2050-goal of label A

Energy efficiency EPC-score of the sold **apartments**[1]

(in % of houses sold (left-hand axis); average EPC in kWh/m² (right-hand axis))



2050 target = EPC 100

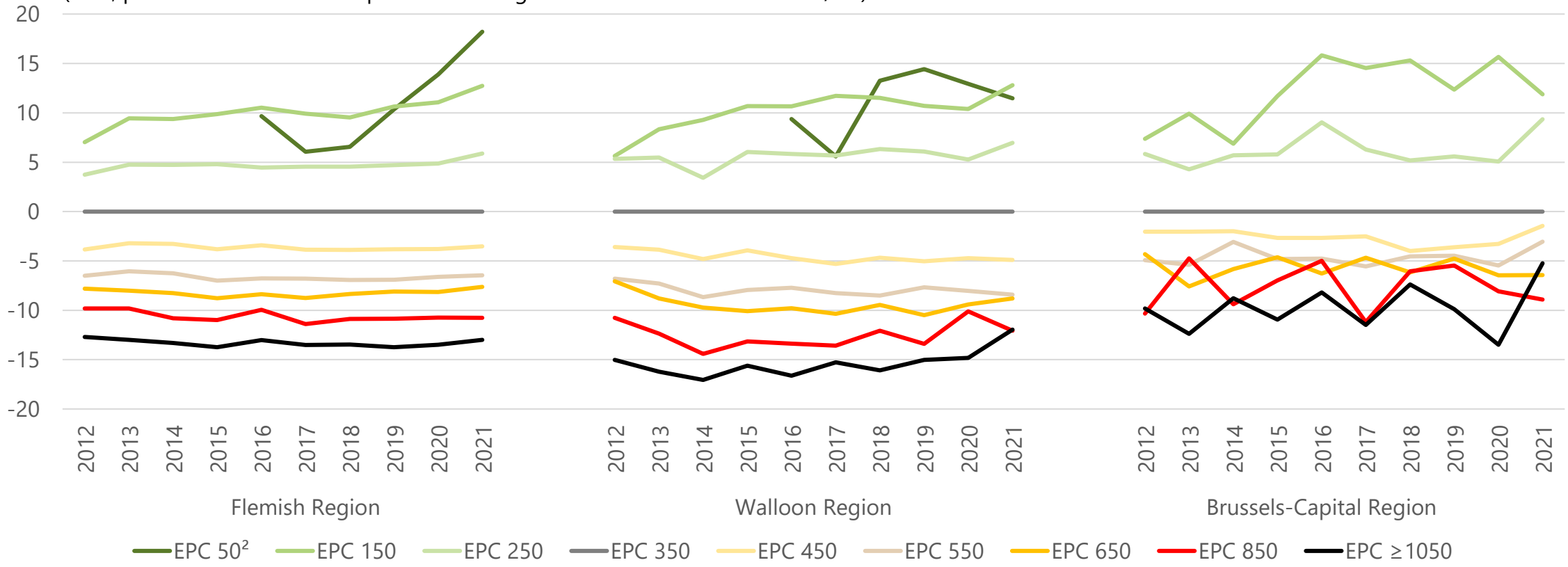
[1] The energy performance scores of the sold dwellings are worse than that of the entire dwelling stock as energetical renovations often take place after the sale (and are therefore not yet included in the EPC score) and because older dwellings are overrepresented in the transaction dataset (Vastmans, 2020).

Source: FPS Finance, VEKA, SPW Wallonie, Leefmilieu Brussel, own calculations

The price difference between energy-efficient and energy-guzzling houses had increased over the previous decade ...

Estimated energy efficiency price premium of houses[1]

(in %, price difference to a comparable dwelling with an EPC score of 350 kWh/m²)



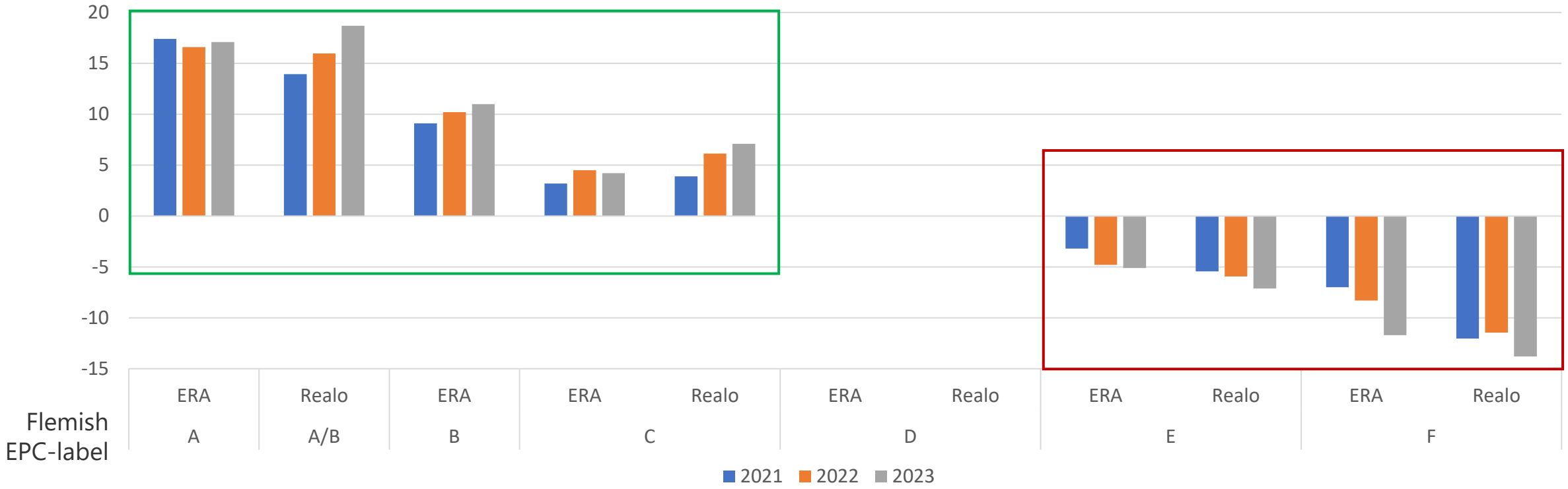
[1] The estimated price premia have been roughly corrected for the impact of unobserved quality and comfort characteristics. Interpretation requires caution.

Source: FPS Finance, VEKA, SPW Wallonie, Leefmilieu Brussel, own calculations

… and recent estimates for Flanders show a further increased price difference (due to high energy prices and renovation obligation for worst labels since 2023)

Estimated energy efficiency price premium of houses in the Flemish Region[1]

(in %, price difference to a comparable dwelling with a Flemish EPC label D)



Sources: ERA (update Professor Sven Damen January 2024), Realo, own calculations.

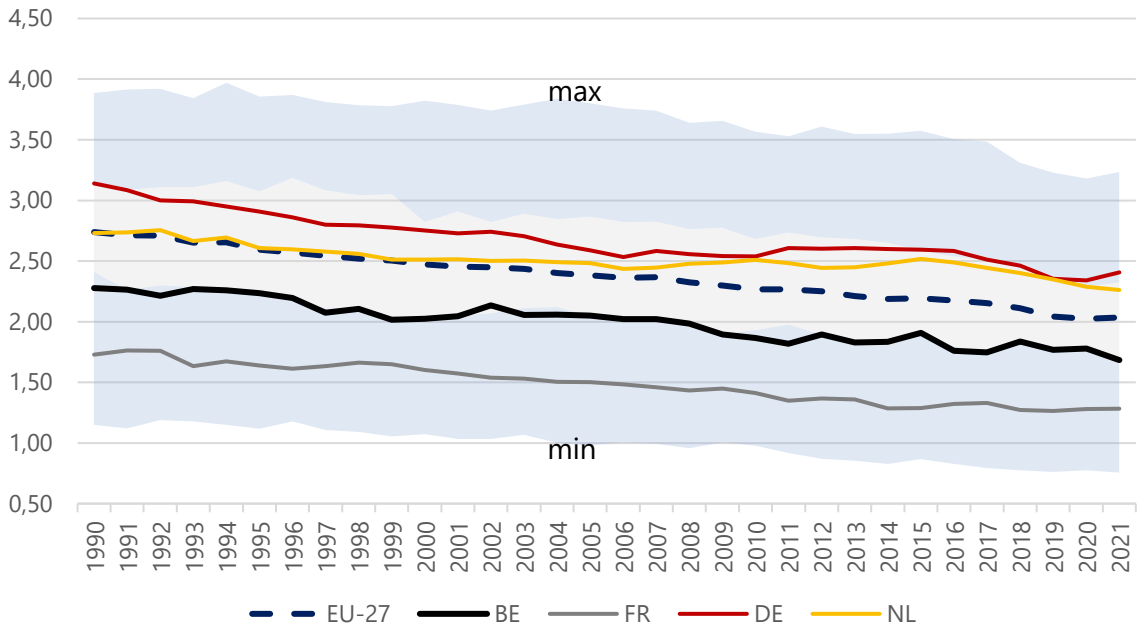
[1] These estimated price differences should be interpreted with caution. The ERA estimate is calculated on of sales prices in the compromises of the ERA broker network and Realo's estimate is calculated on the basis of asking prices from a dataset of online listings.

4. Current energy context

While the greenhouse gas intensity of Belgium's energy consumption is declining, substantial fossil-fuel based greenhouse gas emissions remain.

Greenhouse gas intensity of energy consumption in Belgium and the EU-27*

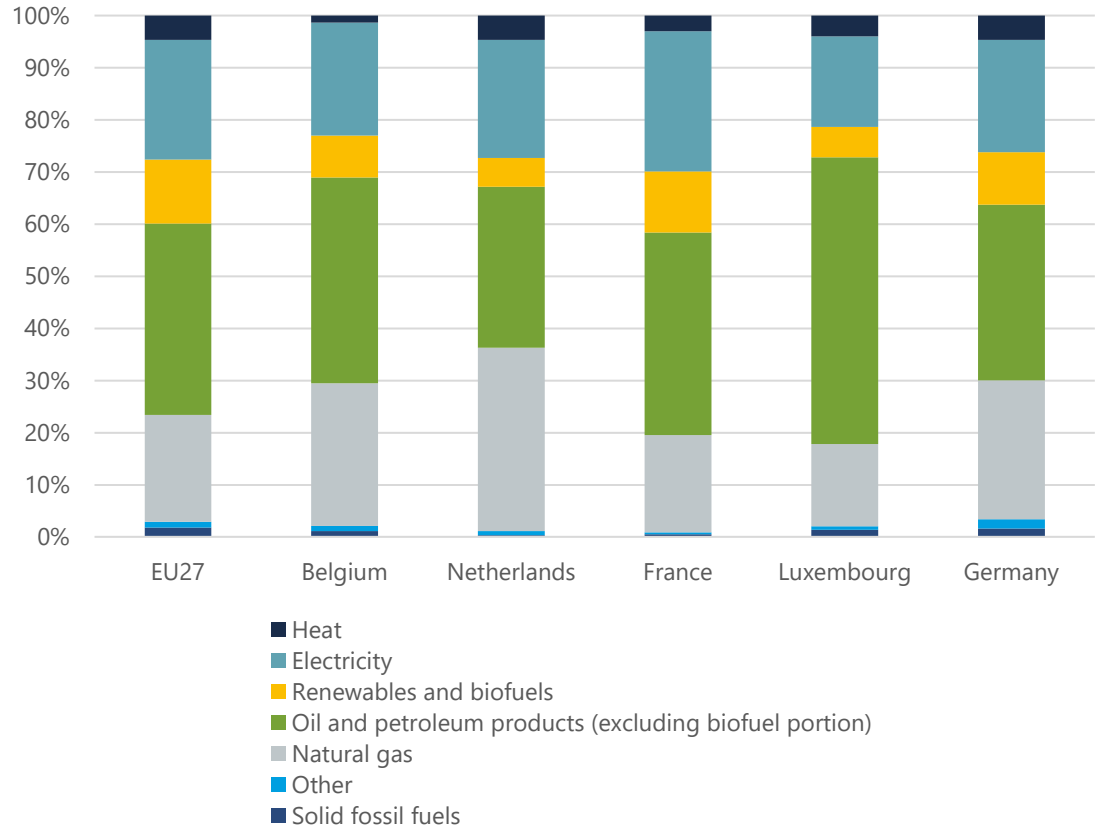
(tons of CO_2 equivalent per ton of oil equivalent)



Source: European Energy Agency and Eurostat

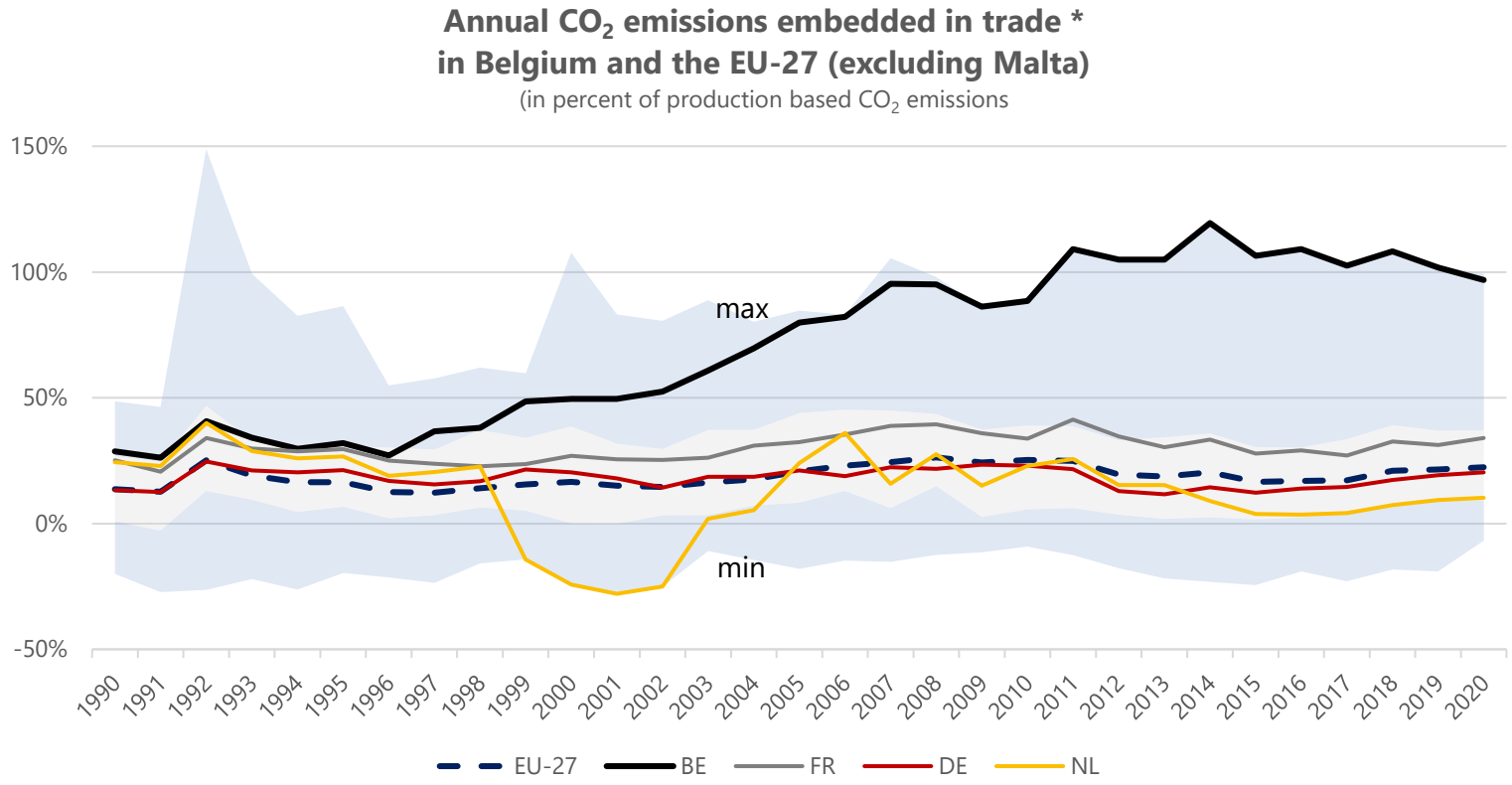
* ratio of energy related emissions to gross inland energy consumption; CO2, CH4, N2O, hydrofluorocarbons, perfluorocarbons, SF6 and NF3

Share of energy products in total final energy consumption, 2022



Source: Adapted from Eurostat.

Indications that Belgium is increasing its consumption carbon footprint via trade

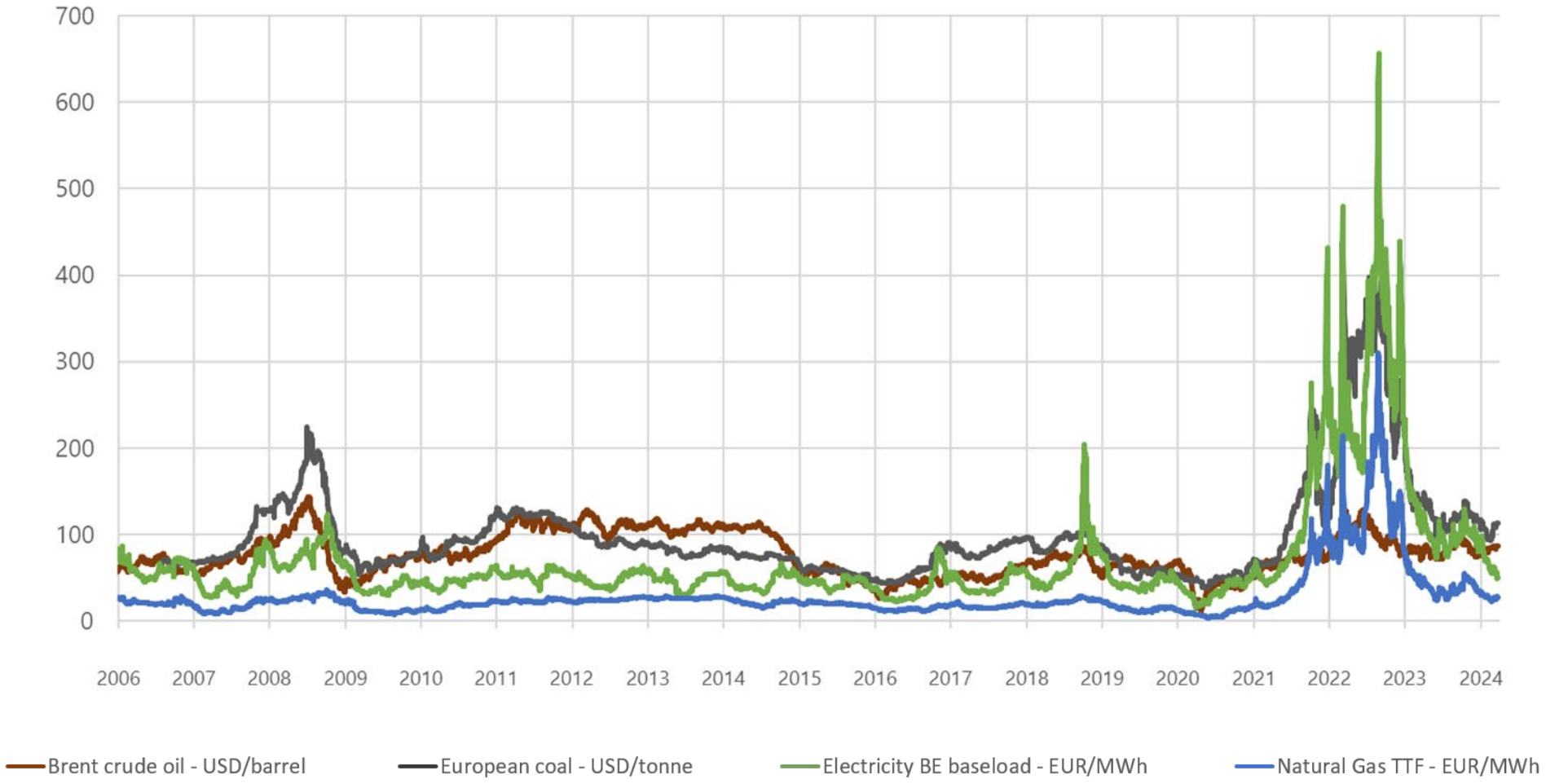


* Annual net carbon dioxide (CO2) emissions embedded in trade, measured as a percentage of production-based emissions of CO_2. Net CO_2 emissions embedded in trade is the net of CO_2 which is imported or exported via traded goods with an economy. A positive value denotes a country or region is a net importer of CO2 emissions; a negative value indicates a country is a net exporter.

N.B. : Malta has been taken out of the sample as it is an extreme outlier, with a ratio going up to 583% in 2016

Sources: Our World in Data (https://ourworldindata.org/grapher/share-co2-embedded-in-trade)
Global Carbon Project. (2022). Supplemental data of Global Carbon Project 2022 (1.0) https://doi.org/10.18160/gcp-2022

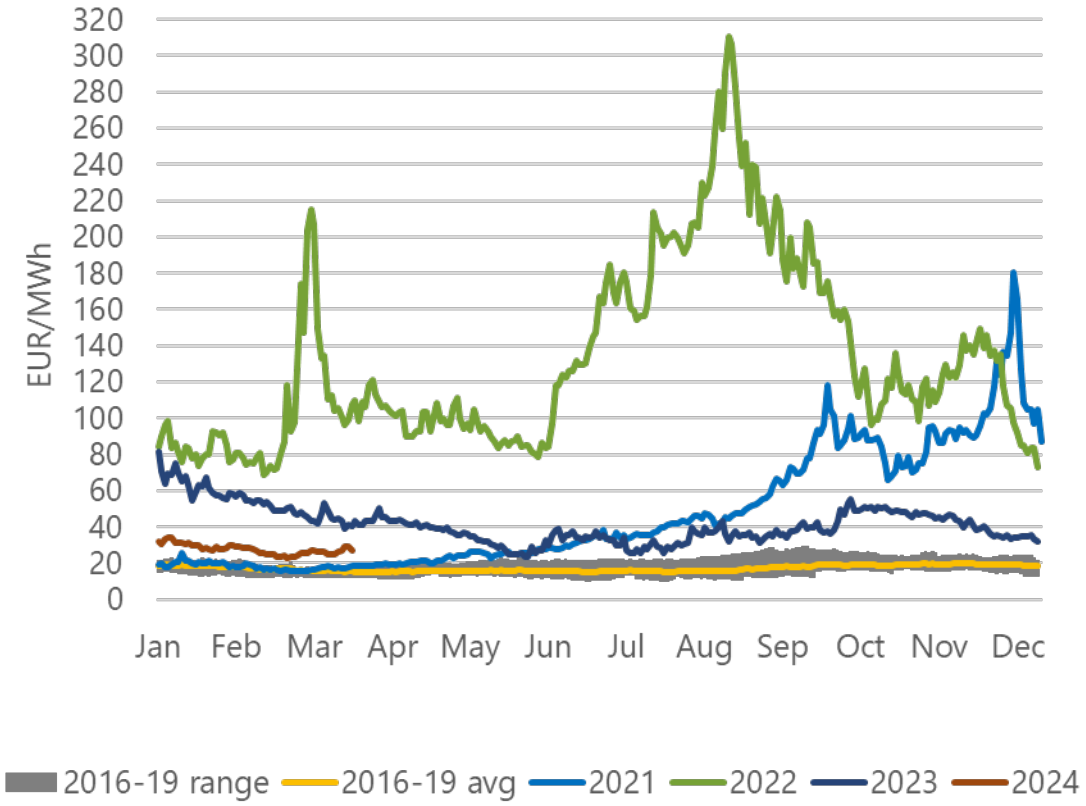
Since early 2023, energy markets have started to normalize after fossil fuel and electricity prices peaked following Russia's invasion of Ukraine



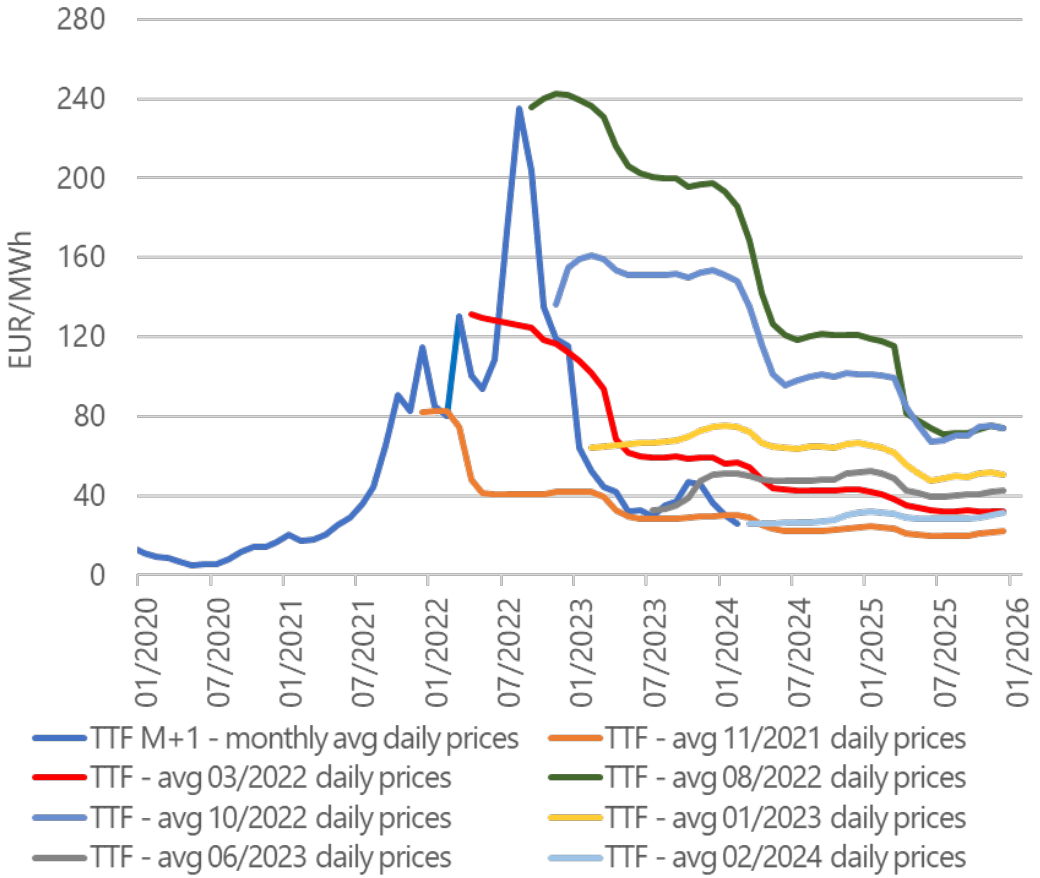
Source: LSEG

Natural gas spot prices fall back to the levels they were before the price rally
Latest futures prices reflect expectations of better supplies for next winter

Dutch TTF – M+1 delivery price



Dutch TTF Futures[1] (monthly averages)



[1] TTF is the Dutch Title Transfer Facility, a virtual trading point for natural gas that acts as reference price.

Source: LSEG; last data point: 20 March 2024

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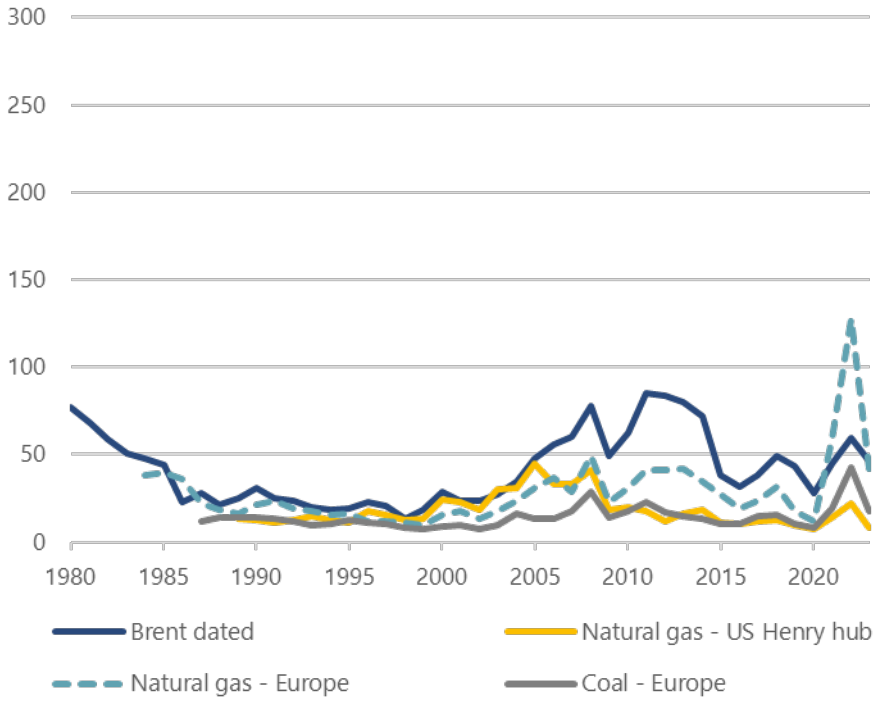
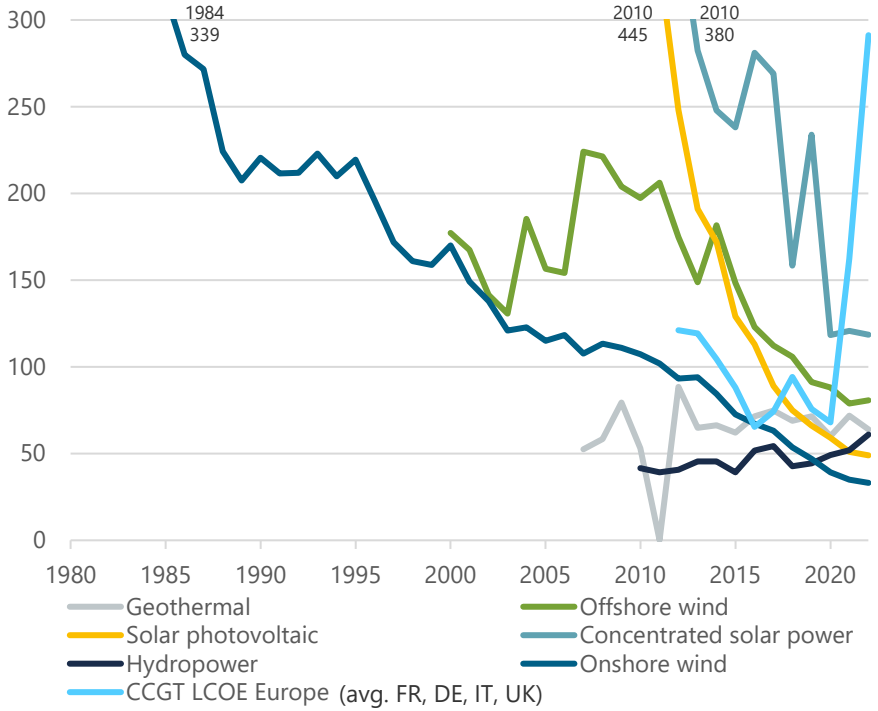
5. Competitiveness of renewables

The cost of renewables has declined substantially, thus increasing their competitiveness vis-à-vis fossil fuels. Further cost decreases are expected.

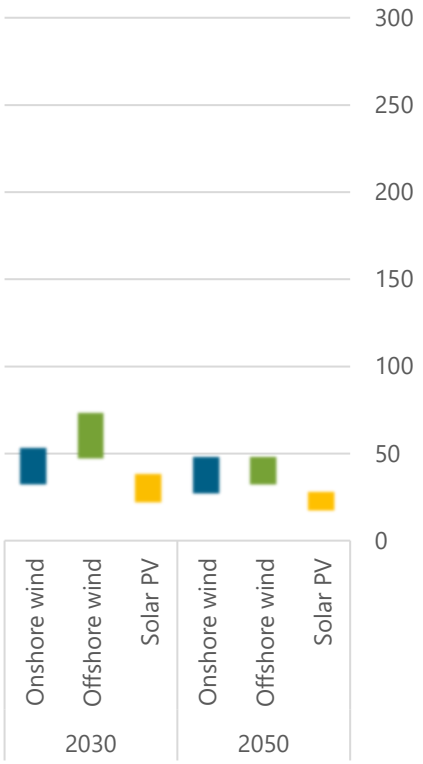
Fossil fuel prices
(in $2022/MWh)



Levelised cost of renewable generation today…
(in $2022/MWh – worldwide)



… and in 2030-2050



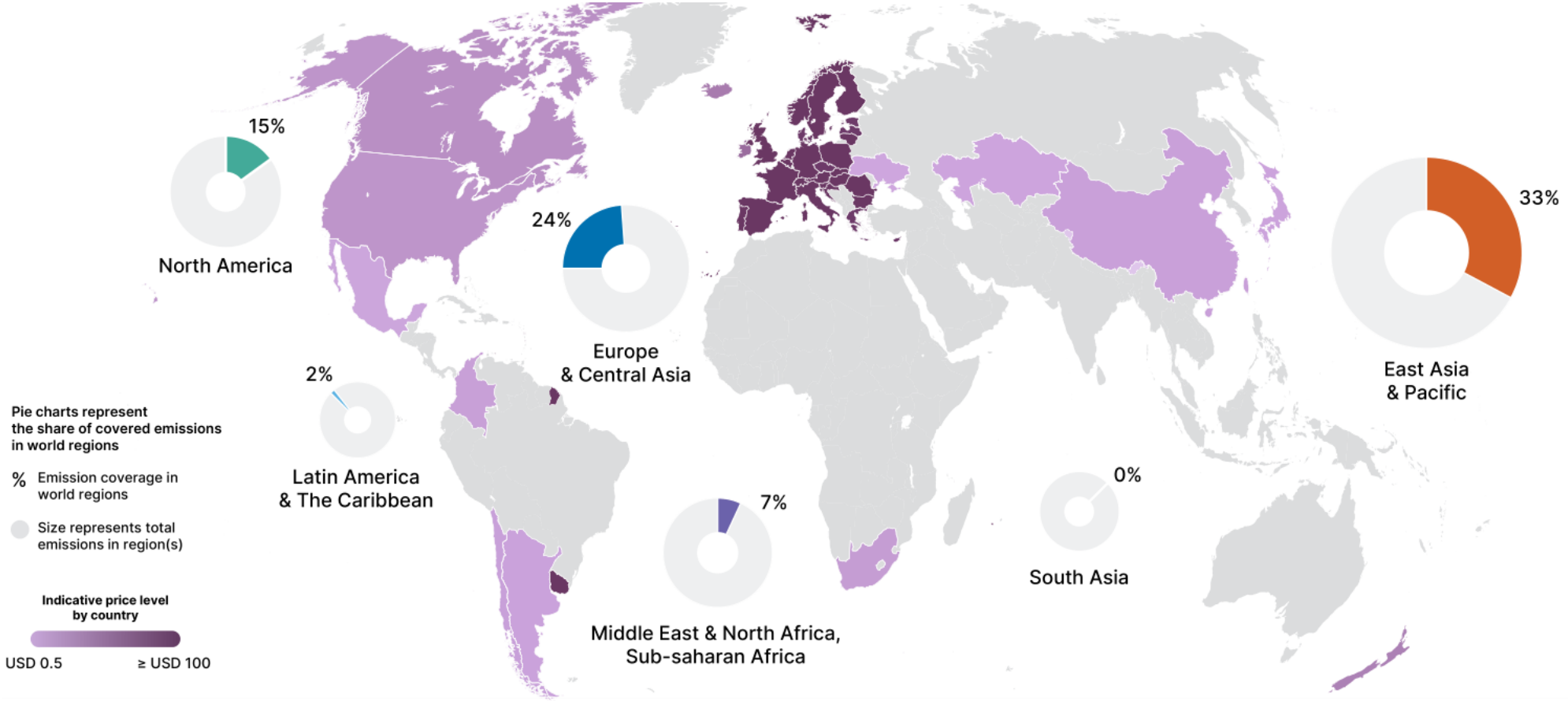
Min. onshore wind = US
Min. offshore wind = Europe
Min. solar PV = India

Sources: BP statistical review of world energy (June 2023), LSEG
Our world in data based on "IRENA Renewable power generation costs in 2022"
"IEA World energy outlook 2023".

6. Carbon pricing and climate policy instruments

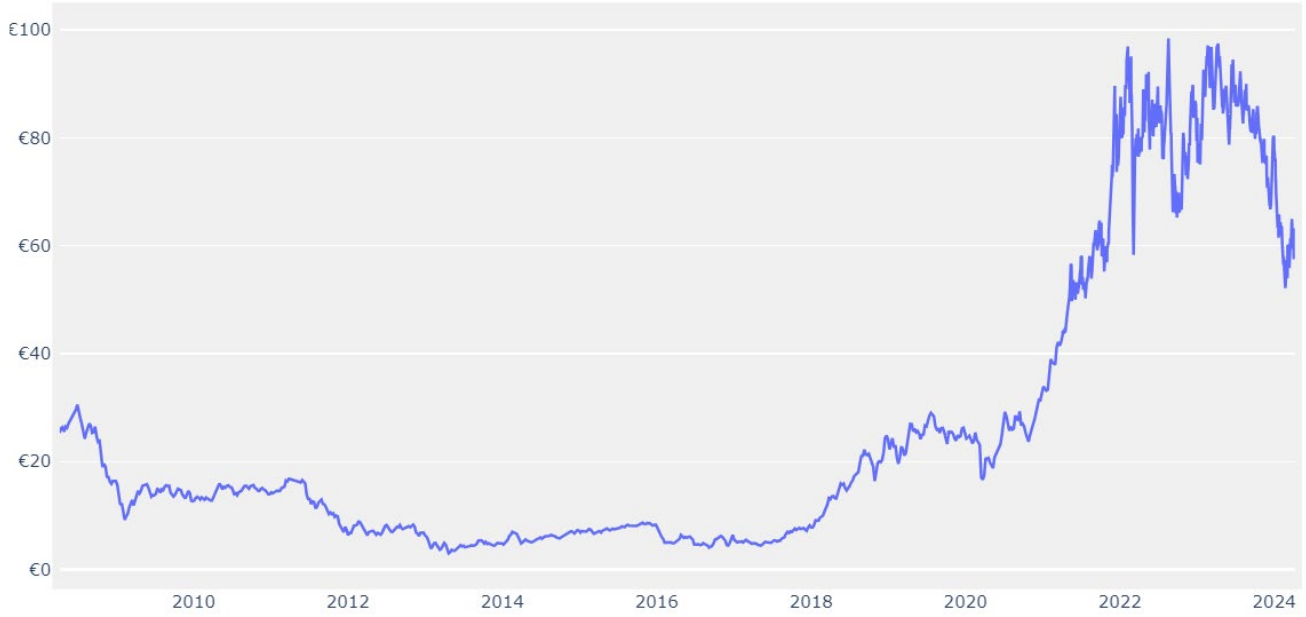
Carbon pricing is the key policy instrument to shift relative prices. Its use is, however, still only moderately wide-spread.

Scope and price levels of carbon pricing initiatives around the world

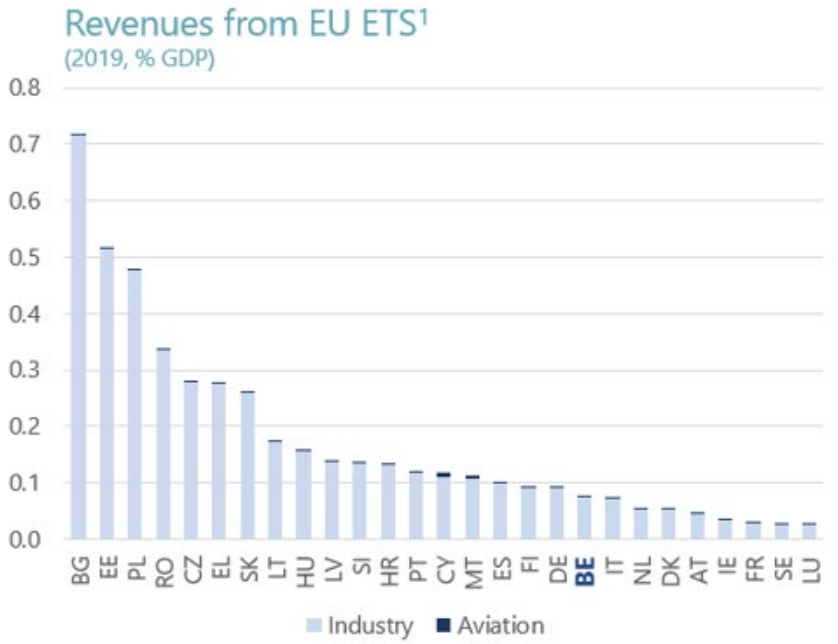


Source: World Bank Group, *States and Trends of Carbon Pricing 2023*

Through the EU Emissions Trading System, the EU sets a carbon price for the power sector, industry, and domestic aviation. More sectors will be added soon.



Source: Sandbag carbon price viewer, consulted 9 April 2024.

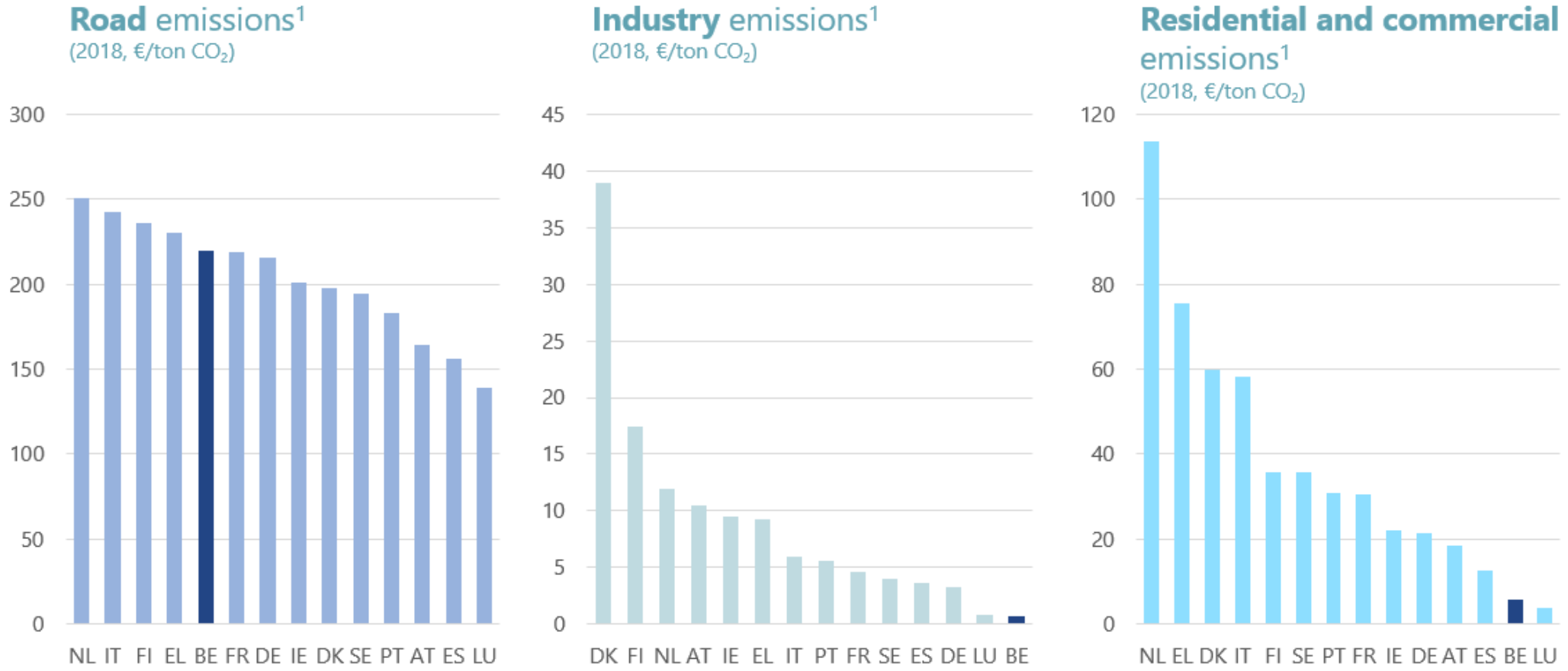


[1] EU ETS revenue for year t refers to 1 April t until March 30 in t+1.

Source: European Commission Carbon Market Report (2020).

Effective carbon pricing in the economy differs widely across sectors.

Average effective carbon price rates: effective carbon price rates show the sum of tradeable carbon emission perimit prices, carbon taxes and fuel excise duties.



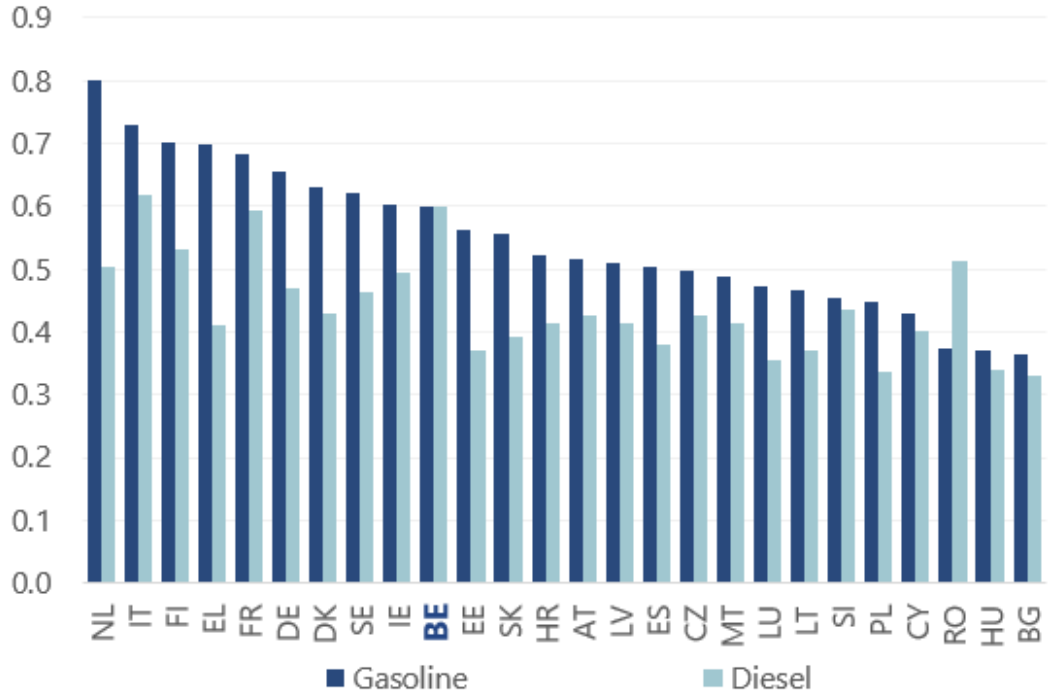
[1] including emissions from the combustion of biofuels. Industry emissions only includes national efffective carbon price.

Source: OECD (2019)

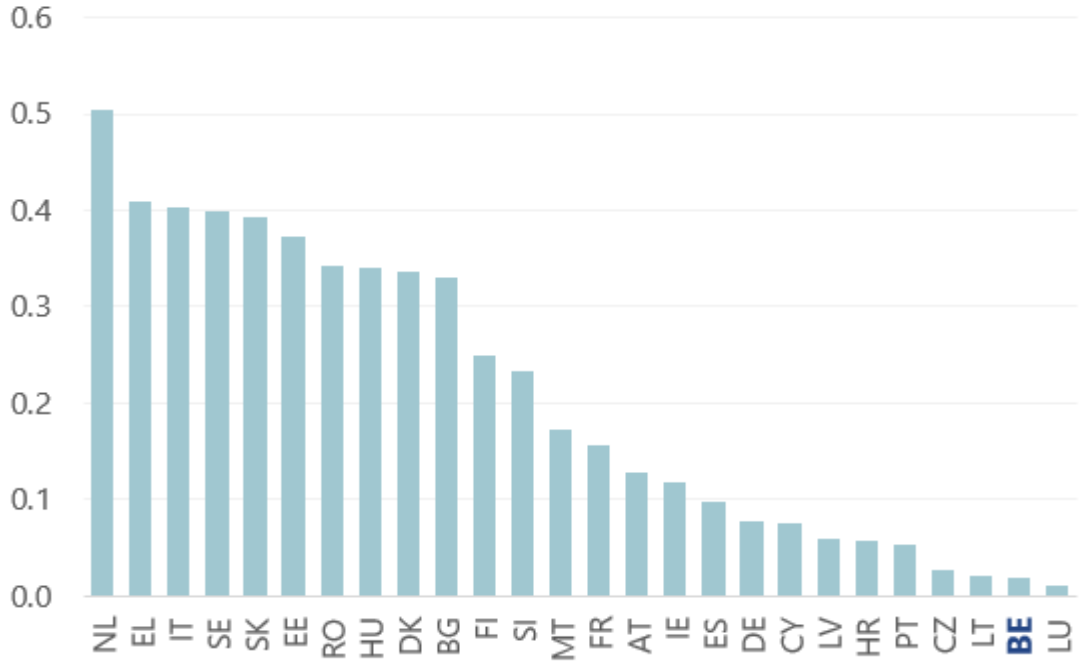
Effective carbon pricing in the economy differs widely across sectors (ctd.)

Average effective carbon price rates: effective carbon price rates show the sum of tradeable carbon emission perimit prices, carbon taxes and fuel excise duties.

Taxing road emissions
Motor fuel excise duties in Europe
(2020, € per litre)



Taxing residential and commercial emissions
Excise duties diesel in Europe
(2020, € per litre)



[1] including emissions from the combustion of biofuels

Source: OECD (2019)

There is a macroeconomic cost to the transition toward climate neutrality. This cost is likely manageable.

National Bank of Belgium

- A back-of-the-envelope calculation suggests abatement cost of ca. 17 billion euro per year for Belgium, which translates to ca. 3.5% of GDP today, or about 2-3% of GDP by 2050 (depending on GDP growth between now and then).
- Put differently, we estimate that annual aggregate income growth between now and 2050 would be ca. 0.1 percentage points lower.

International Monetary Fund

- -0.15 to -0.25 percentage points of GDP growth between now and 2030.
- +0.1 to +0.4 percentage point increase in inflation.

European Commission

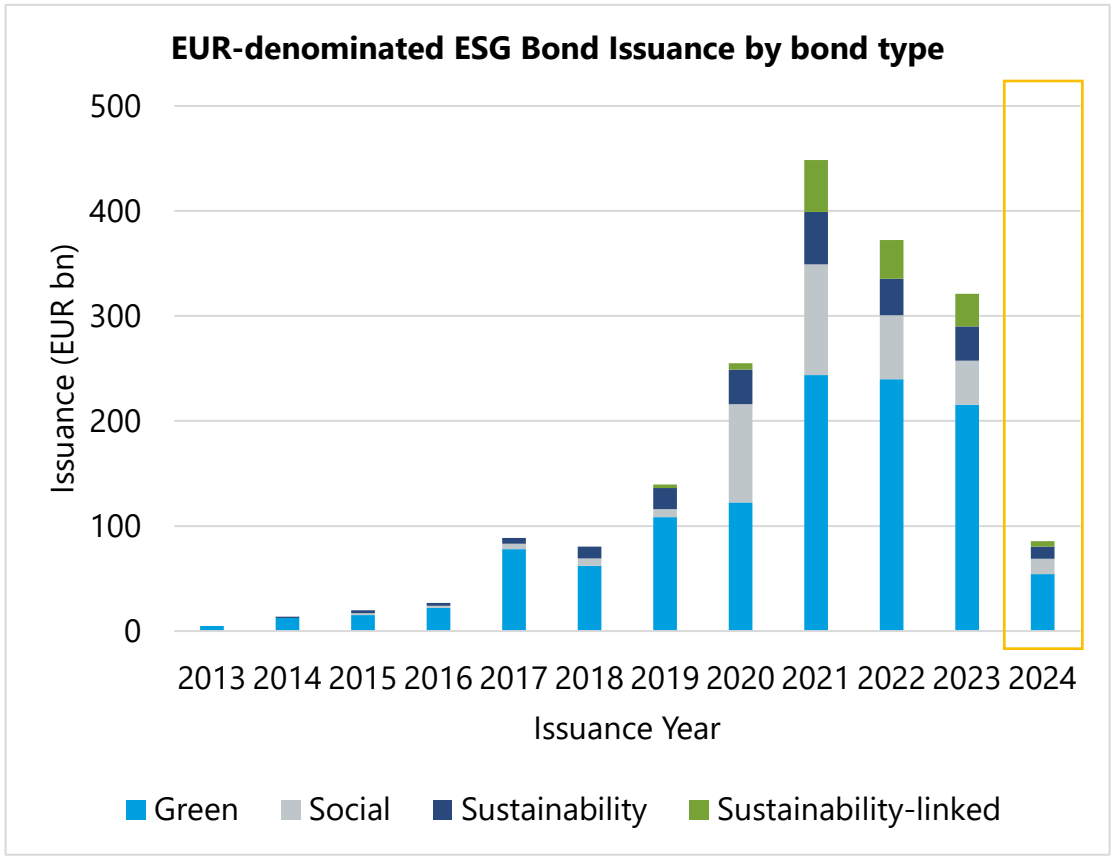
- GDP changes of between -0.4% to +0.5% of GDP in 2030, and between -1.3% to +2.2% in 2050.

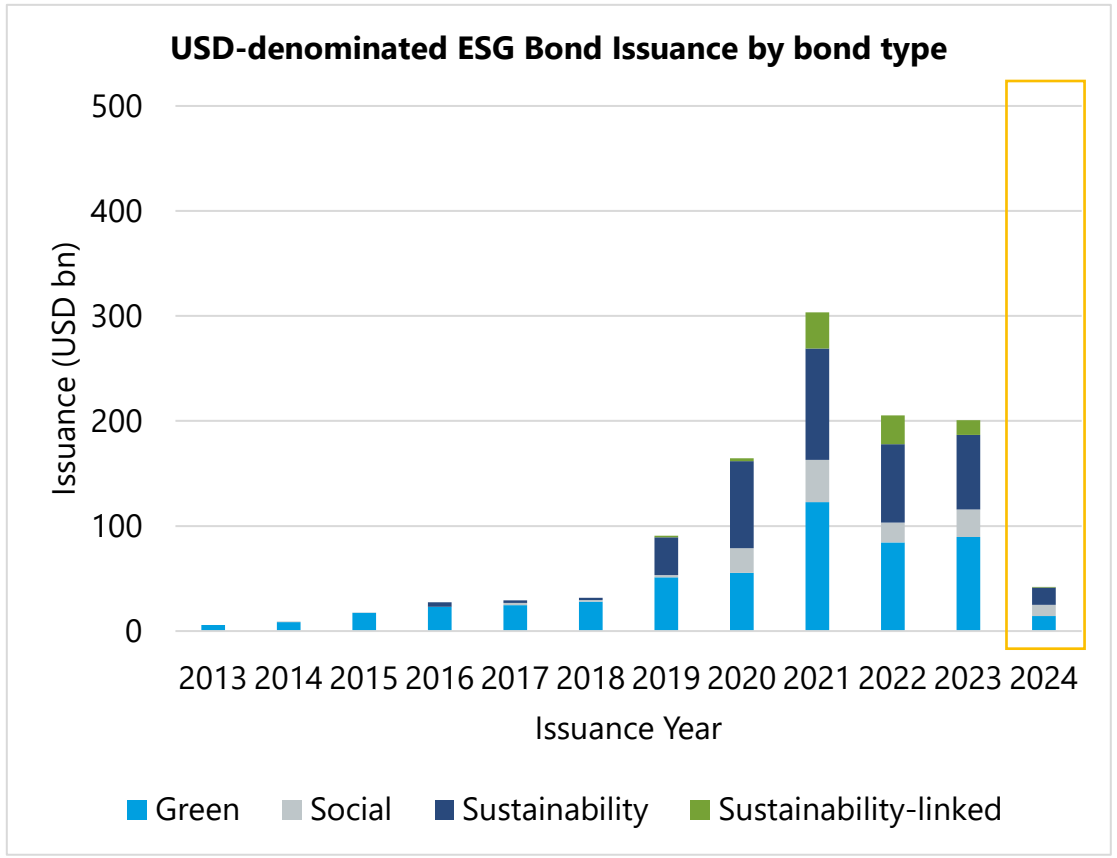
Note: Co-benefits are not included in the above estimates. According to European Commission estimates, improved air quality would lead to co-benefits of +218-459 billion euro per year for the EU27 alone.

Sources: NBB: https://www.bis.org/review/r220318d.pdf
European Commission: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020SC0176&from=EN and https://climate.ec.europa.eu/system/files/2018-11/com_2018_733_analysis_in_support_en.pdf
IMF: https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022

7. Sustainable finance market

Green bond issuance picks up better in EUR than in USD

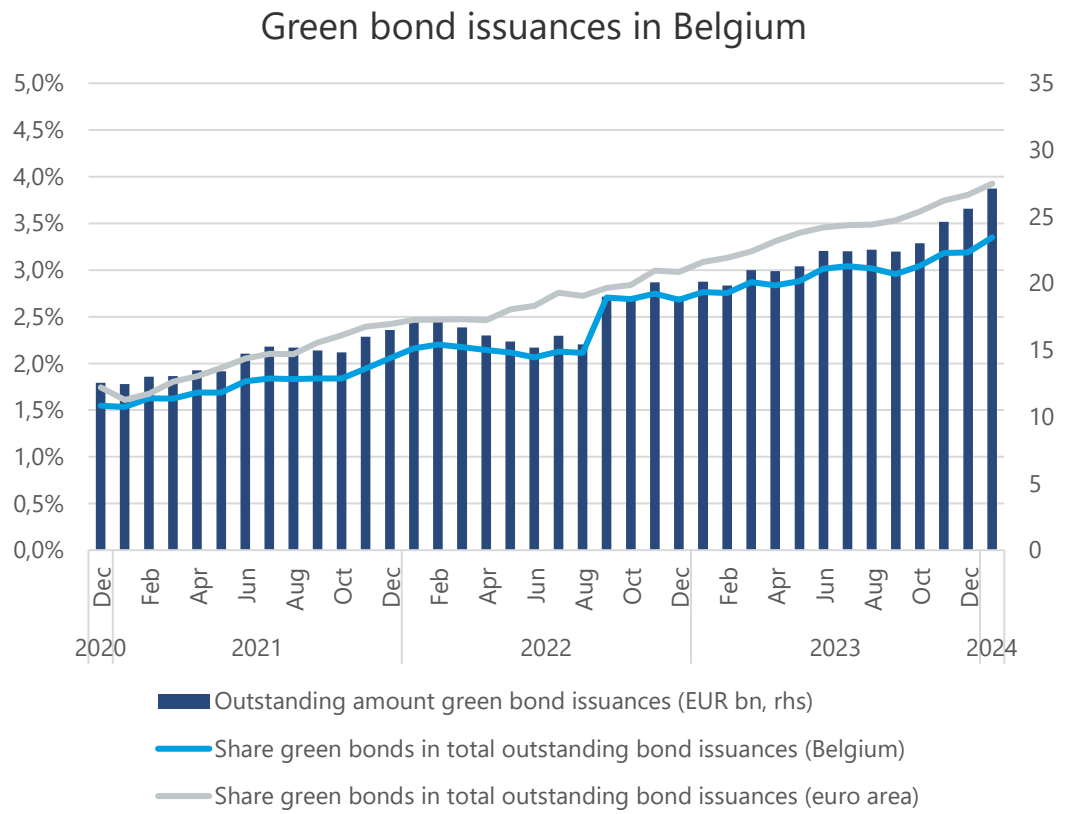


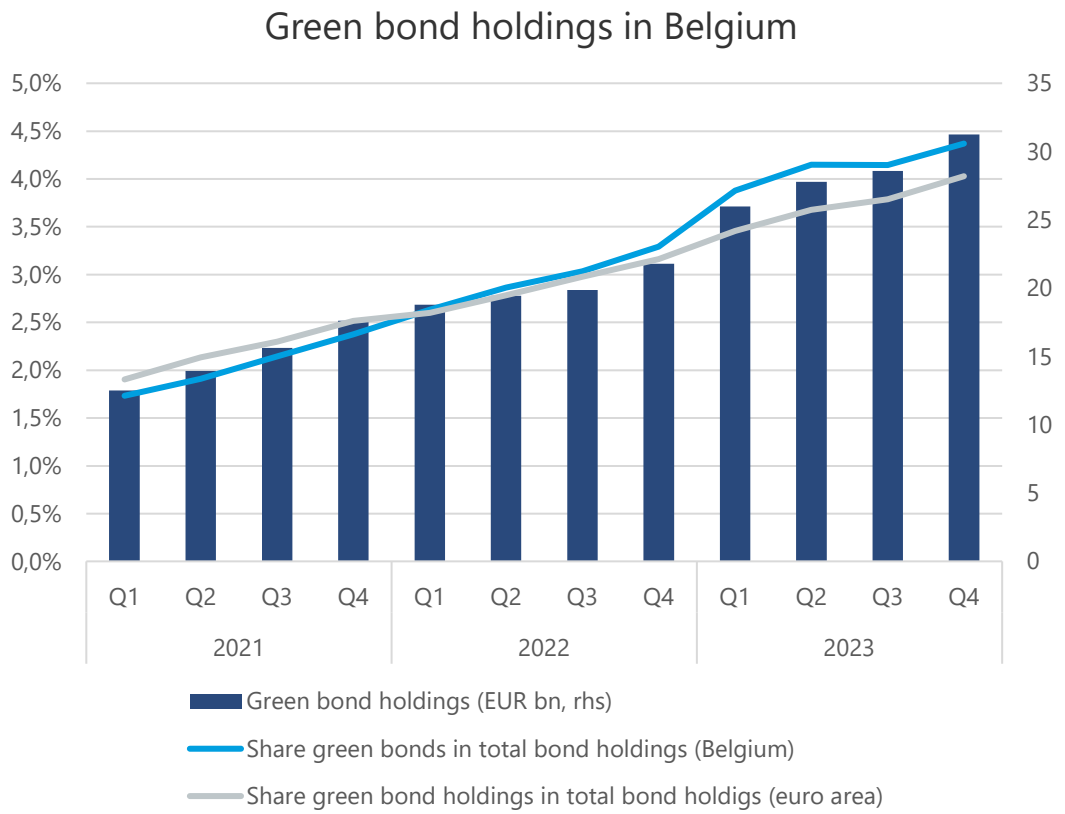


Note: 2024 represents 2024 YTD (26 February 2024)

Source: Bloomberg/NBB

Green bond issuances and holdings in Belgium



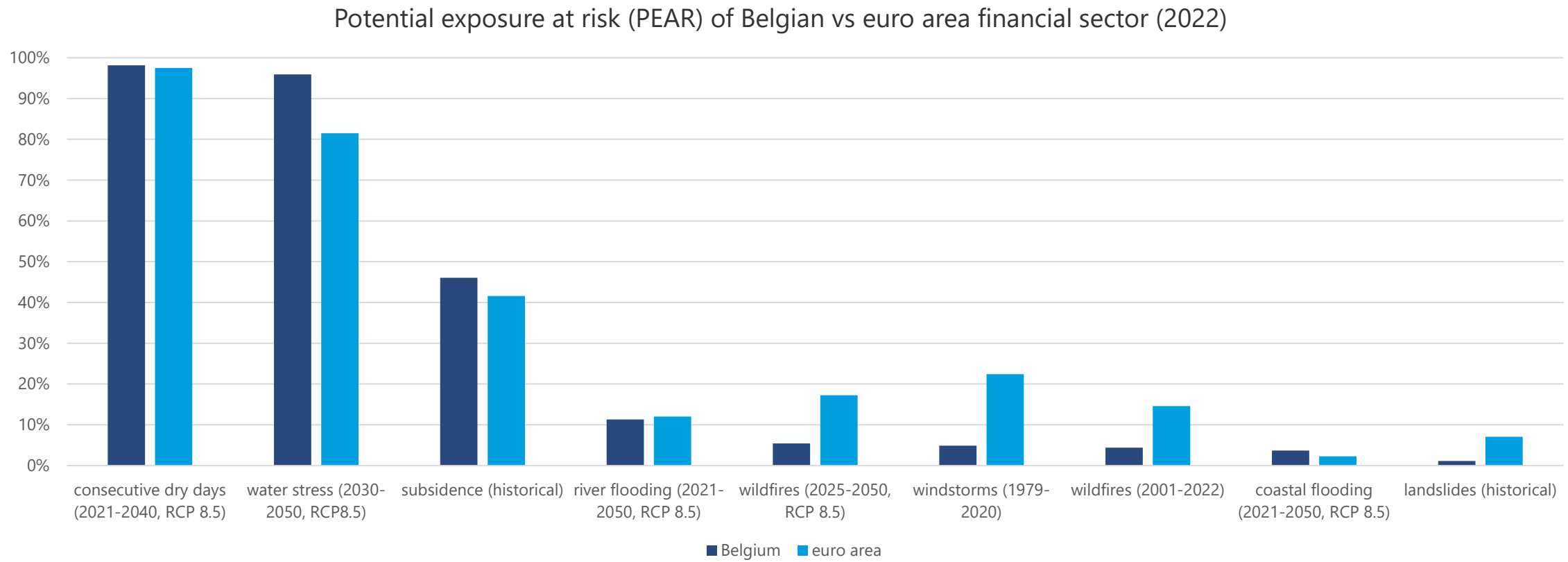


Notes: Issuances and holdings of financial and non-financial sectors. All self-labelled green bonds are included.

Source: ECB

8. Physical risk in the Belgian financial sector

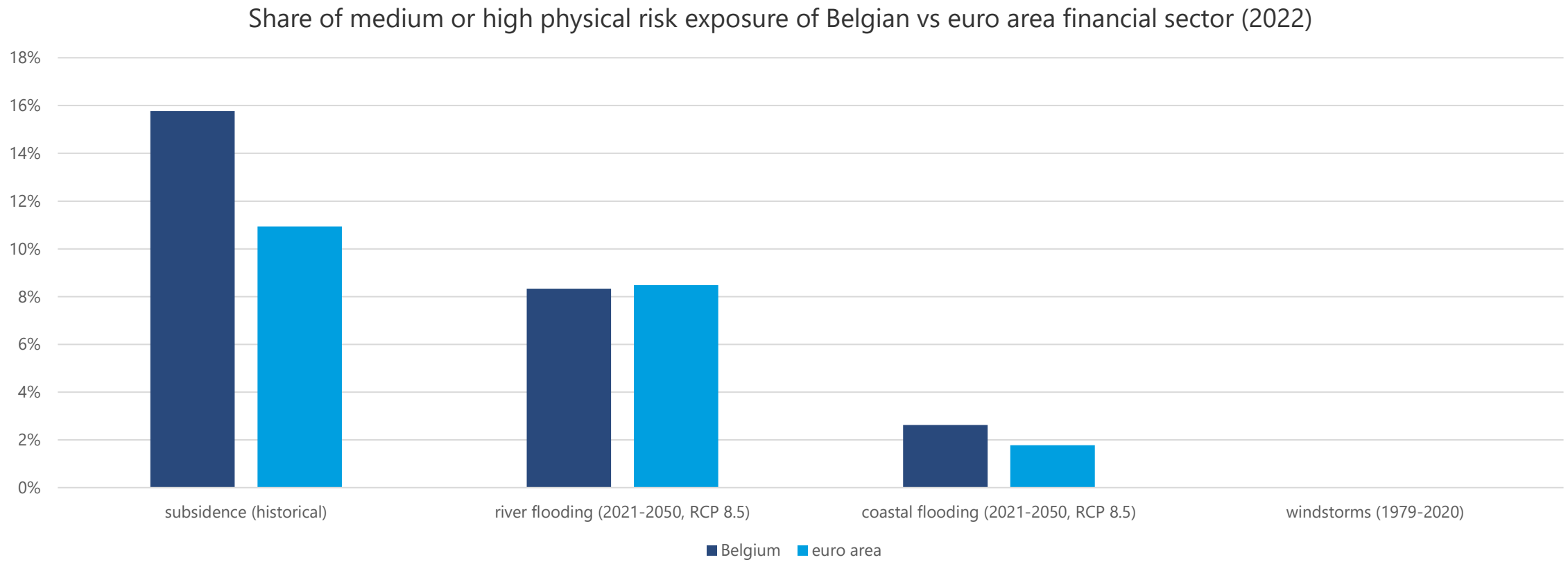
Water stress and drought appears to be most important **physical risk** for Belgian financial institutions



Notes: Financial sector contains deposit-taking institutions, investment funds, insurance companies and pension funds. Financial sector exposures include listed shares and debt securities issued by non-financial corporations. PEAR can be considered as a measure of the prevalence of a natural phenomenon, encompassing all exposures without considering the vulnerability of affected issuers should an event occur. **Indicators are analytical and should be used with caution.**

Source: ECB

Share of medium or high physical risk exposure for Belgian financial sector

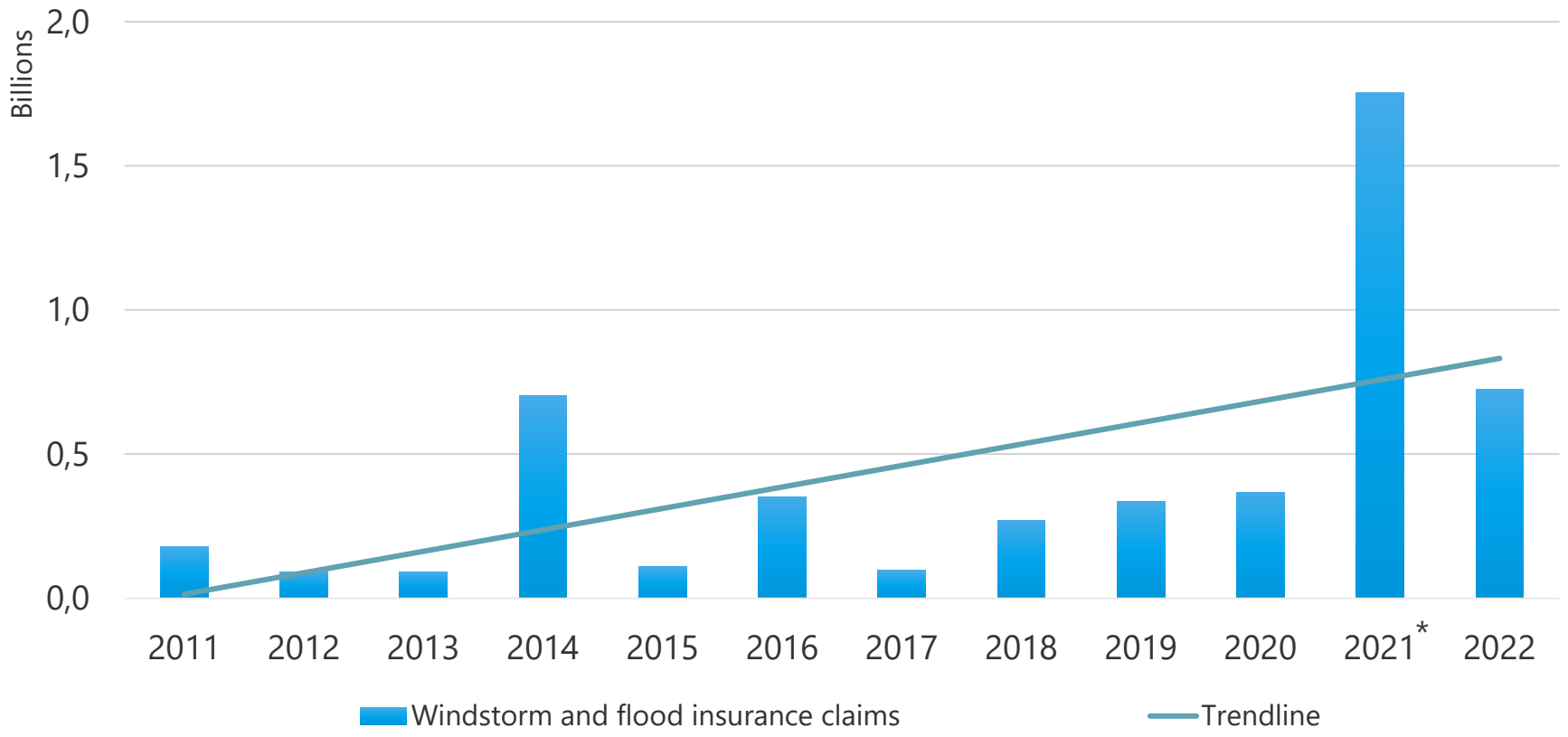


Notes: Financial sector contains deposit-taking institutions, investment funds, insurance companies and pension funds. Financial sector exposures include listed shares and debt securities issued by non-financial corporations. For confidentiality reasons, the share of medium or high risk exposures of the Belgian financial sector is only available for subsidence, river and coastal flooding, and windstorms. **Indicators are analytical and should be used with caution.**

Source: ECB

Insurance claims for natural catastrophes are increasing

Windstorm and flood insurance claims in Belgium



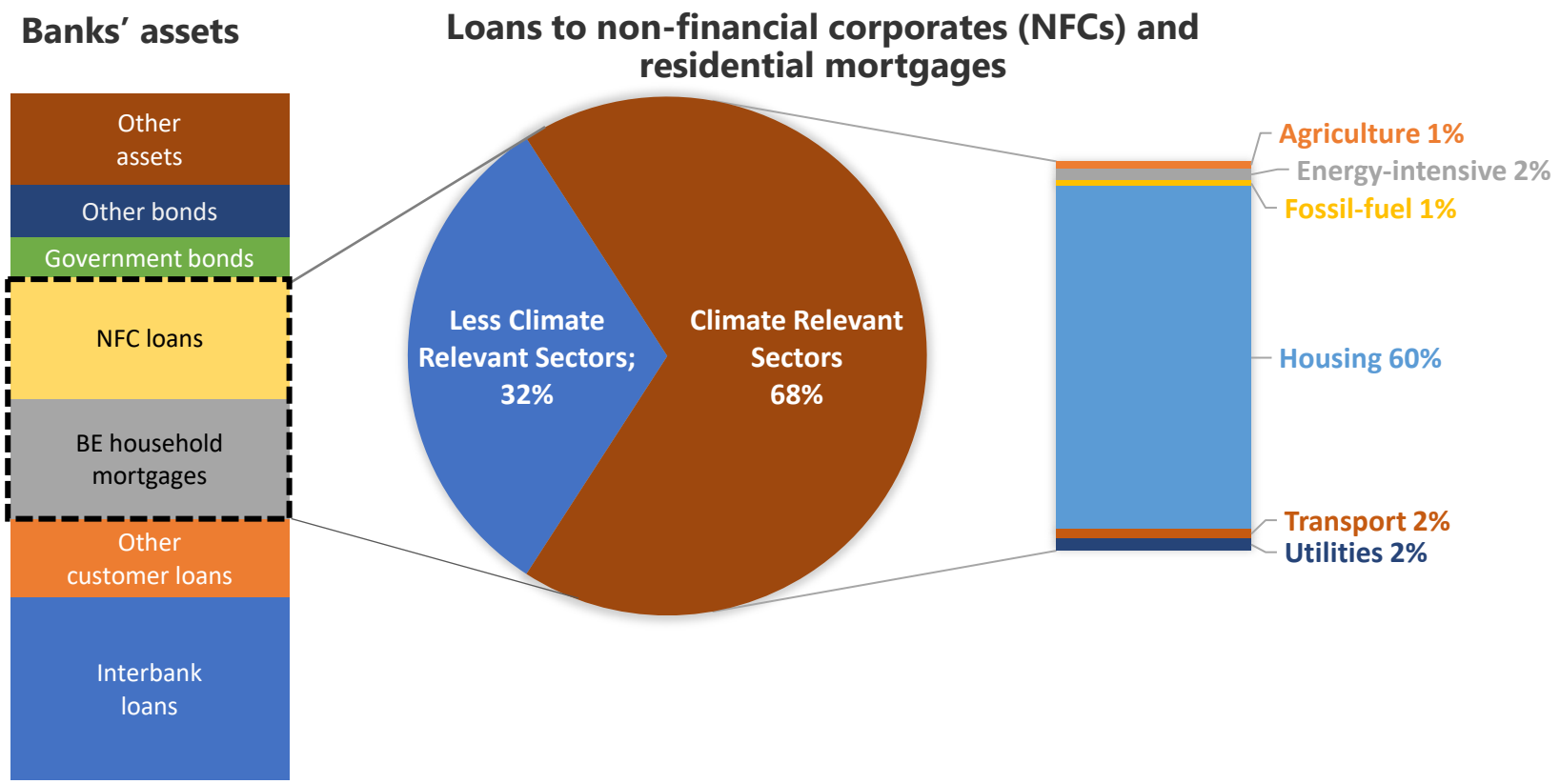
* In 2021, the total claims of the 14-16 July flood event was 2,4 billions. 1,4 billions was covered by the insurance sector.

Source: Assuralia and NBB

9. Transition risk in the Belgian financial sector

Real estate exposures are considered to be the main source of transition risk for Belgian banks

Belgian banks' loan exposure to greenhouse gas intensive sectors (end 2023)



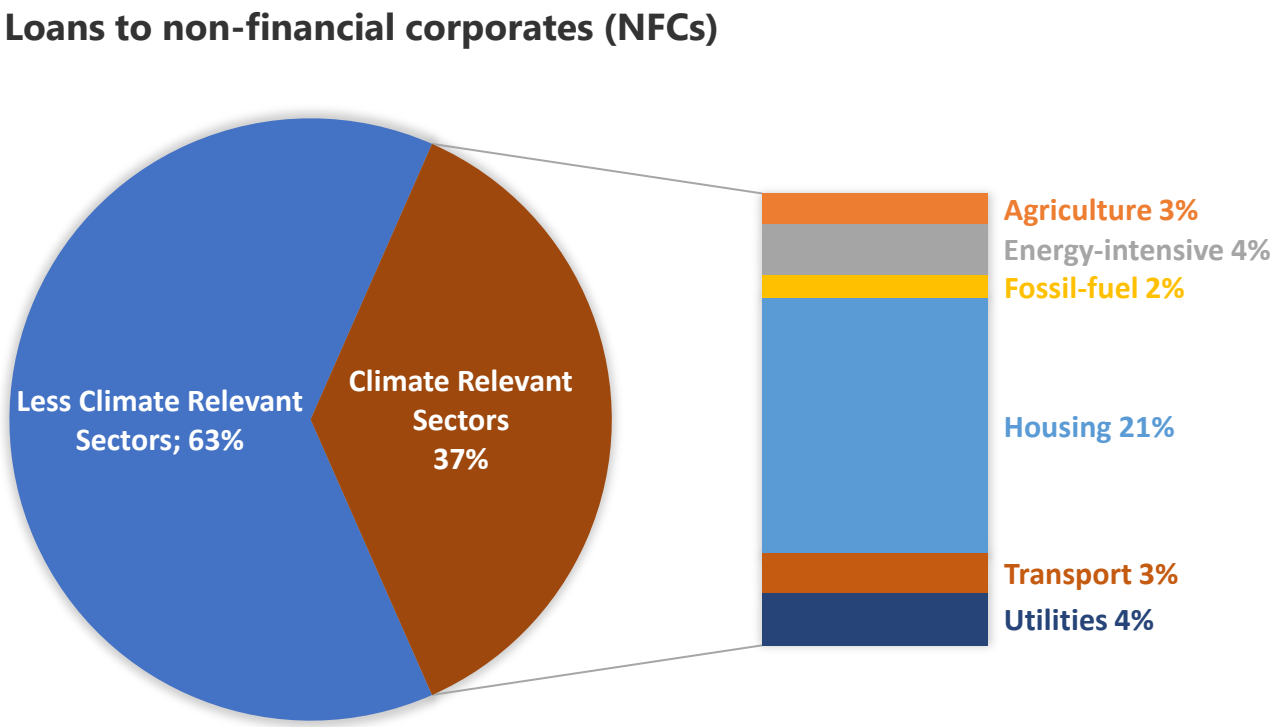
- 68% of banks' loans to non-financial corporates and residential mortgages have counterparties in "climate relevant sectors"
- GHG intensive sectors are considered climate relevant, as they are most vulnerable for additional climate policies and impacts from technological changes and consumer preferences directed at increased sustainability, resulting in higher transition risk.
- Of all climate relevant sectors, real estate exposures or housing represents the largest sector, making up 60% of all loans to NFCs and mortgages: see slide 12 (left) and slide 14
- There are of course differences in GHG intensity within sectors , which are not taken into account

Notes: Non-financial corporates do include natural persons. All loans and mortgages exclude securitisation.

Source: NBB

Real estate exposures are considered to be the main source of transition risk for Belgian banks

Belgian banks' loan exposure to greenhouse gas intensive sectors (end 2023)

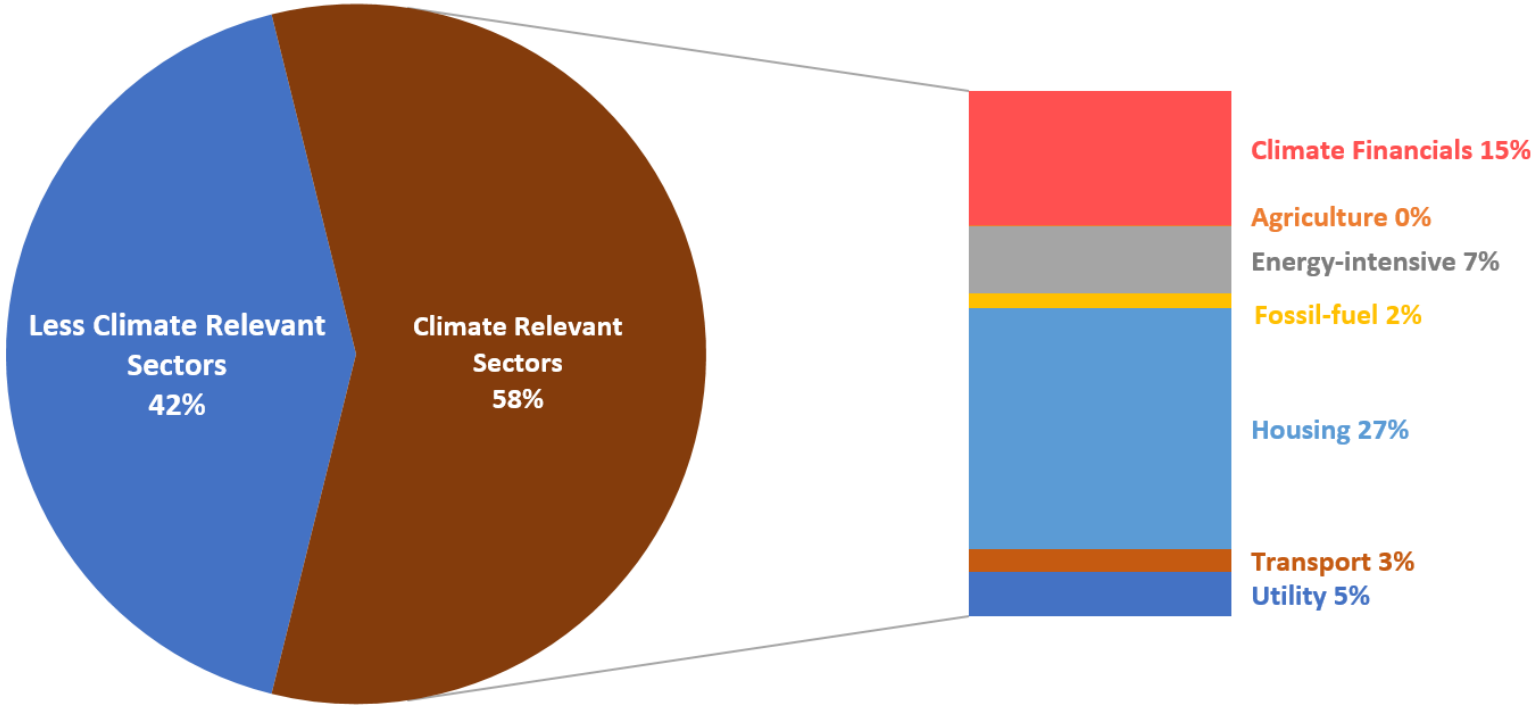


- 37% of banks' loans to non-financial corporates are considered "climate relevant or GHG intensive sectors"
- Of all climate relevant sectors, real estate exposures or housing represents the largest sector, making up 21% of all loans to NFCs
- There are of course differences in GHG intensity within sectors , which are not taken into account

Notes: Non-financial corporates do include natural persons. Loans exclude securitisations.

58% of equity, corporate bonds, loans and mortgages are exposed to transition risk

Belgian Insurance Companies' EQUITY/CORPORATE BONDS/LOANS/ MORTGAGES exposure to greenhouse gas intensive sectors (end 2022)



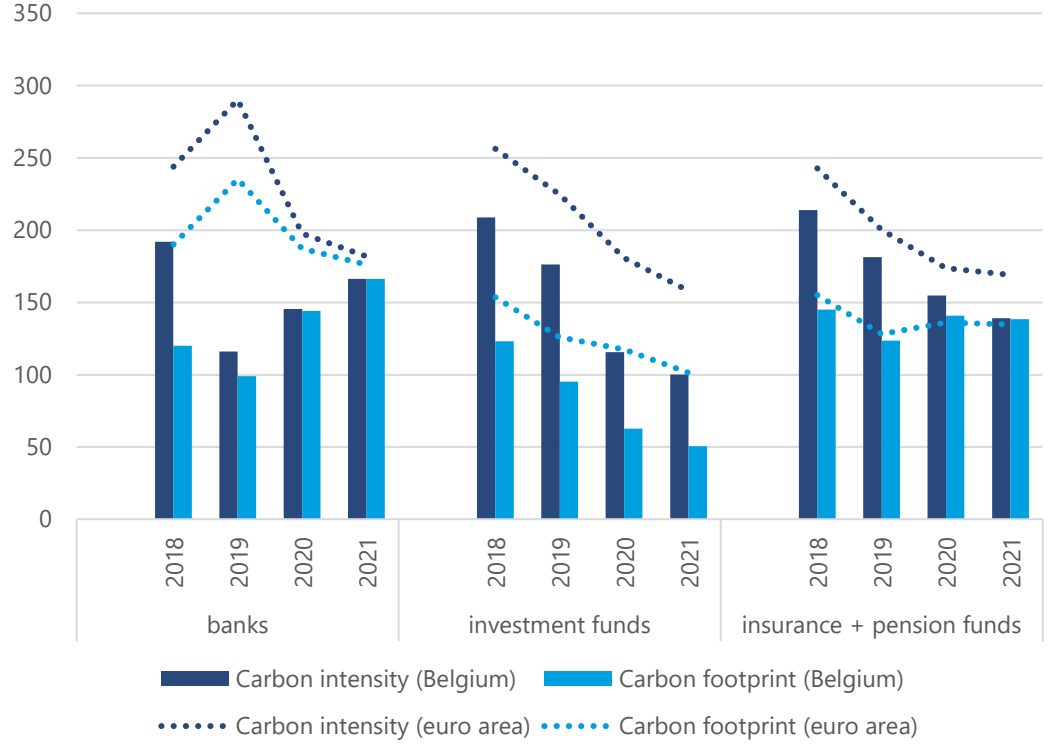
Climate Financials refers to an estimated portion of the assets that belong to the financial sector that would have been classified as climate relevant sectors if properly looked through.

Those assets, include participation in other insurance companies or banks and holdings of investment funds, which are not looked through.

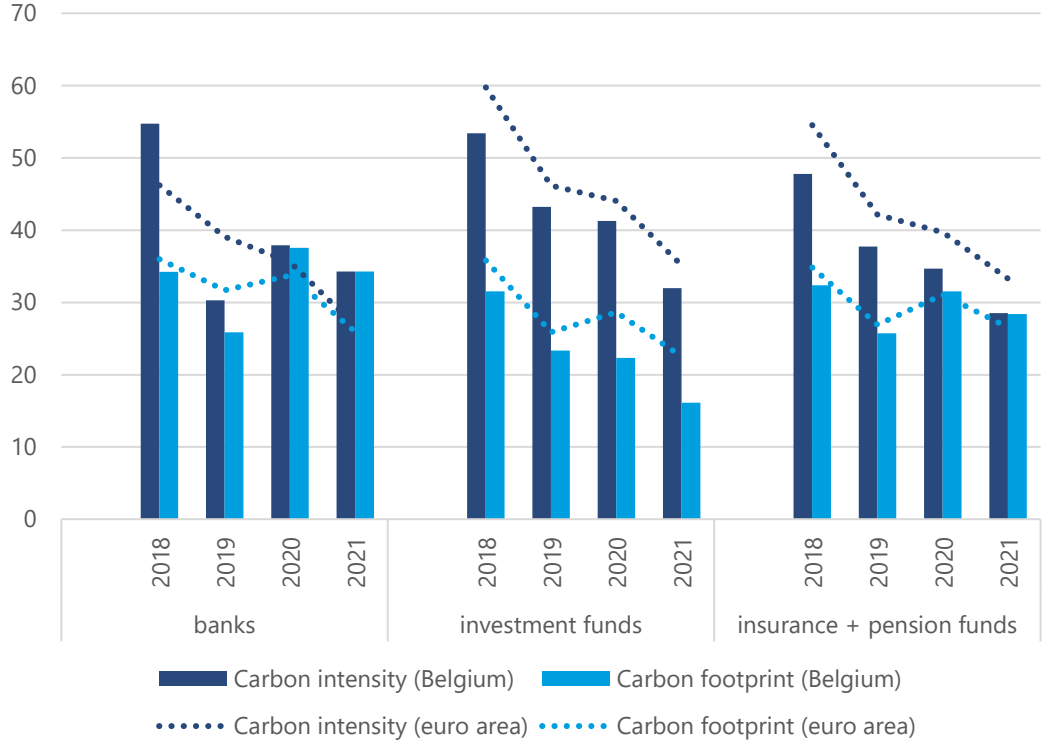
To approximate the exposures that would result from a look-through approach, it was assumed that entities or funds classified in the financial sector include climate-relevant assets in a similar proportion to that of assets directly held by insurers.

Carbon indicators for securities holdings of the Belgian financial sector

Scope 1 carbon intensity and footprint of Belgian vs euro area financial sector (in tons of CO2e per EUR mio)



Scope 2 carbon intensity and footprint of Belgian vs euro area financial sector (in tons of CO2 per EUR mio)



Notes: Carbon intensity equals firms' emissions financed by the financial sector over firms' revenues financed by the financial sector; carbon footprint equals financed emissions over portfolio size. Securities holdings include listed shares and debt securities issued by non-financial corporations. **Indicators are analytical and should be used with caution.**

Source: ECB