Climate Dashboard

Compiled by the National Bank of Belgium Climate Hub

July 2023

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

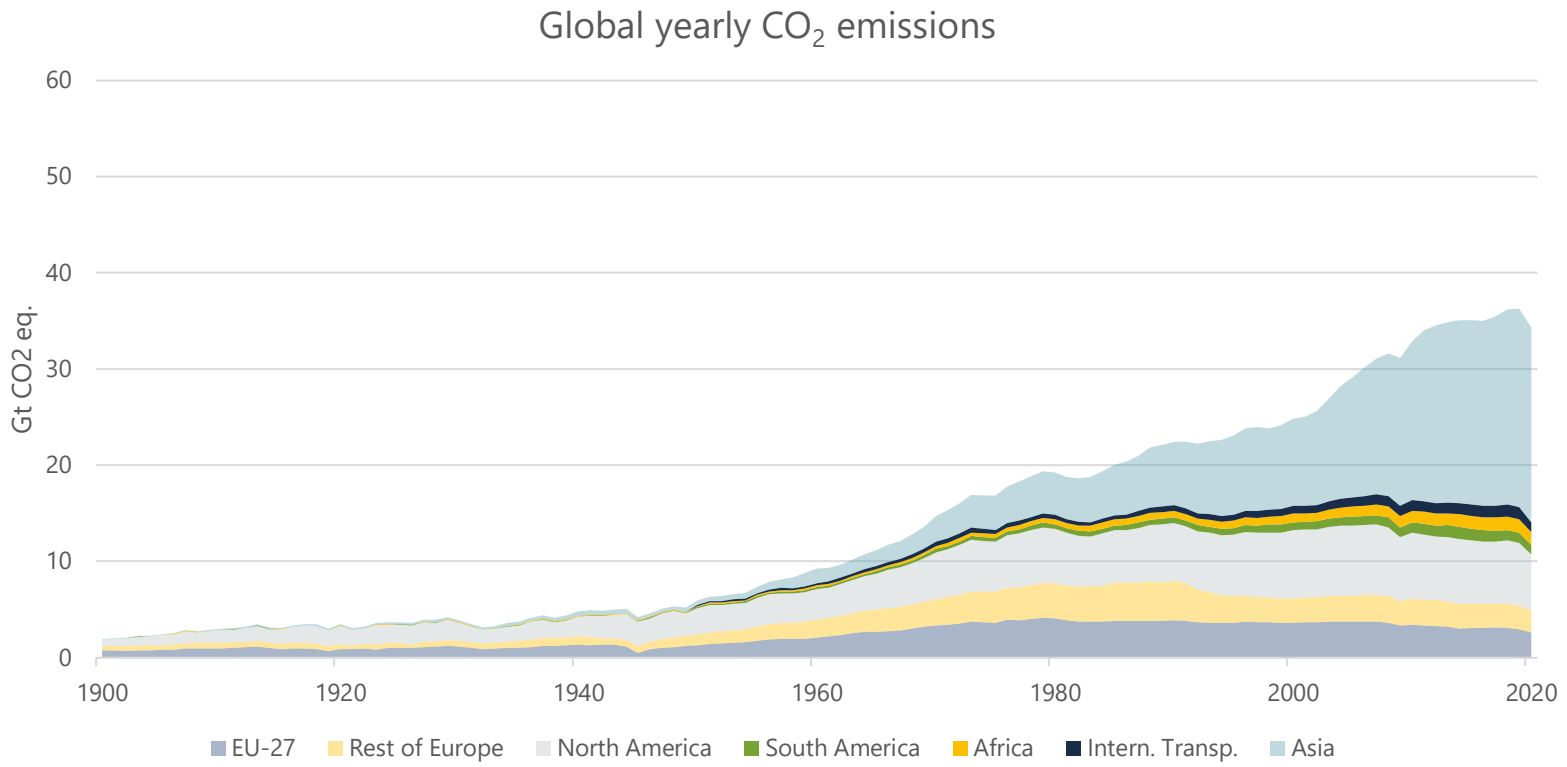
4. Current energy context
5. Competitiveness of renewables
6. Carbon pricing and climate policy instruments

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: Global Carbon Project.

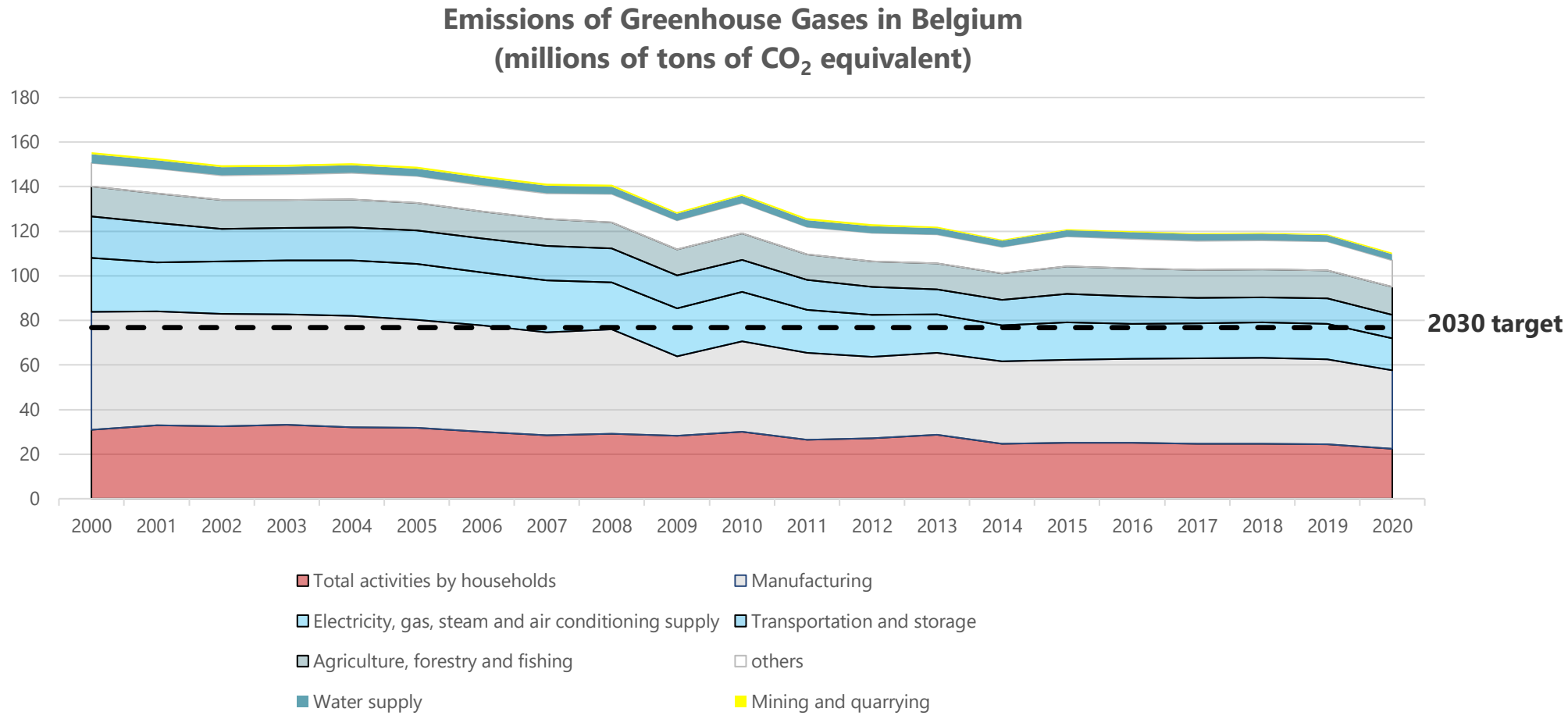
Remaining carbon budget

- = "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 67% likelihood of limiting global warming to
  - 1.5°C: ~300 Gt CO2
  - 2.0°C: ~1050 Gt CO2
  - Changes to non-CO2 greenhouse gas emissions can add or subtract ~220 GtCO2eq

Source: Based on IPCC AR6 SPM Table SPM2

2. Greenhouse gas emissions trends: Belgian economy

While Belgian greenhouse gas emissions have fallen in the last decades, additional decarbonisation is needed towards the 2030 target.



Belgium's carbon intensity is declining at a similar pace as the carbon intensity of the European Union.

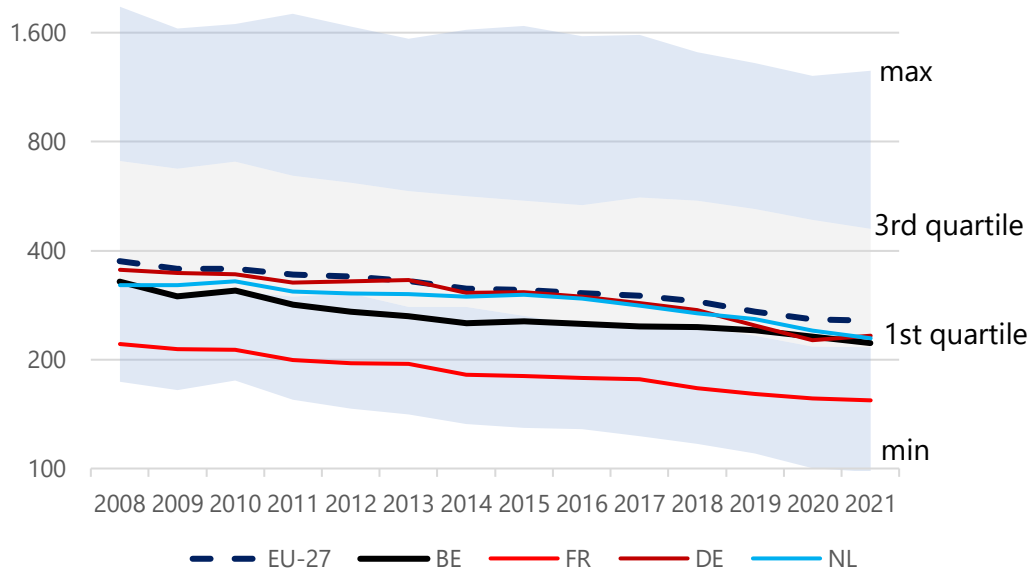
Evolution of BE emissions efficiency – Firms & Households

79% of all Belgian GHG emissions for 2020

Greenhouse gas intensity* in Belgium and the EU-27

All NACE activities

grams of CO2 equivalent per euro (log scale)

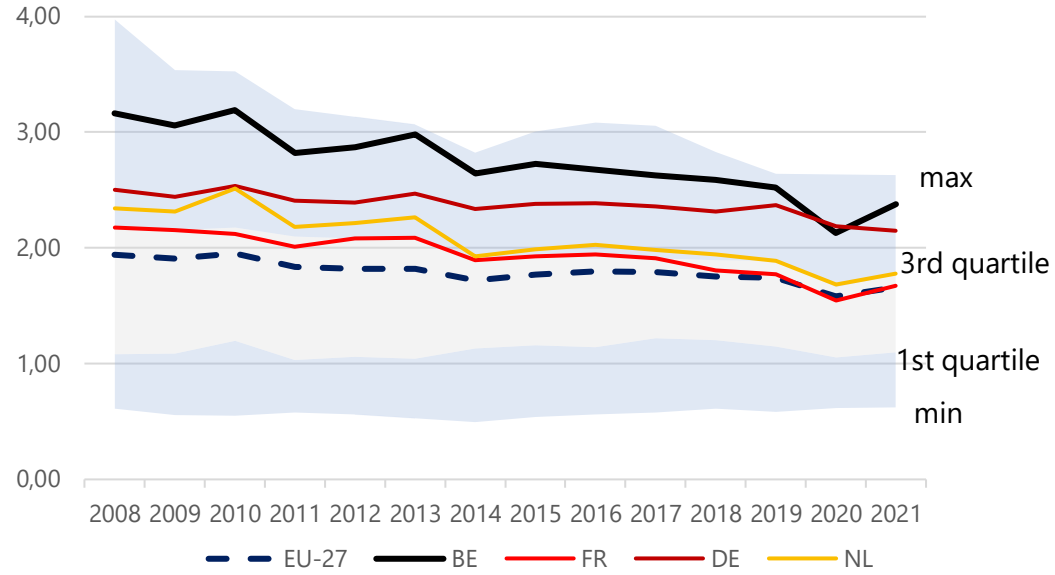


21% of all Belgian GHG emissions for 2020

Greenhouse gas intensity* in Belgium and the EU-27

Households - total activities

(tons of CO_2 equivalent per capita)



* ratio of emission to gross value added (chain-linked volumes); CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, SF_6 and NF_3

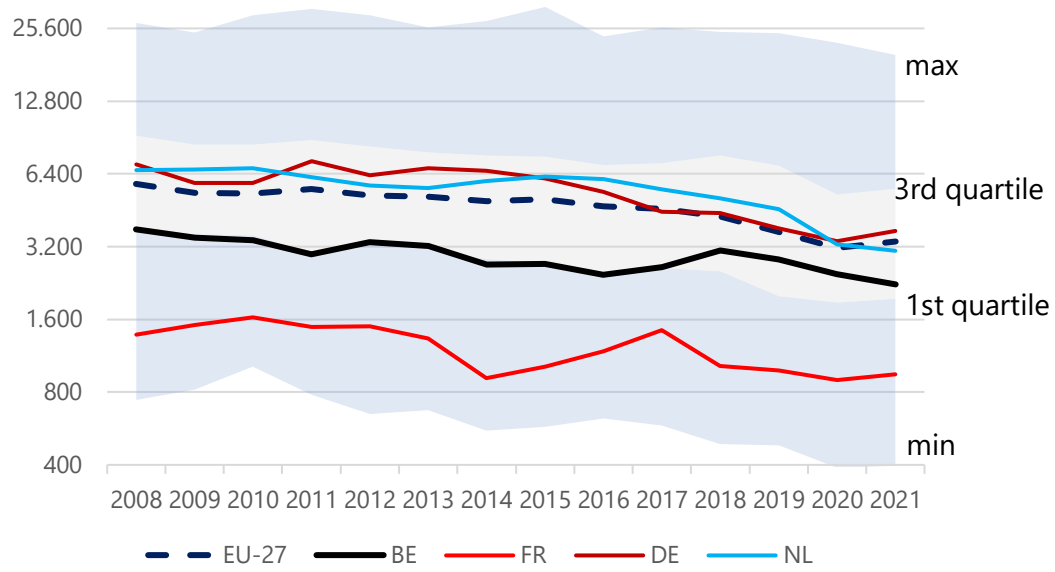
Source: Eurostat

This decline in carbon intensity is mostly driven by the power sector and manufacturing…

Evolution of BE emissions efficiency – All activity except households

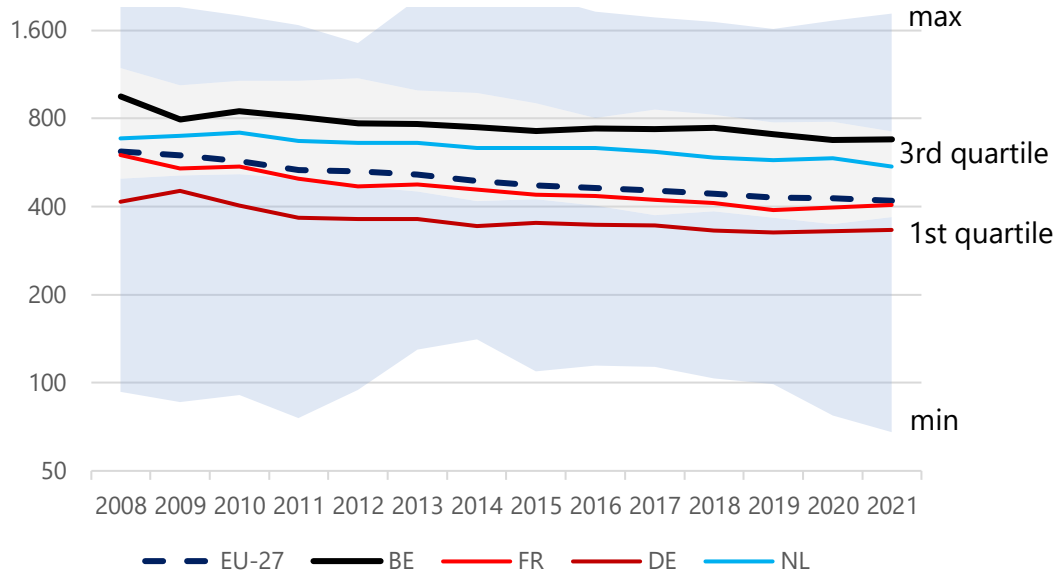
13% of all Belgian GHG emissions for 2020

Greenhouse gas intensity*
in Belgium and the EU-27
Electricity, gas, steam and air conditionning
grams of CO2 equivalent per euro (log scale)



32% of all Belgian GHG emissions for 2020

Greenhouse gas intensity*
in Belgium and the EU-27
Manufacturing
grams of CO2 equivalent per euro (log scale)



* ratio of emission to gross value added (chain-linked volumes); CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, SF_6 and NF_3

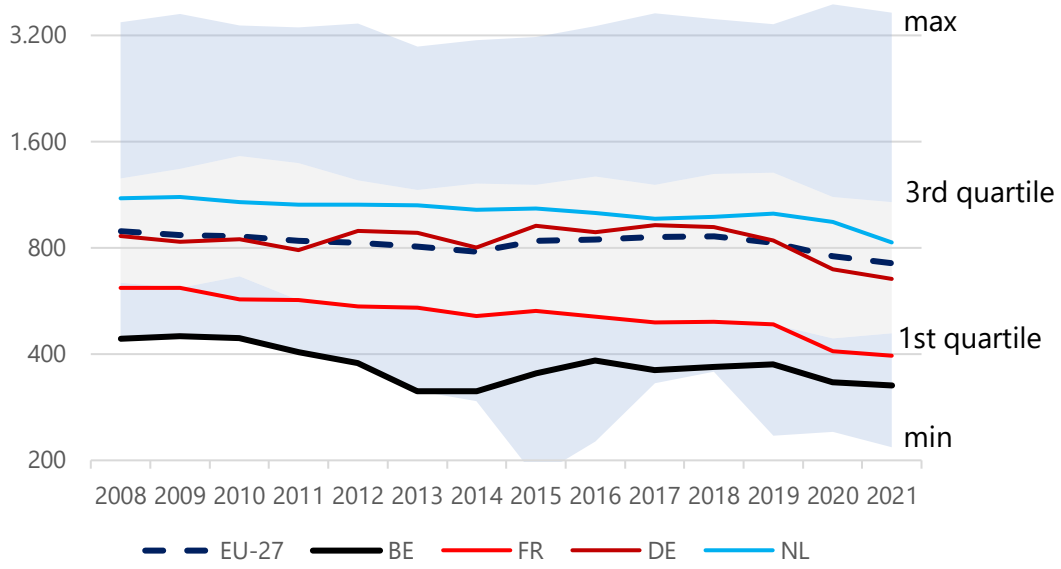
Source: Eurostat

…less so in transport or agriculture

Evolution of BE emissions efficiency – All activity except households

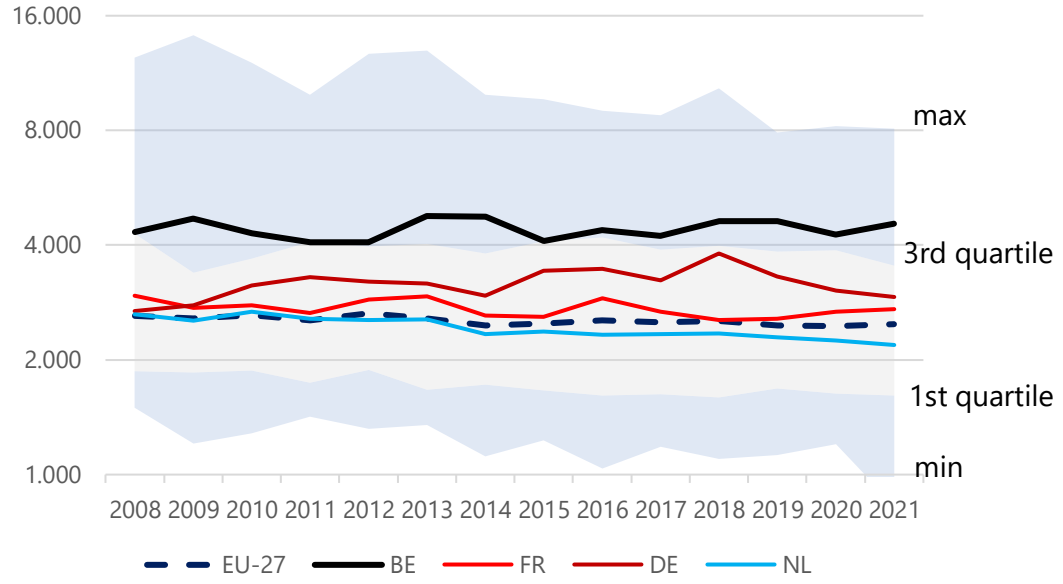
Greenhouse gas intensity*
in Belgium and the EU-27
Transportation and storage
grams of CO2 equivalent per euro (log scale)

10% of all Belgian GHG emissions of 2020



Greenhouse gas intensity*
in Belgium and the EU-27
Agriculture, forestry and fishing
grams of CO2 equivalent per euro (log scale)

11% of all Belgian GHG emissions of 2020



* ratio of emission to gross value added (chain-linked volumes); CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, SF_6 and NF_3

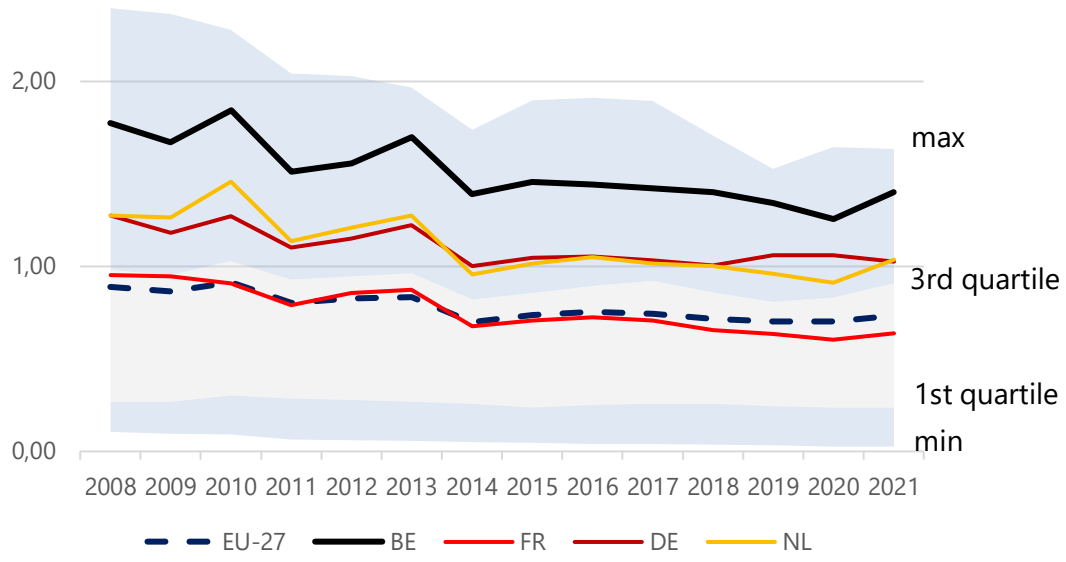
Source: Eurostat

The emissions intensity of Belgian households has largely remained unchanged over the last decade

Evolution of BE emissions efficiency – Households

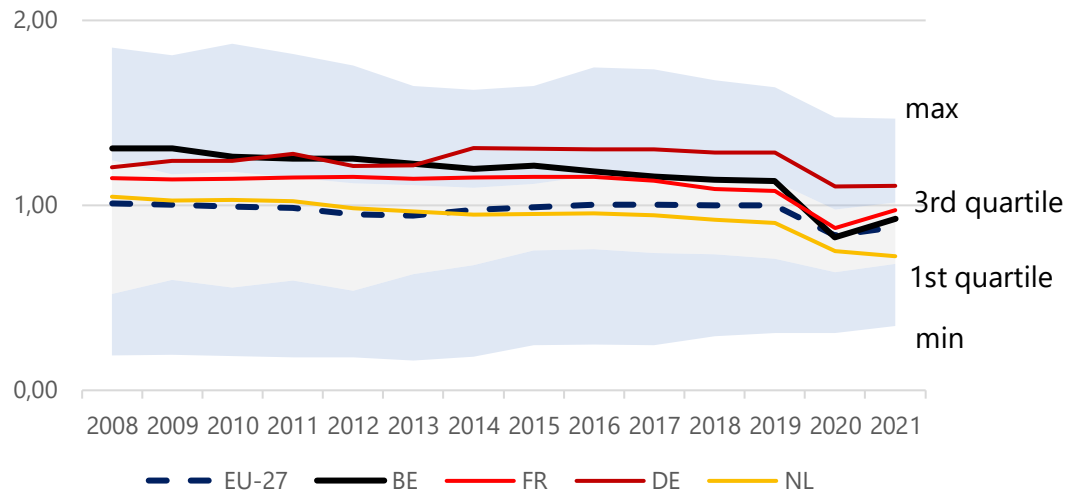
12% of all Belgian GHG emissions of 2020

Greenhouse gas intensity*
in Belgium and the EU-27
Households - heating and cooling
(tons of CO_2 equivalent per capita)



6% of all Belgian GHG emissions of 2020

Greenhouse gas intensity*
in Belgium and the EU-27
Households - transport
(tons of CO_2 equivalent per capita)



* ratio of emission to gross value added (chain-linked volumes); CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, SF_6 and NF_3

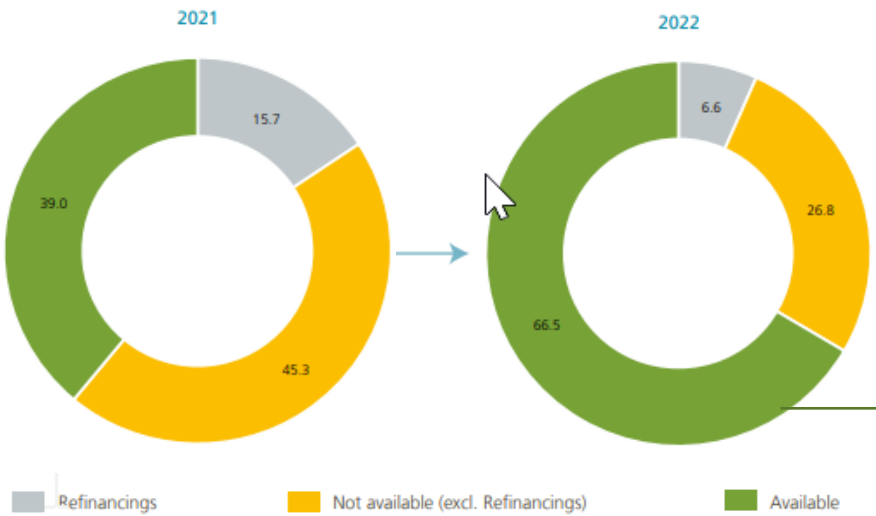
Source: Eurostat

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

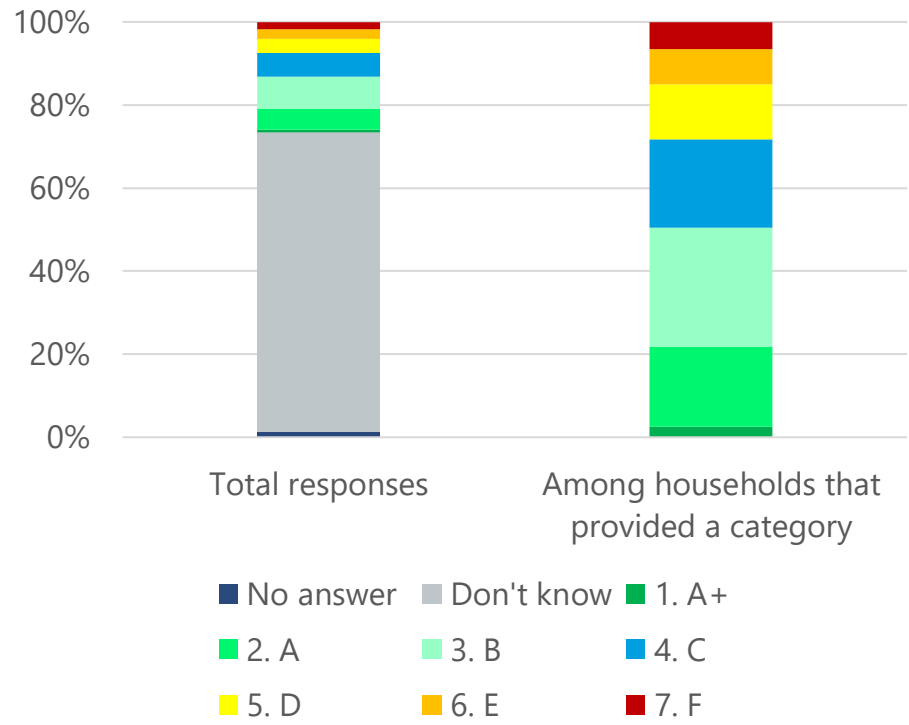
EPC new production residential mortgage loans

Data availability
(in % of new production)



EPC-breakdown 2022
(in % of new production)

Energy performance certificate status of homes (%)

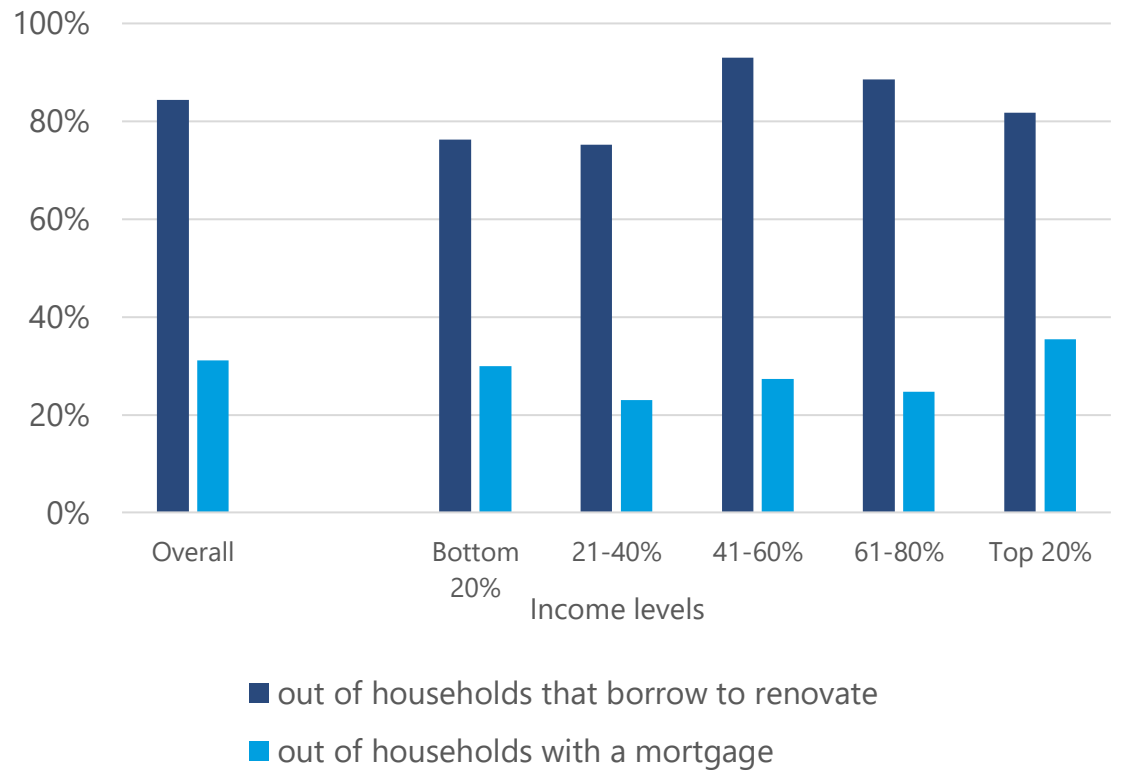


NB: Banks did not need to report EPC labels for refinancings (not real new loans). Classification according to Flanders label.

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

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

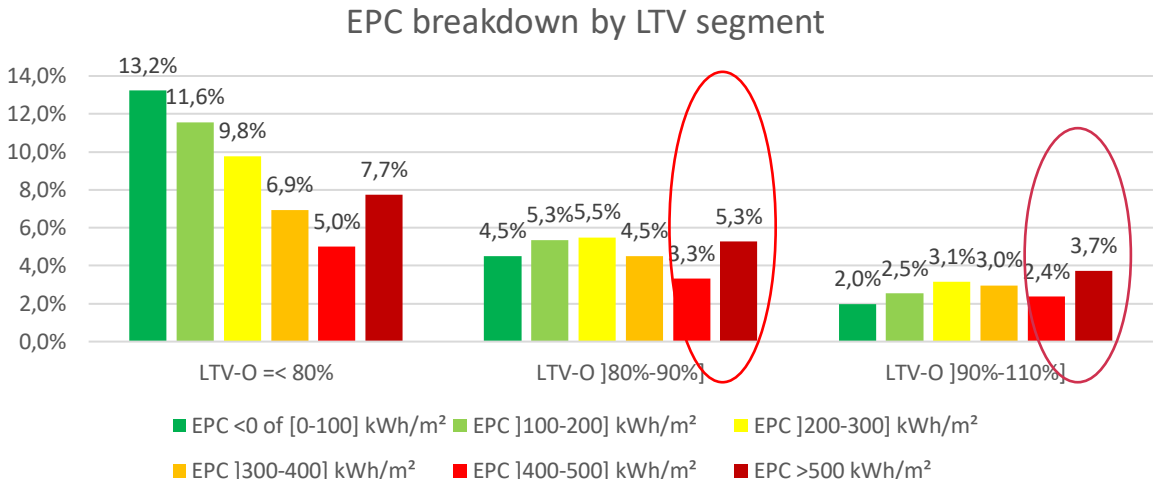
Households borrowing to improve energy efficiency (%; mortgages on the main residence)

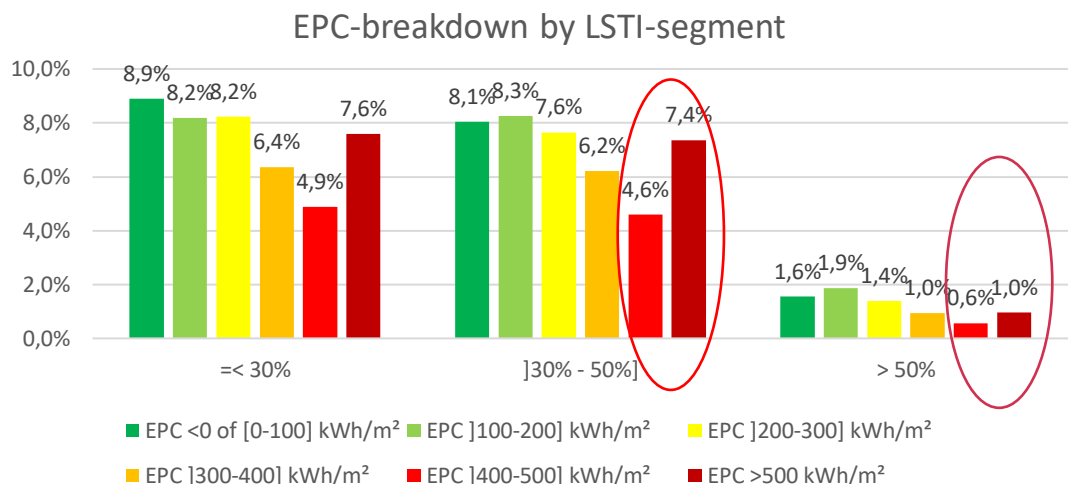


Source: NBB (HFCS, 4th wave, June 2020-June 2021)

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 2022-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**

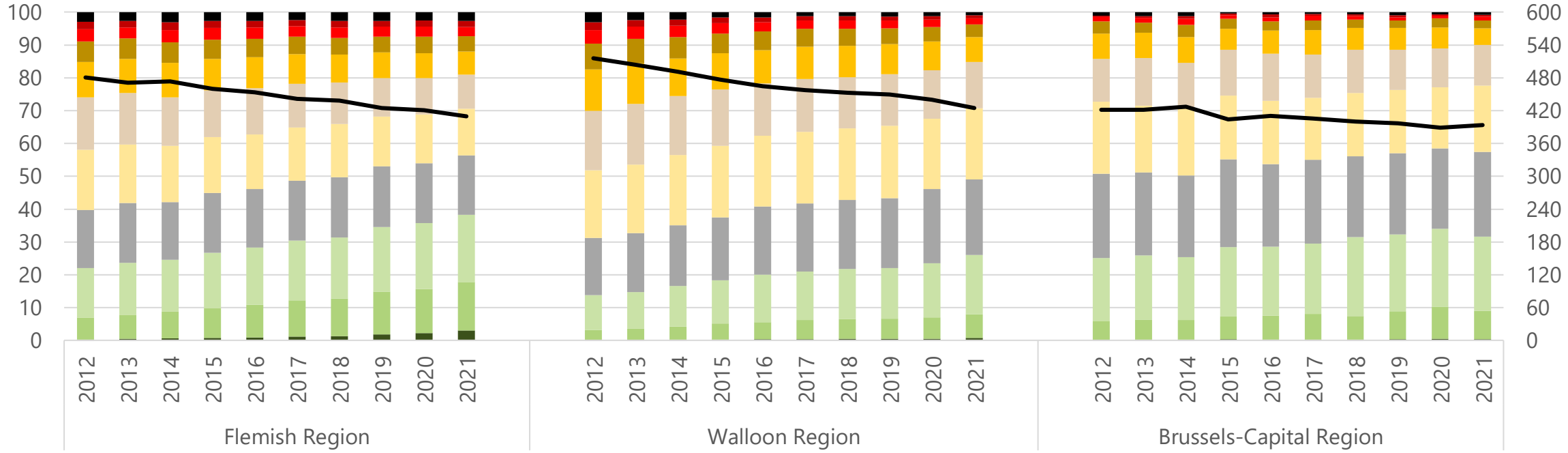
= double vulnerability

Source: NBB

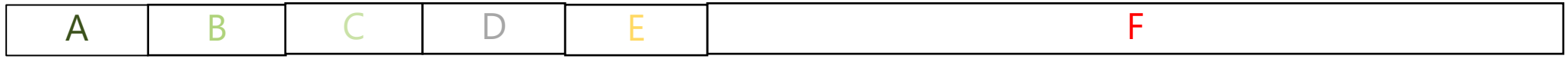
Energy performance of the sold houses has improved over the past decade, but it will need to improve significantly more to reach the 2050-goal of label A

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

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



Flemish energy label



2050 target = EPC 100

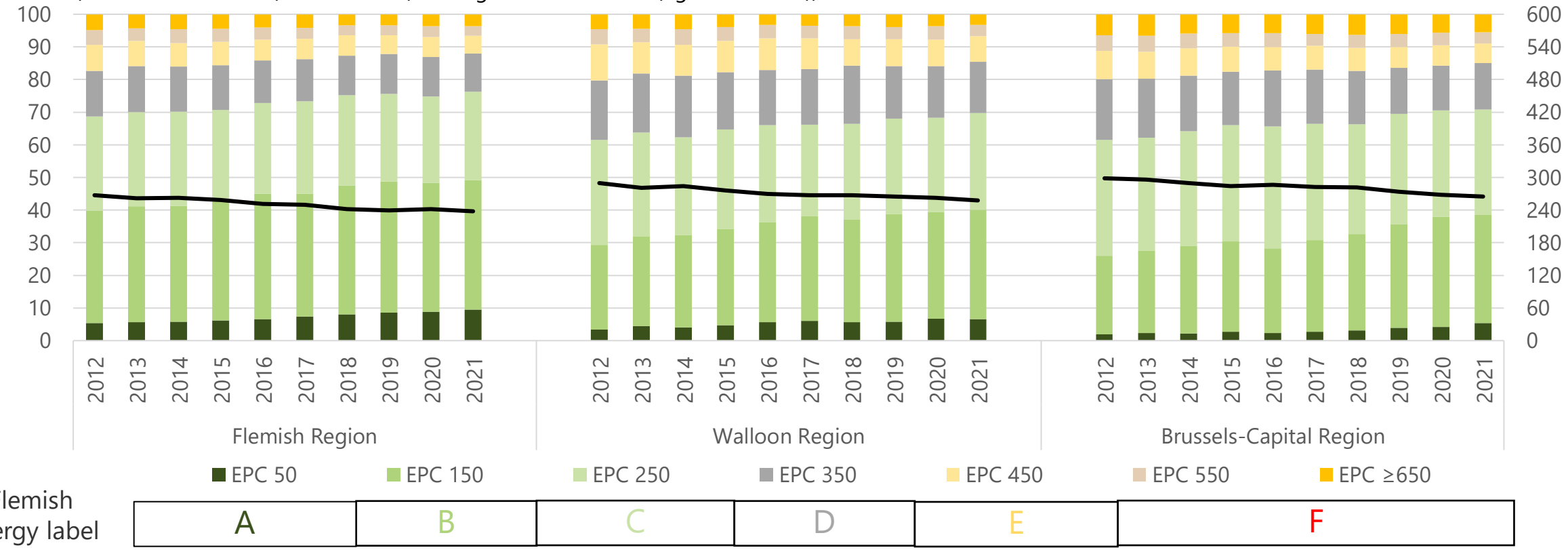
[1] The energy performance scores of the sold dwellings are worse than that of the entire dwelling stock as energetical renovations often take place after the sale (and are therefore not yet included in the EPC score) and because older dwellings are overrepresented in the transaction dataset (Vastmans,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

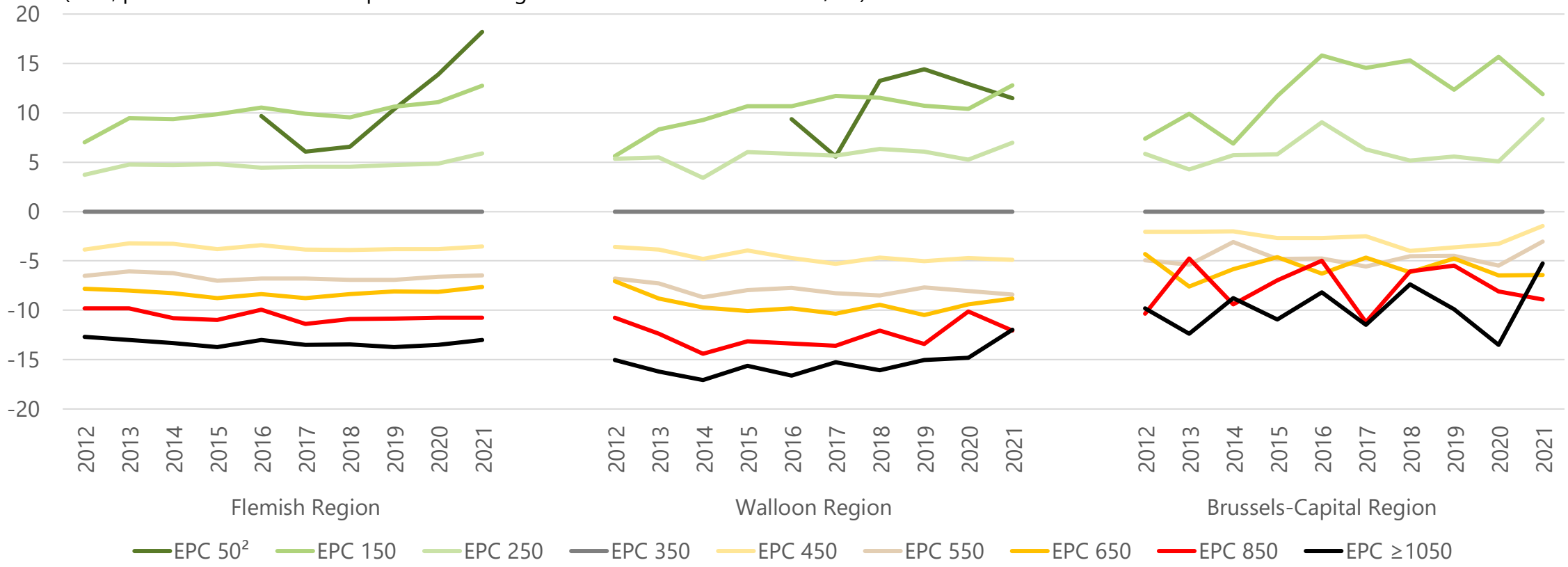
[1] The energy performance scores of the sold dwellings are worse than that of the entire dwelling stock as energetical renovations often take place after the sale (and are therefore not yet included in the EPC score) and because older dwellings are overrepresented in the transaction dataset (Vastmans,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

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

The price premium of energy efficient houses has increased over the past decade (and will likely have risen further in recent months due to the energy price surge)

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.

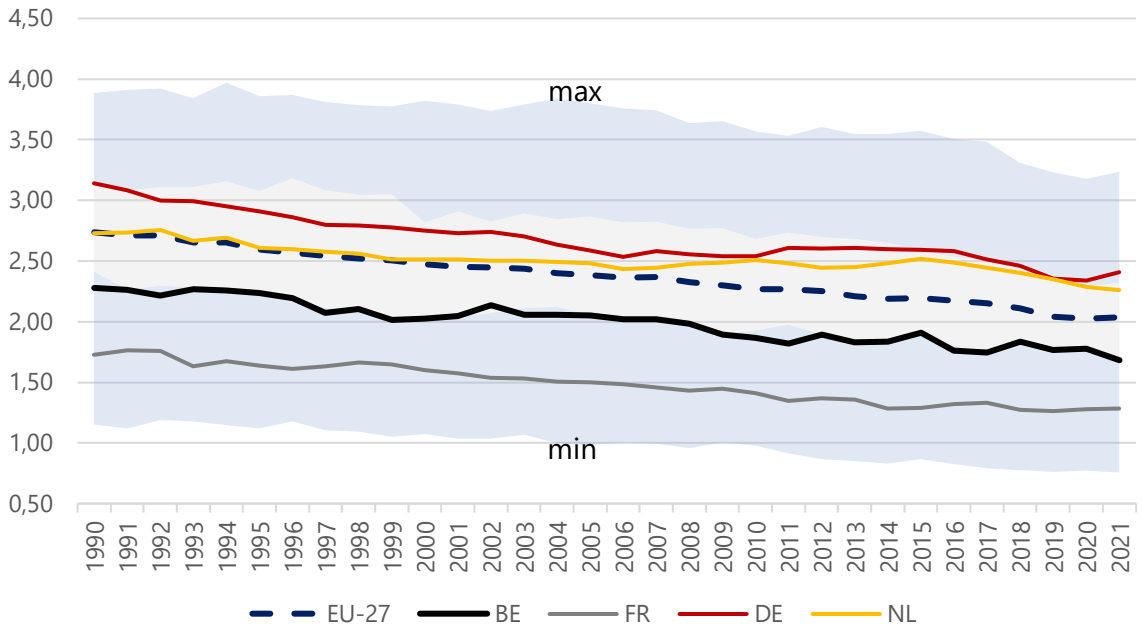
Source: FPS Finance, VEKA, SPW Wallonie, Leefmilieu Brussel, own calculations

4. Current energy context

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

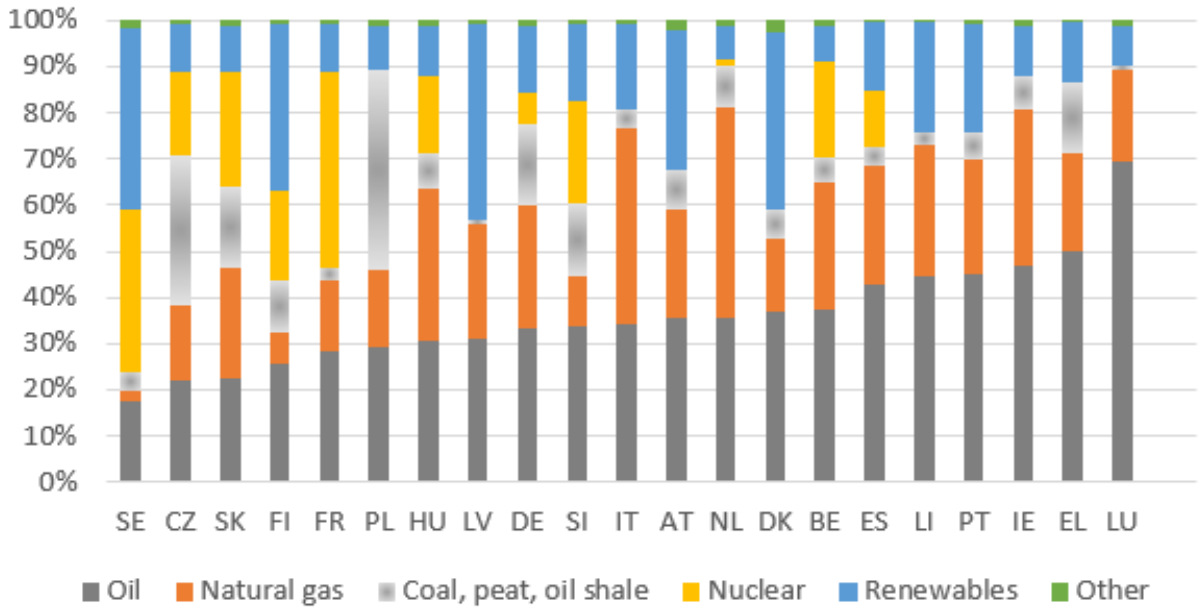
Greenhouse gas intensity of energy consumption in Belgium and the EU-27*

(tons of CO_2 equivalent per ton of oil equivalent)



Source: European Energy Agency and Eurostat

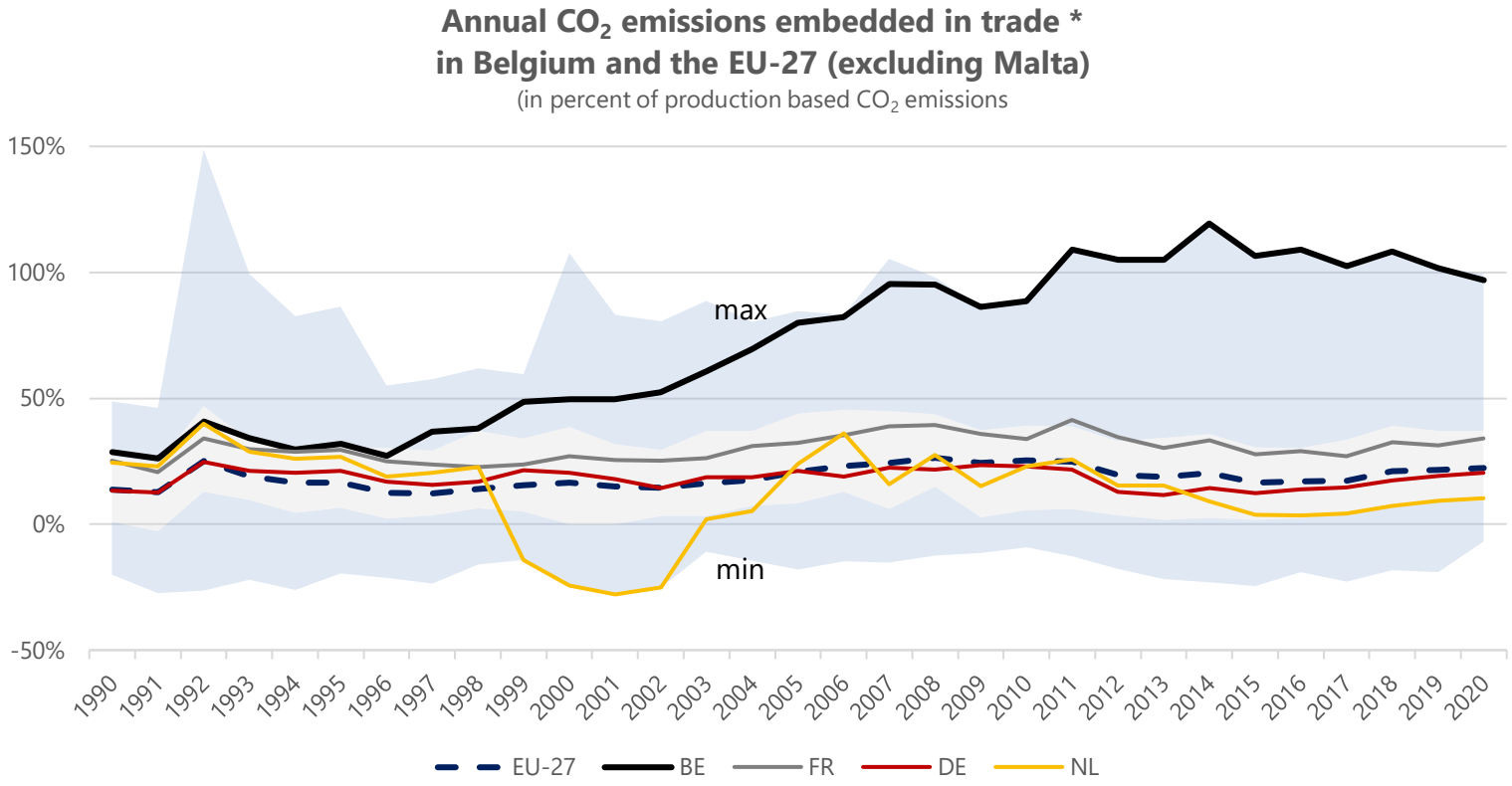
Energy mix in total energy supply (2019)



Source: IEA World Energy Statistics and Balance

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

Indications that Belgium is increasing its consumption carbon footprint via trade

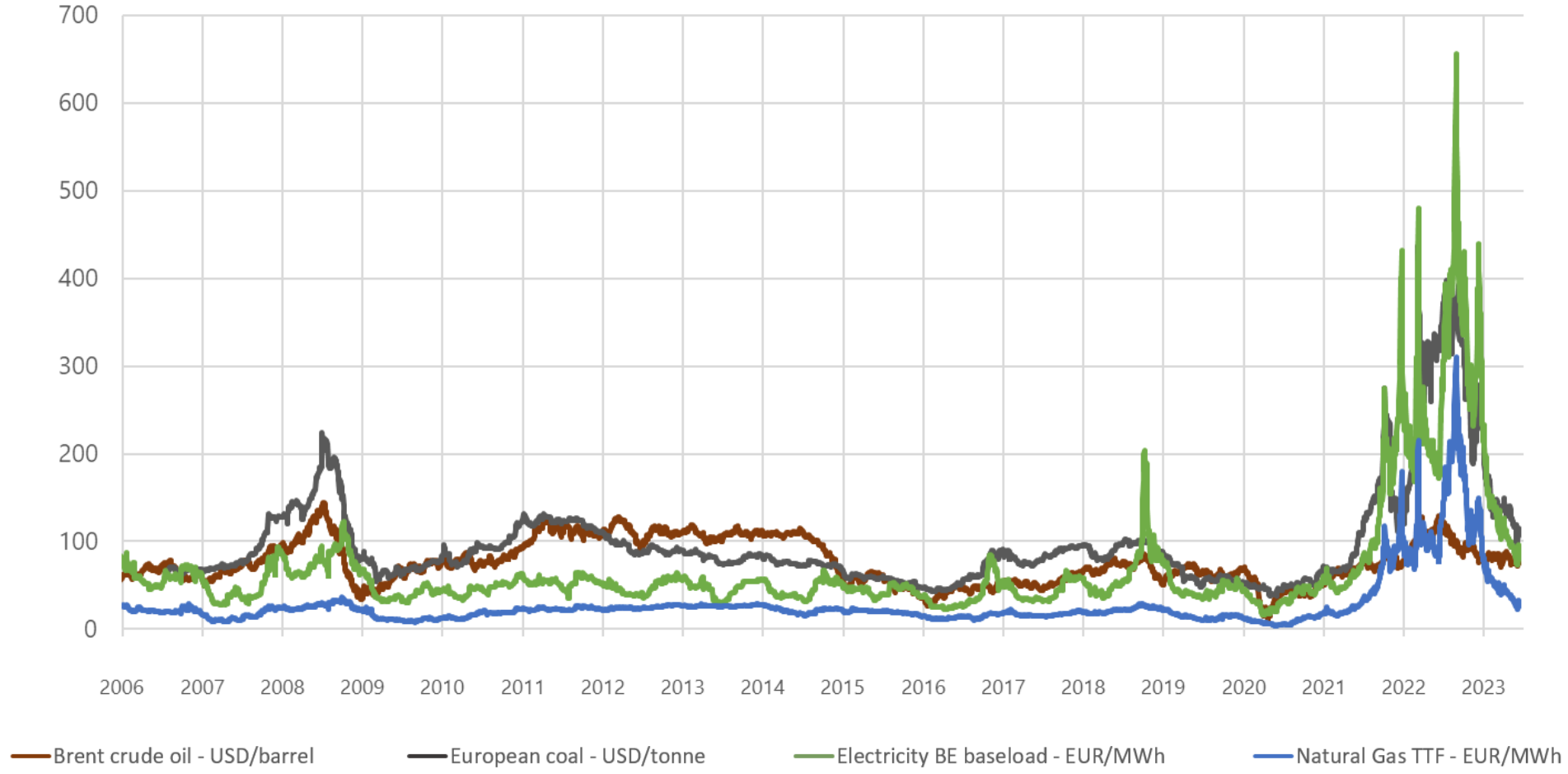


* Annual net carbon dioxide (CO2) emissions embedded in trade, measured as a percentage of production-based emissions of CO_2. Net CO_2 emissions embedded in trade is the net of CO_2 which is imported or exported via traded goods with an economy. A positive value denotes a country or region is a net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

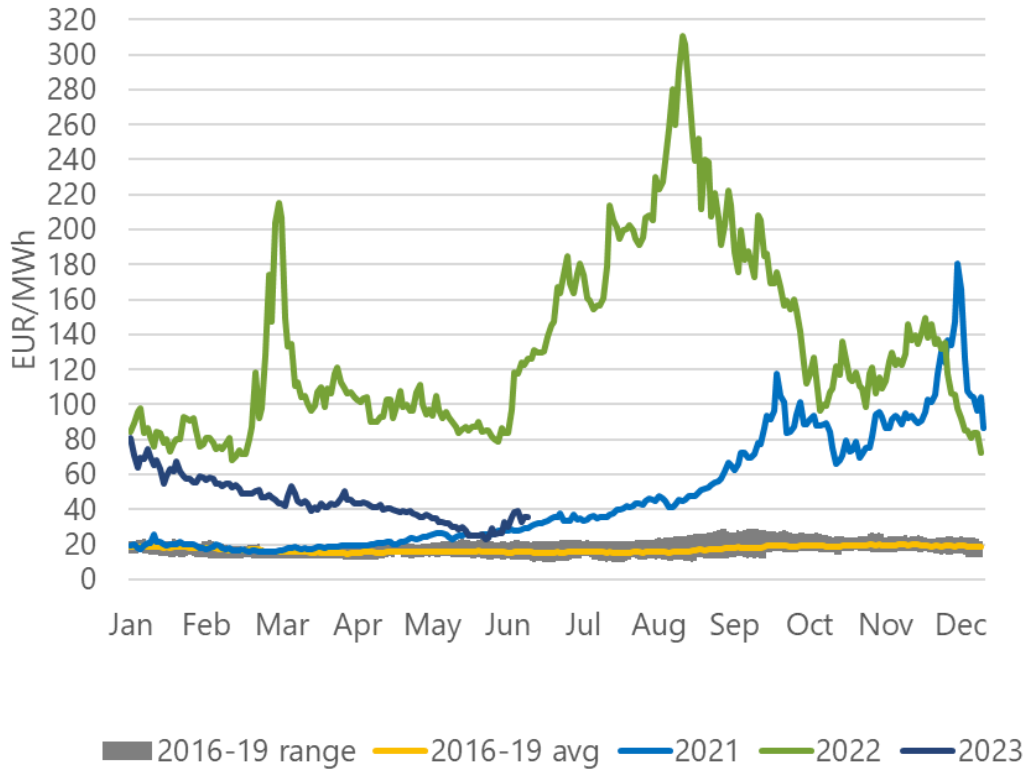
Fossil fuels and electricity prices spiked sharply following the Russian invasion of Ukraine. In 2023, energy markets have started to normalize.



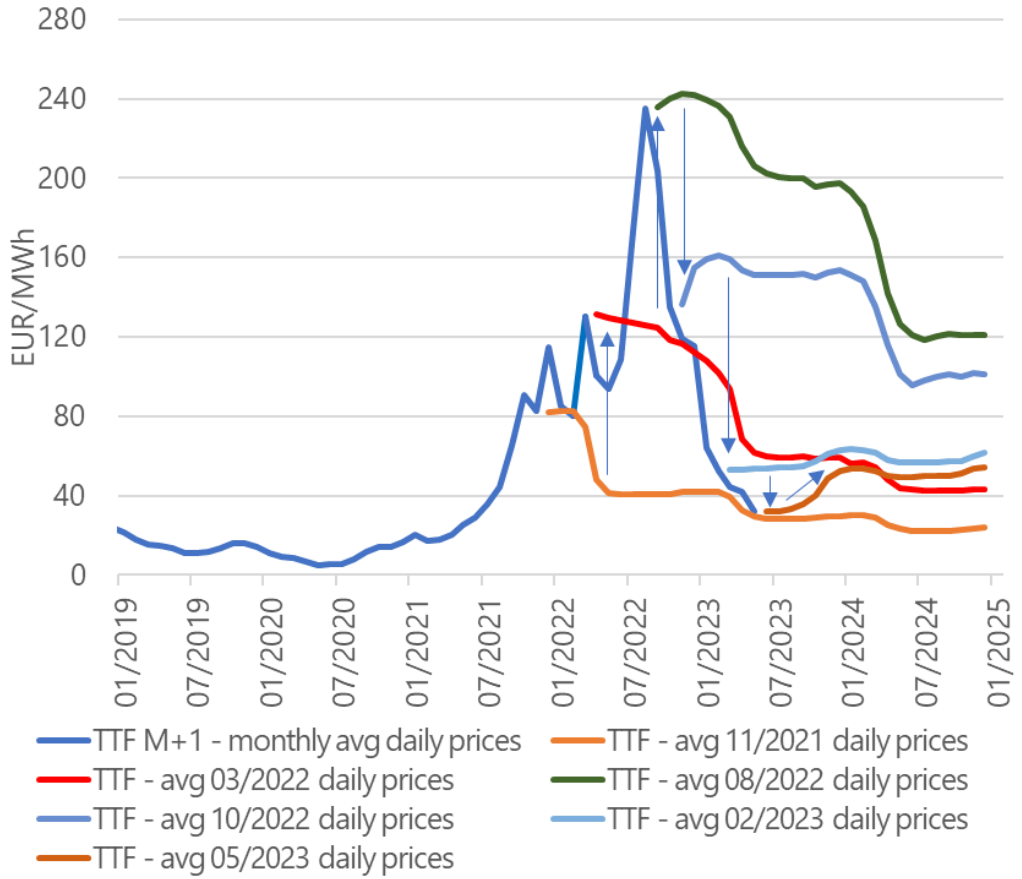
Source: Refinitiv

Natural gas spot prices are closer to earlier levels. Futures in the European gas market still show expectations for a tight market next winter.

- Dutch TTF – M+1 delivery price



- Dutch TTF Futures[1] (monthly averages)

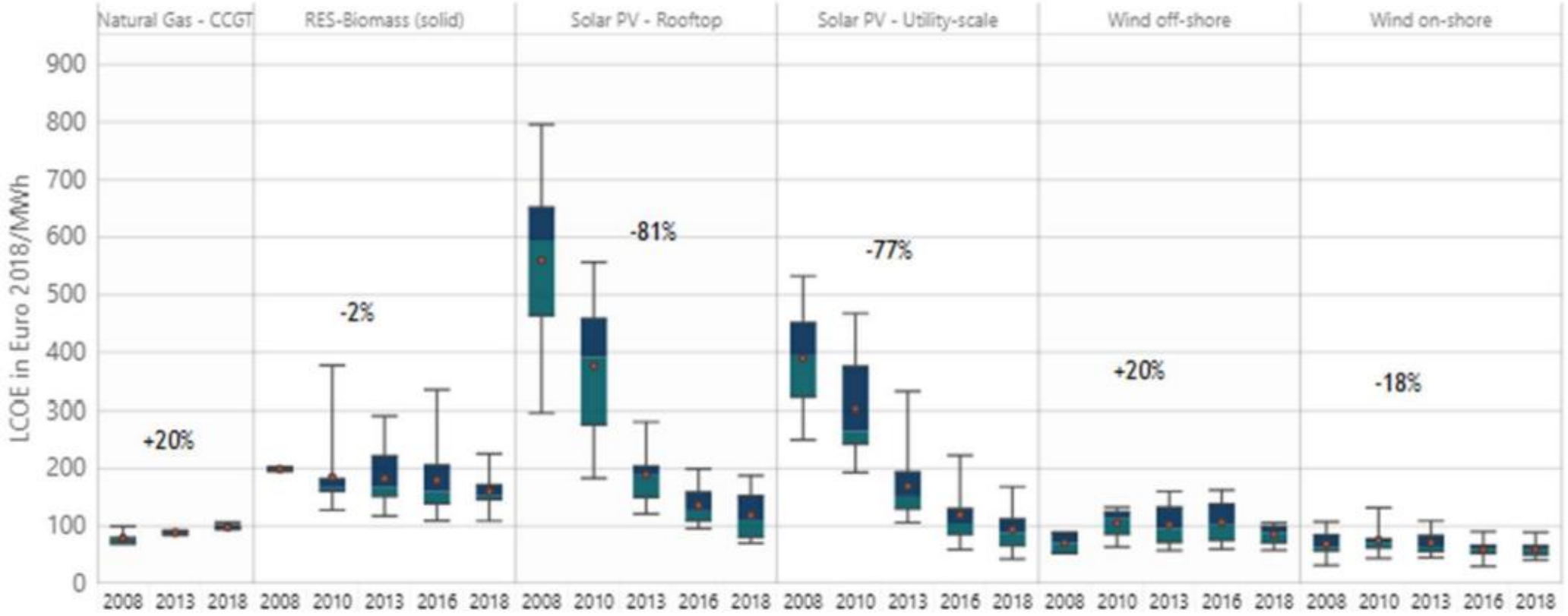


[1] TTF is the Dutch Title Transfer Facility, a virtual trading point for natural gas that acts as reference price.

Source: Refinitiv (a London Stock Exchange company), Standard & Poor's, Goldman Sachs, last data point: 1 July 2022

5. Competitiveness of renewables

The cost of renewables has declined substantially, thus increasing their competitiveness. Energy security is an additional co-benefit.



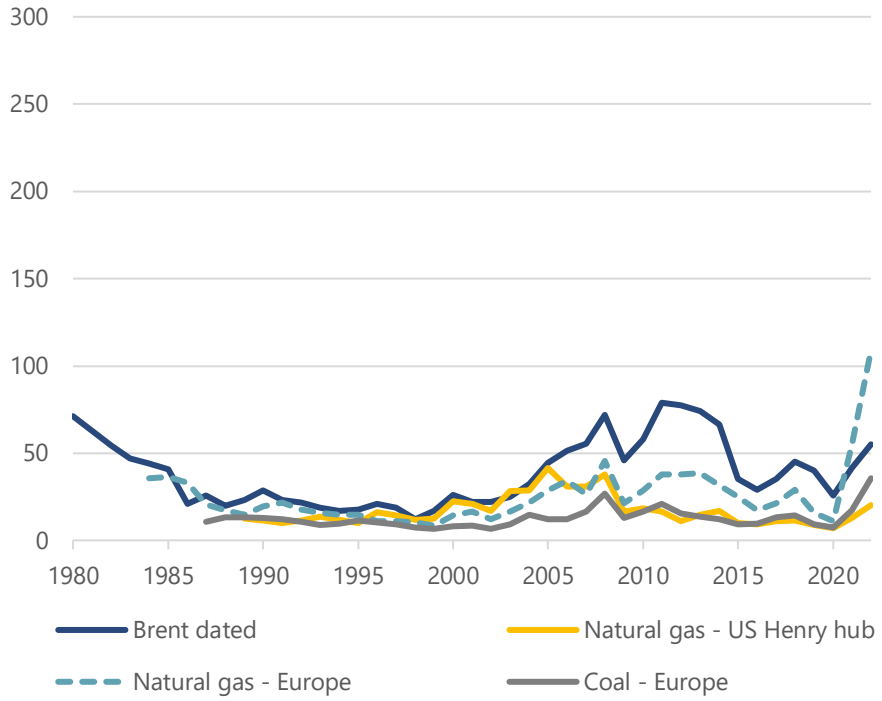
LCOE = gives the average cost incurred to produce one unit of electricity over the life of a project = ratio of lifetime costs (upfront capital investment, financing costs, fuel costs, O&M costs, and CO_2 prices when applicable) to lifetime electricity generation of a plant discounted back to a common year. LCOE does not include network costs due to intermittency. Discount rate used: 7%, except for rooftop solar for which it is 3%.

Source: EC (2020), "Cost of Energy (LCOE): Energy costs, taxes and the impact of government interventions on investments"

Renewables are firmly expected to become even cheaper through 2050

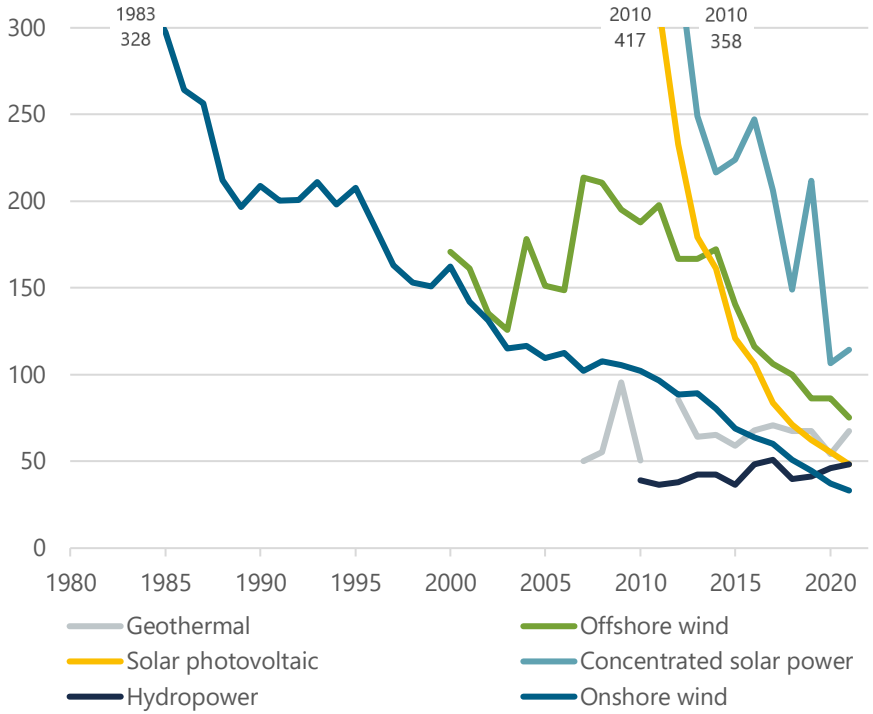
Fossil fuel prices

(in $2021/MWh)

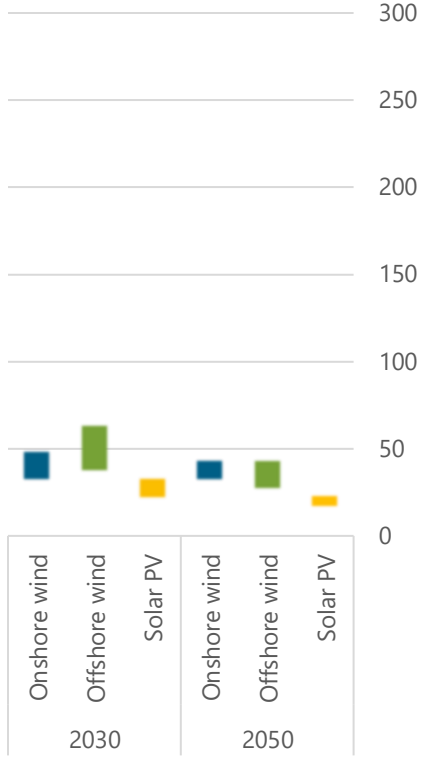


Levelised cost of renewable generation today…

(in $2021/MWh – worldwide)



… and in 2030-2050



Min. onshore wind = US

Min. offshore wind = Europe

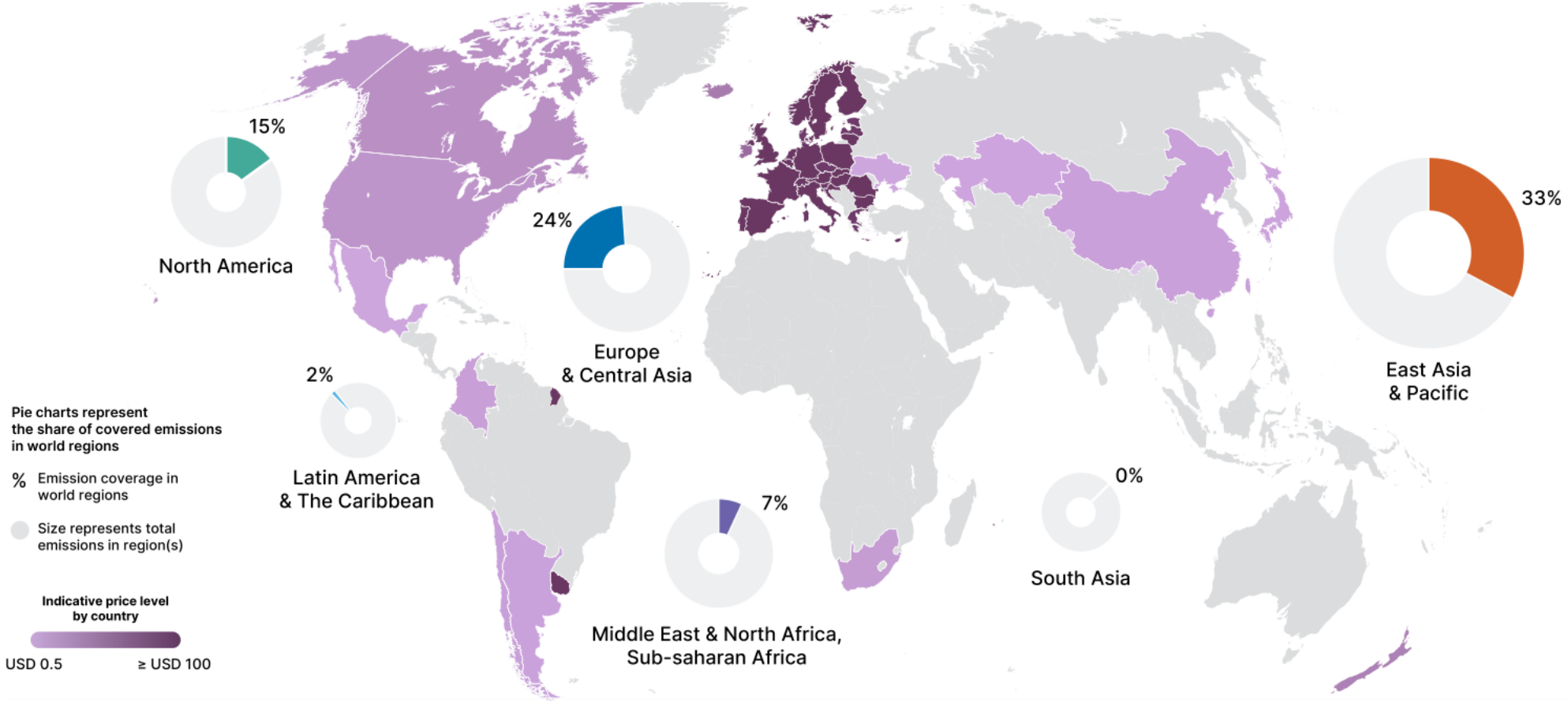
Min. solar PV = China

Source: BP statistical review of world energy (June 2022) – Our world in data based on "IRENA Renewable power generation costs in 2021" – "IEA World energy outlook 2022".

6. Carbon pricing and climate policy instruments

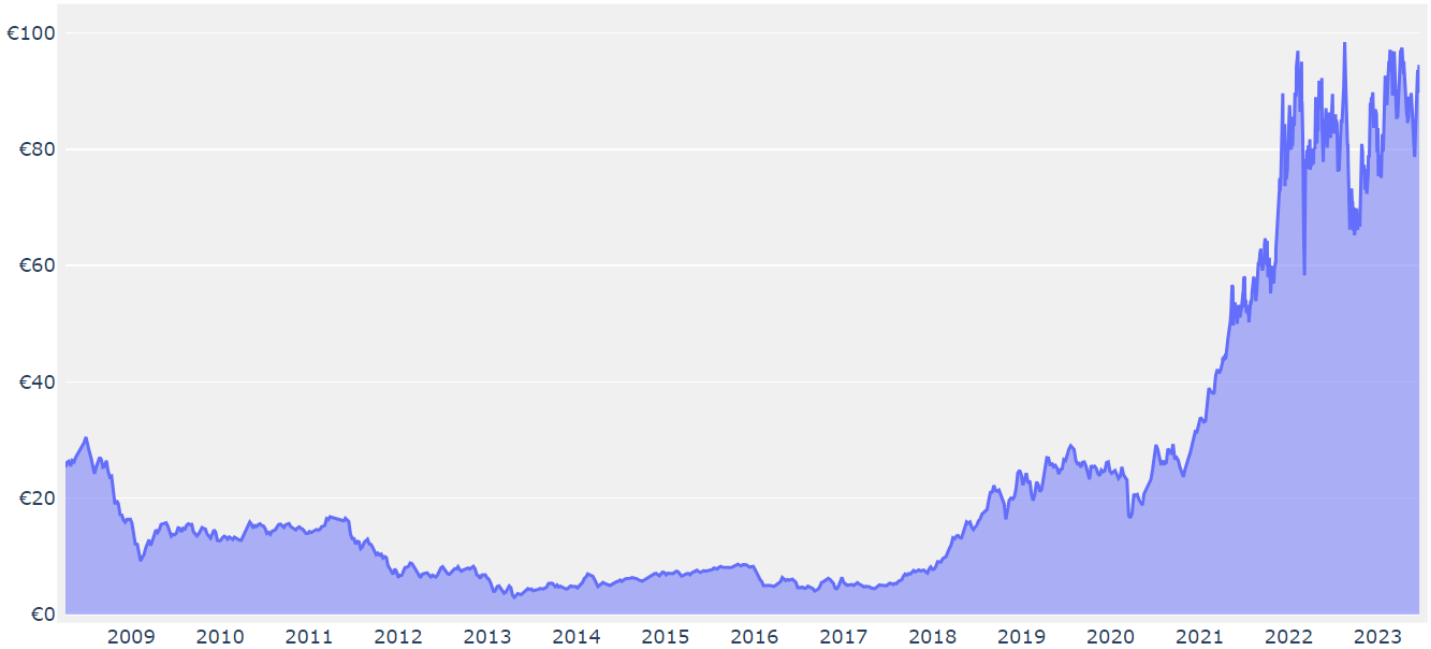
Carbon pricing is the key policy instrument to shift relative prices. Its use is, however, still only moderately wide-spread.

Scope and price levels of carbon pricing initiatives around the world

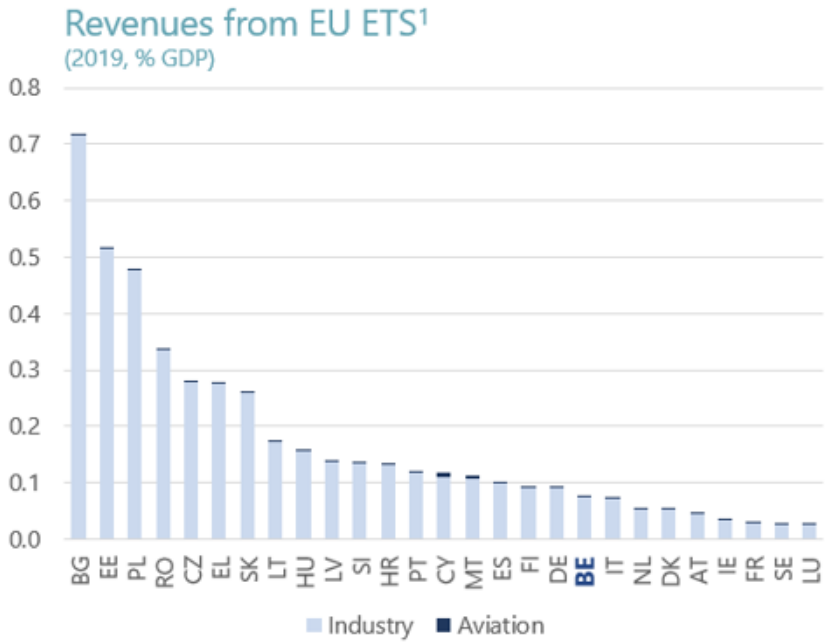


Source: World Bank Group, *States and Trends of Carbon Pricing 2023*

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 22 June 2023

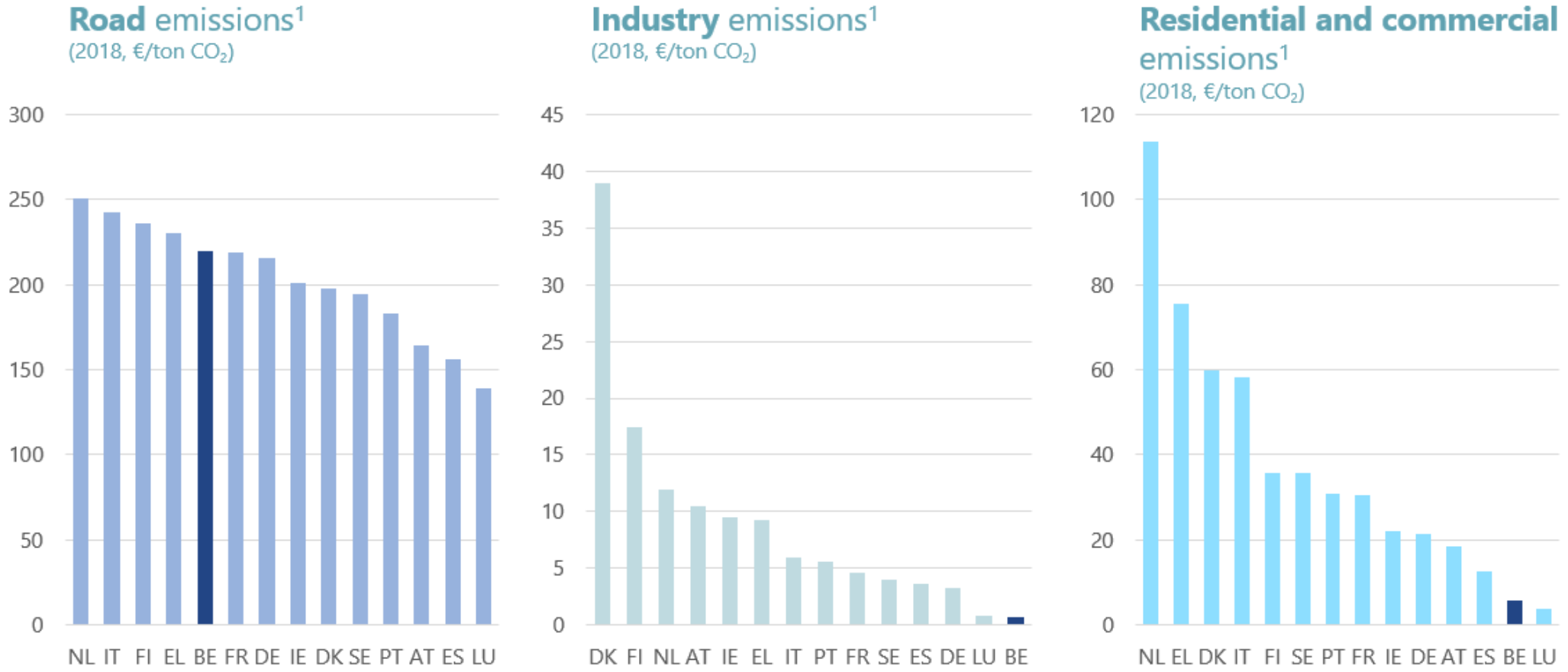


[1] EU ETS revenue for year t refers to 1 April t until March 30 in t+1.

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.



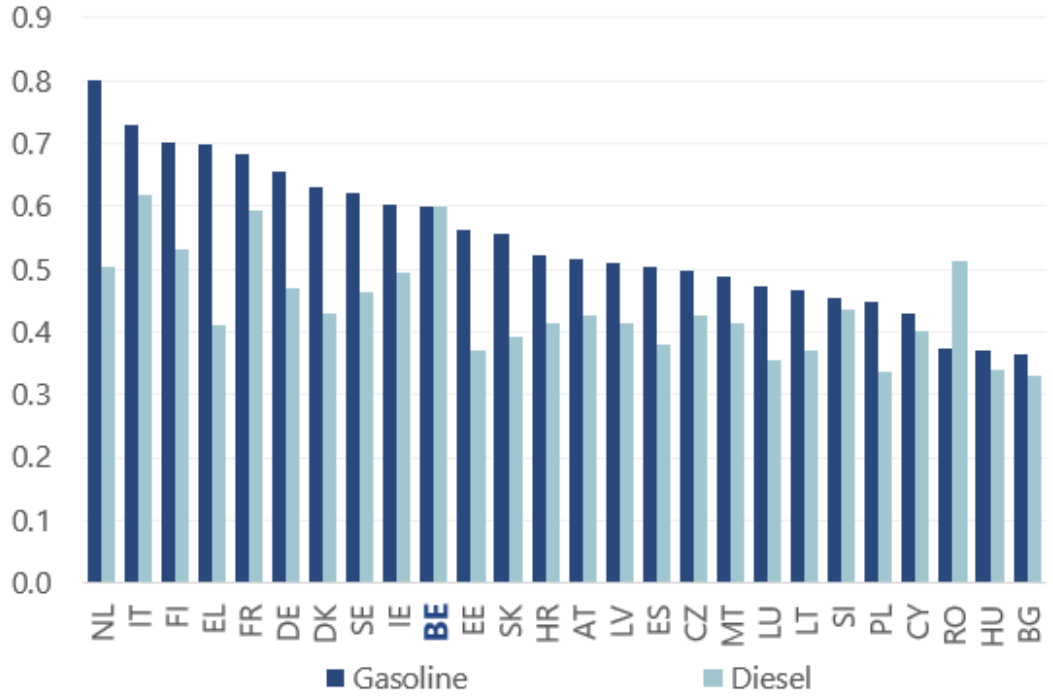
[1] including emissions from the combustion of biofuels. Industry emissions only includes national efffective carbon price.

Source: OECD (2019)

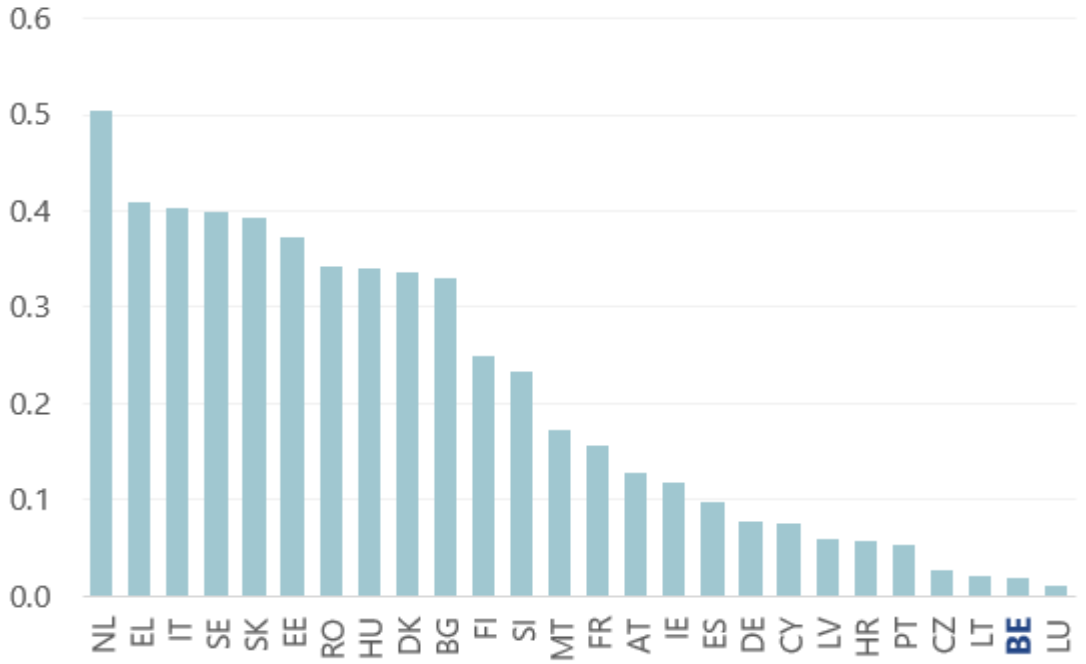
Effective carbon pricing in the economy differs widely across sectors (ctd.)

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

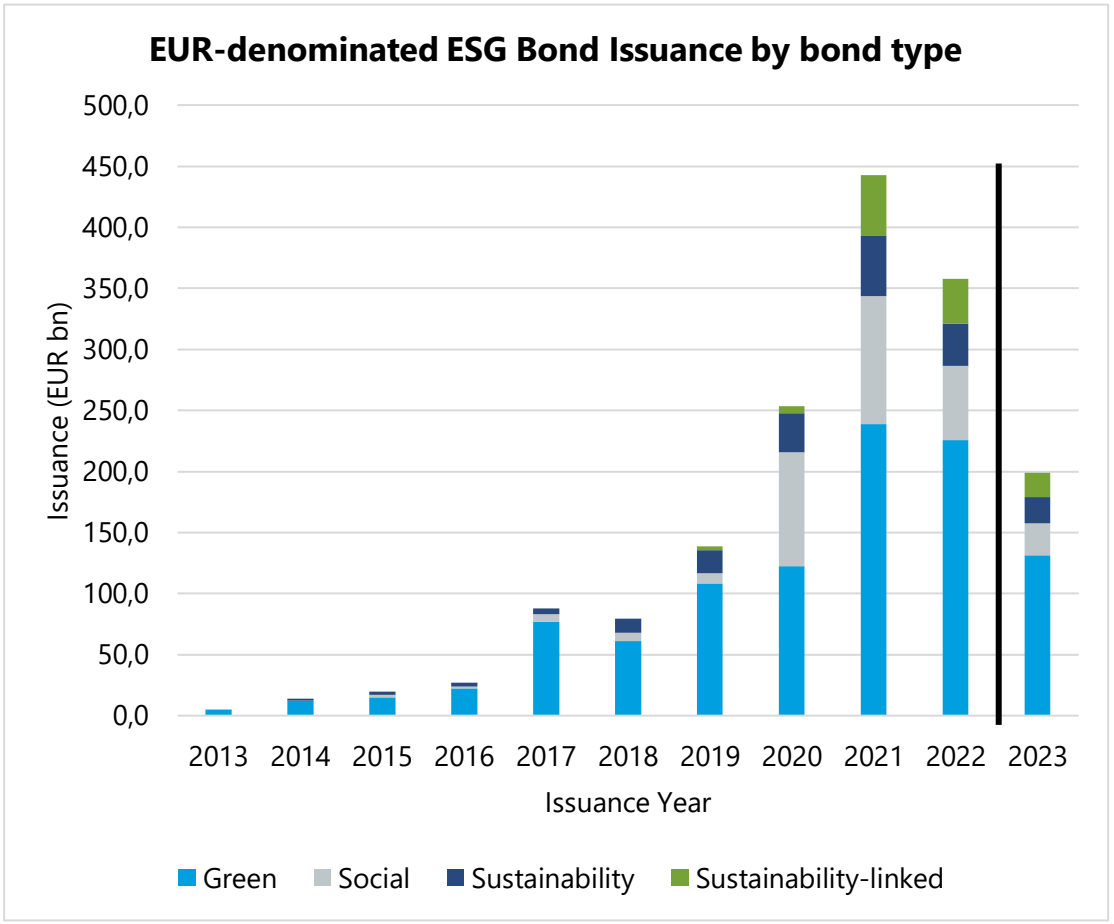
- GDP changes of between -0.4% to +0.5% of GDP in 2030, and between -1.3% to +2.2% in 2050.

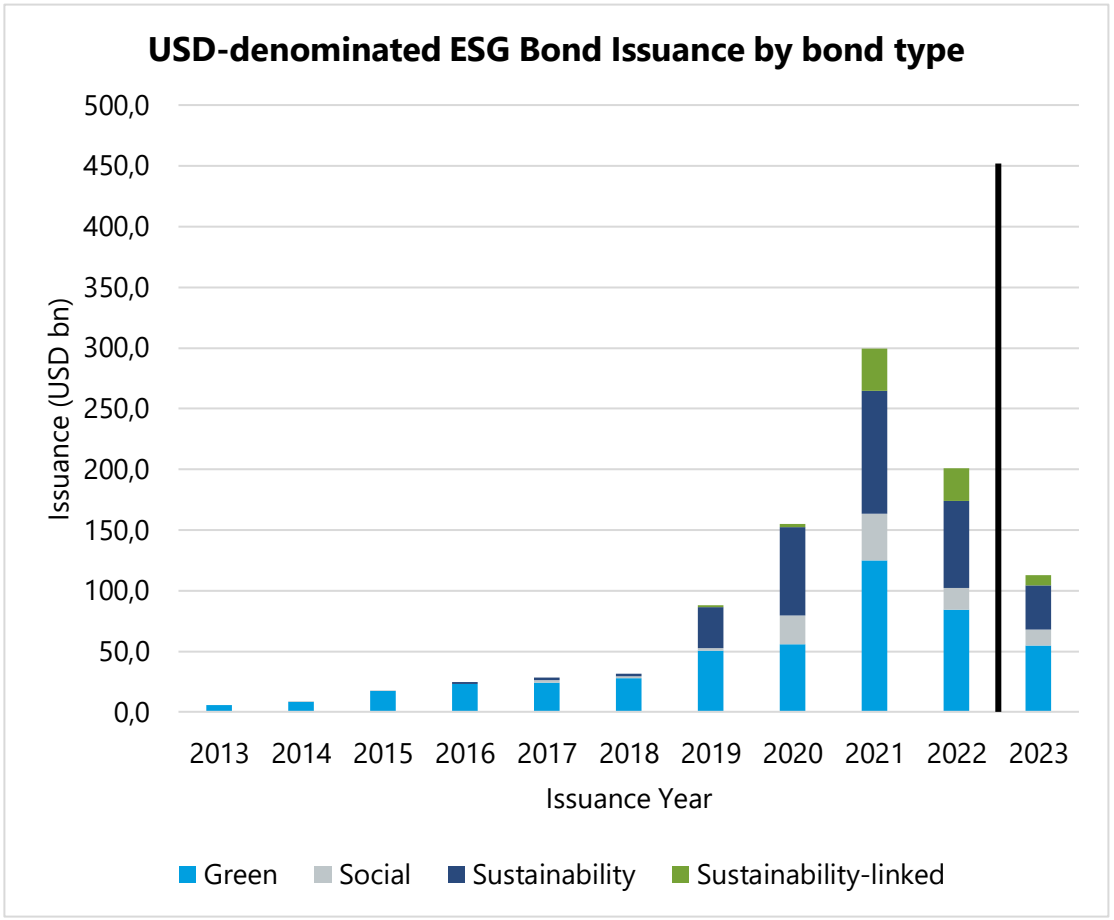
Note: Co-benefits are not included in the above estimates. According to European Commission estimates, improved air quality would lead to co-benefits of +218-459 billion euro per year for the EU27 alone.

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

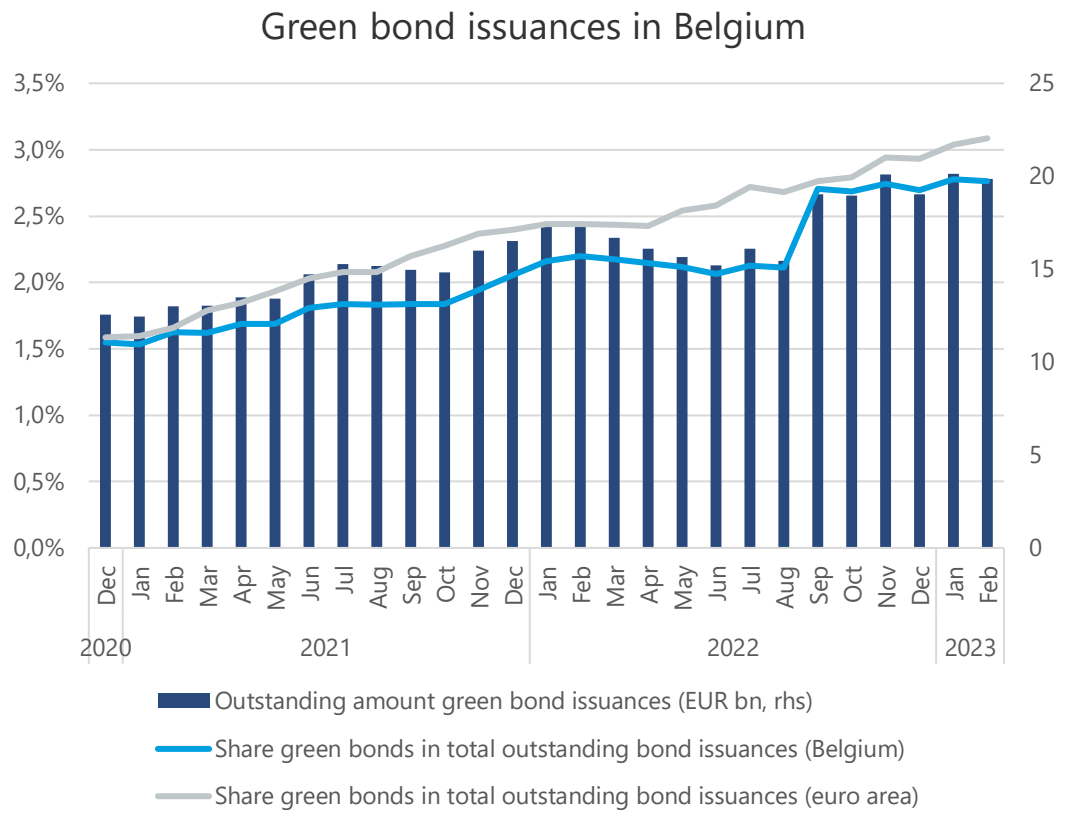
Sustainable bond issuance drops slightly in 2022 after period of growth

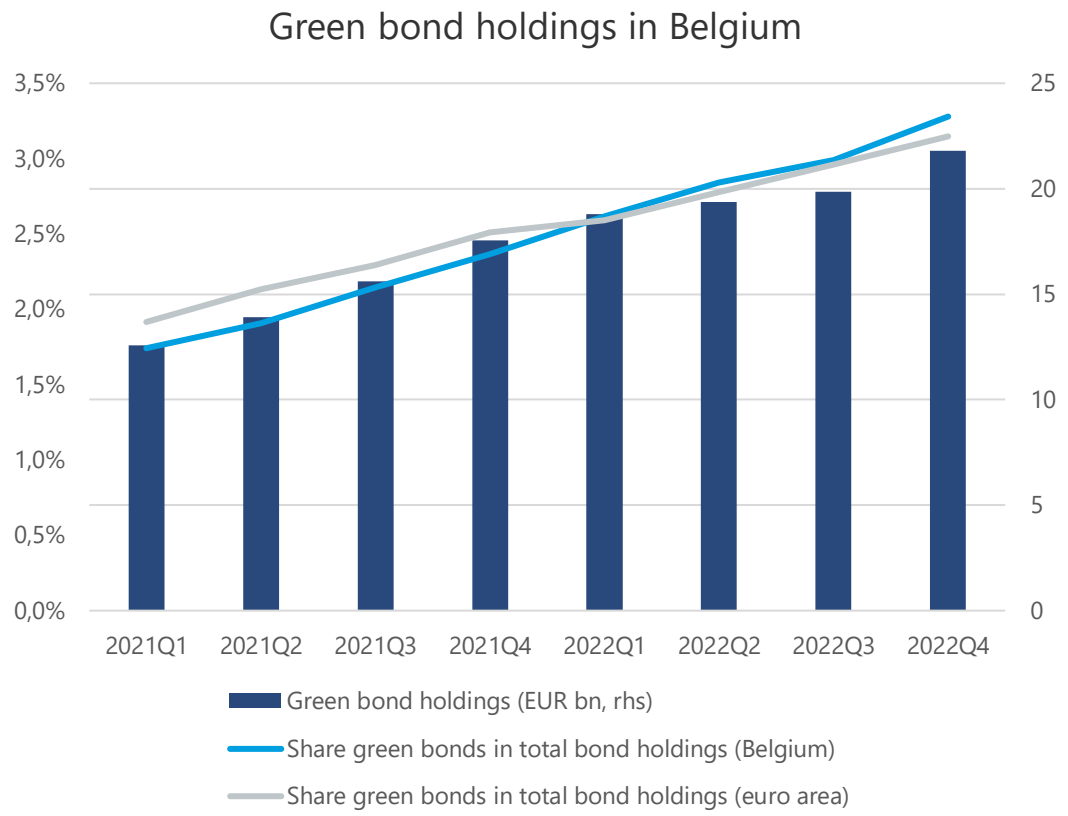




Note: 2023 represents 2023 year-to-date data (June 2023)

Green bond issuances and holdings in Belgium grow but still remain limited





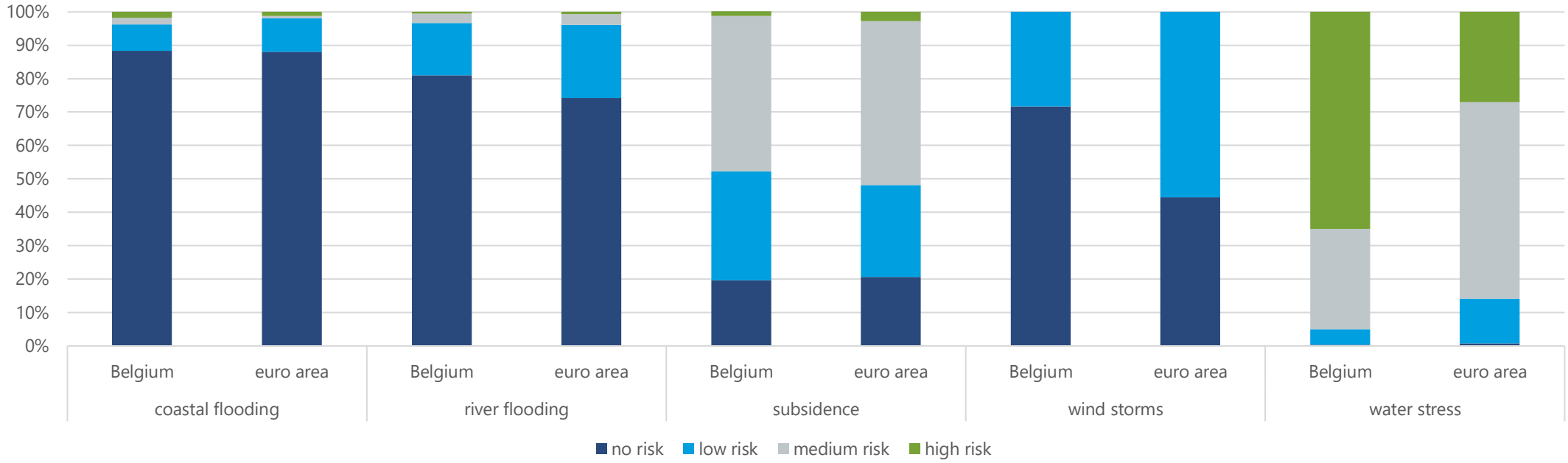
Notes: Issuances and holdings of financial and non-financial sectors. All self-labelled green bonds are included

Source: ECB

8. Physical risk in the Belgian financial sector

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

Score-based indicator of Belgian vs Euro Area financial sector (2020)

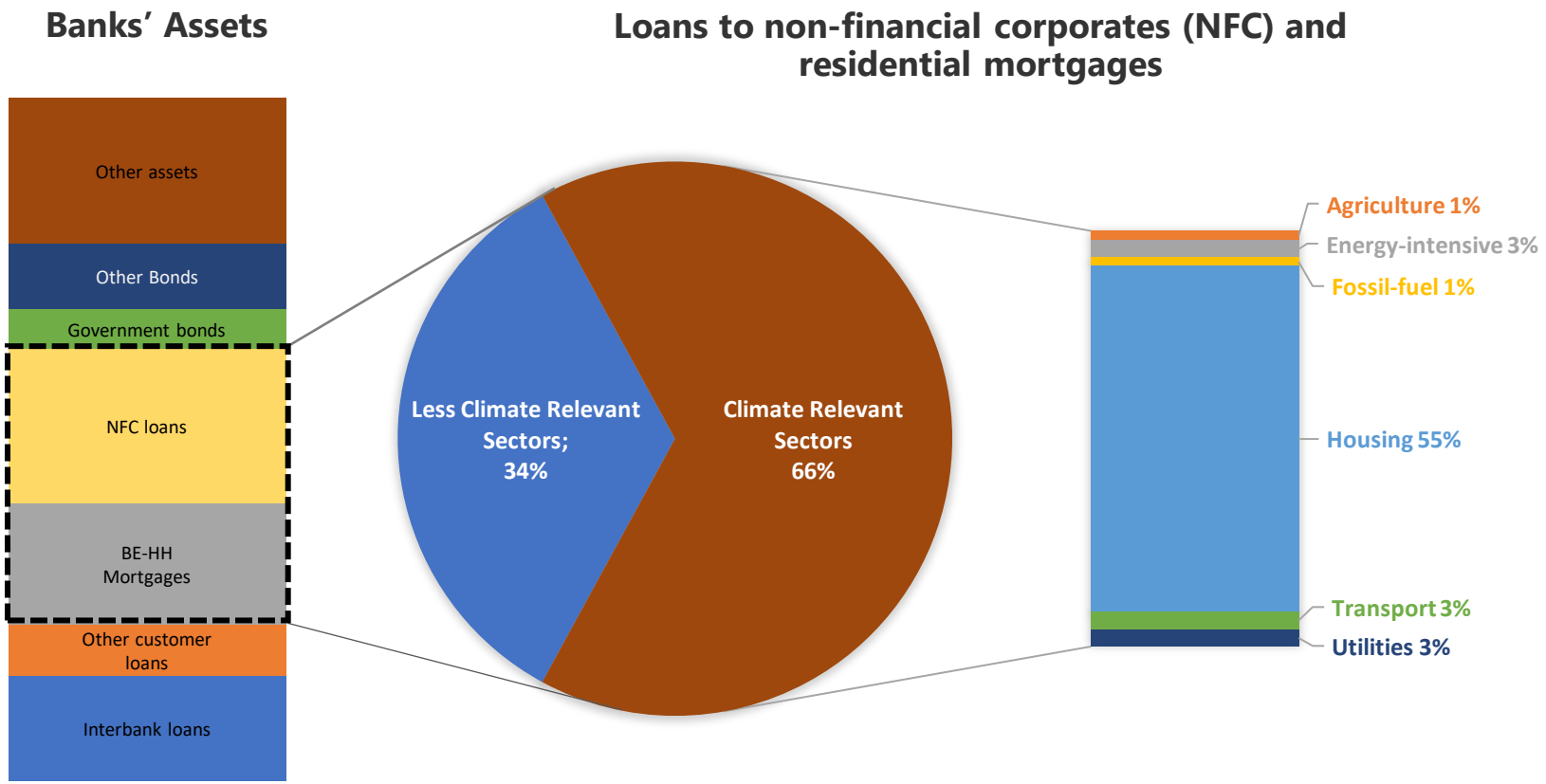


Notes: Financial sector contains deposit-taking institutions, investment funds, insurance companies and pension funds. Financial sector exposures include bank loans to non-financial corporations and listed shares and debt securities issued by non-financial corporations.
Only waterstress includes projected data for 2030 and 2030-2050. For the other indicators only current hazard profiles are available. No wildfire hazard data is currently available for Belgium.
Indicators are analytical and should be used with caution.

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 2021)

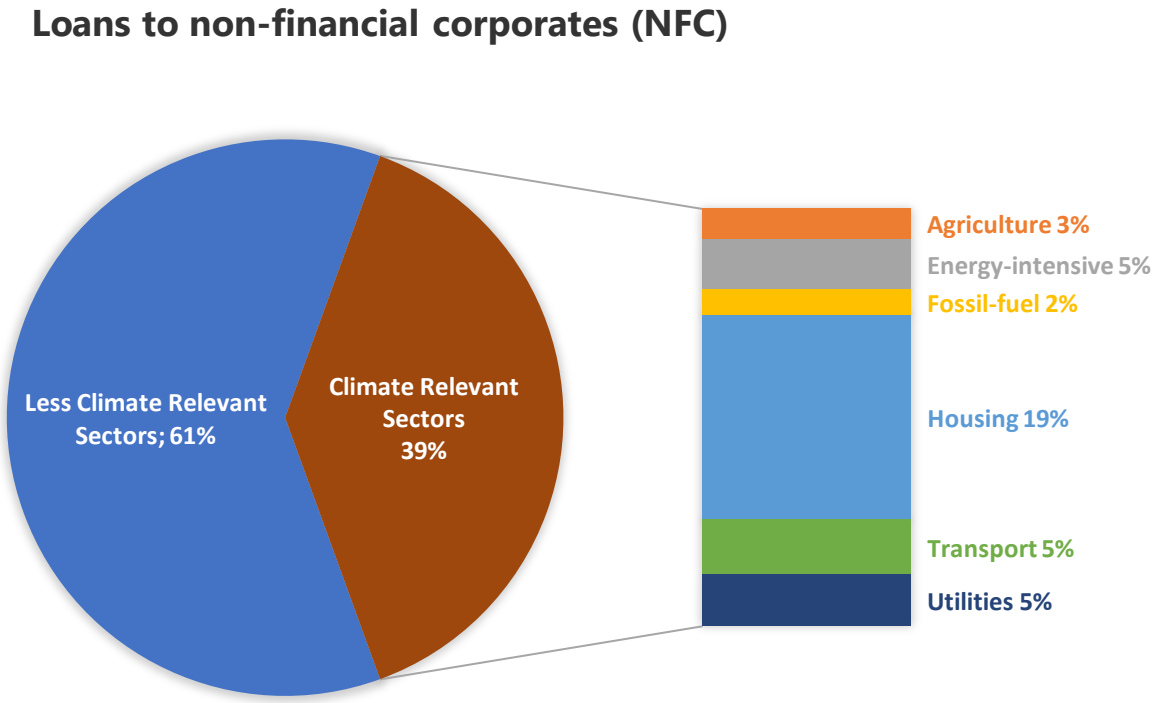


- 66% of banks' loans to non-financial corporates and mortgages have counterparties in "climate relevant sectors"
- GHG intensive sectors are considered climate relevant, as they are most vulnerable for additional climate policies and impacts from technological changes and consumer preferences directed at increased sustainability, resulting in higher transition risk.
- Of all climate relevant sectors, real estate exposures or housing represents the largest sector, making up 55% of all loans to NFCs and mortgages: see slide 13 (left) and slide 15
- There are of course differences in GHG intensity within sectors , which are not taken into account

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 2021)

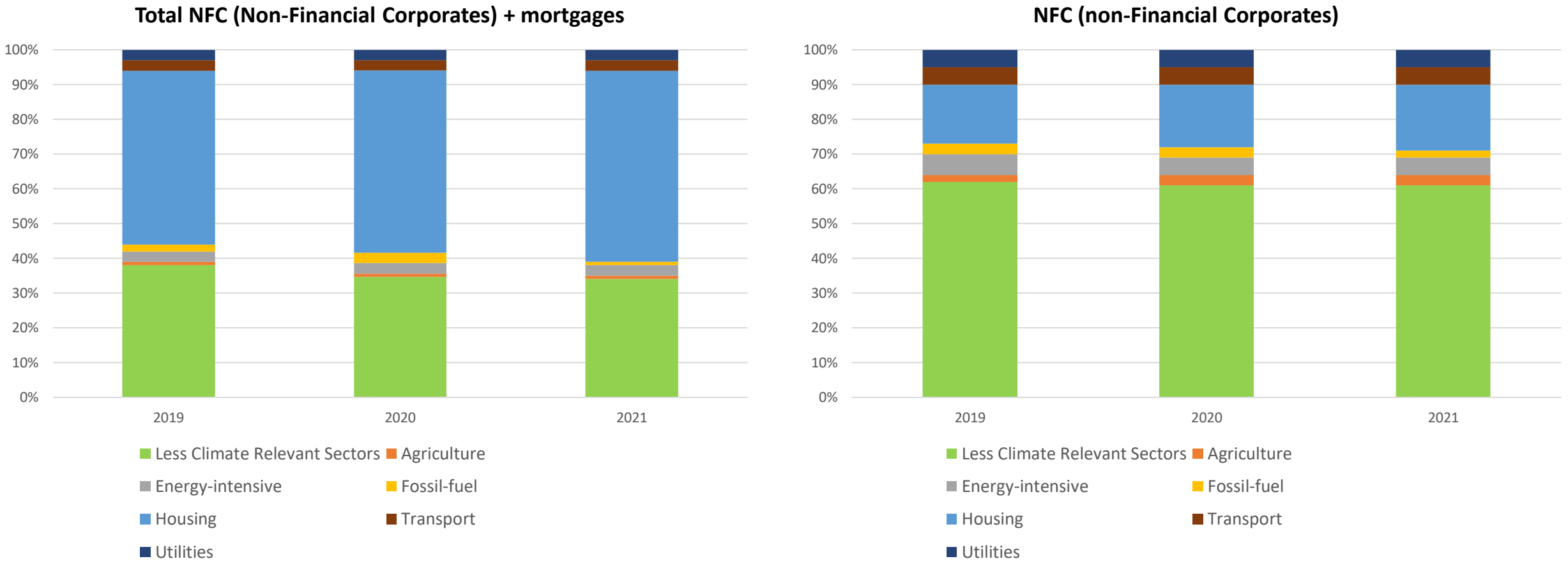


- 39% of banks' loans to non-financial corporates are considered "climate relevant or GHG intensive sectors"
- Of all climate relevant sectors, real estate exposures or housing represents the largest sector, making up 19% of all loans to NFCs
- There are of course differences in GHG intensity within sectors , which are not taken into account

Source: NBB

The increase in real estate exposures causes banks' exposure to transition risk to slightly increase over the past years

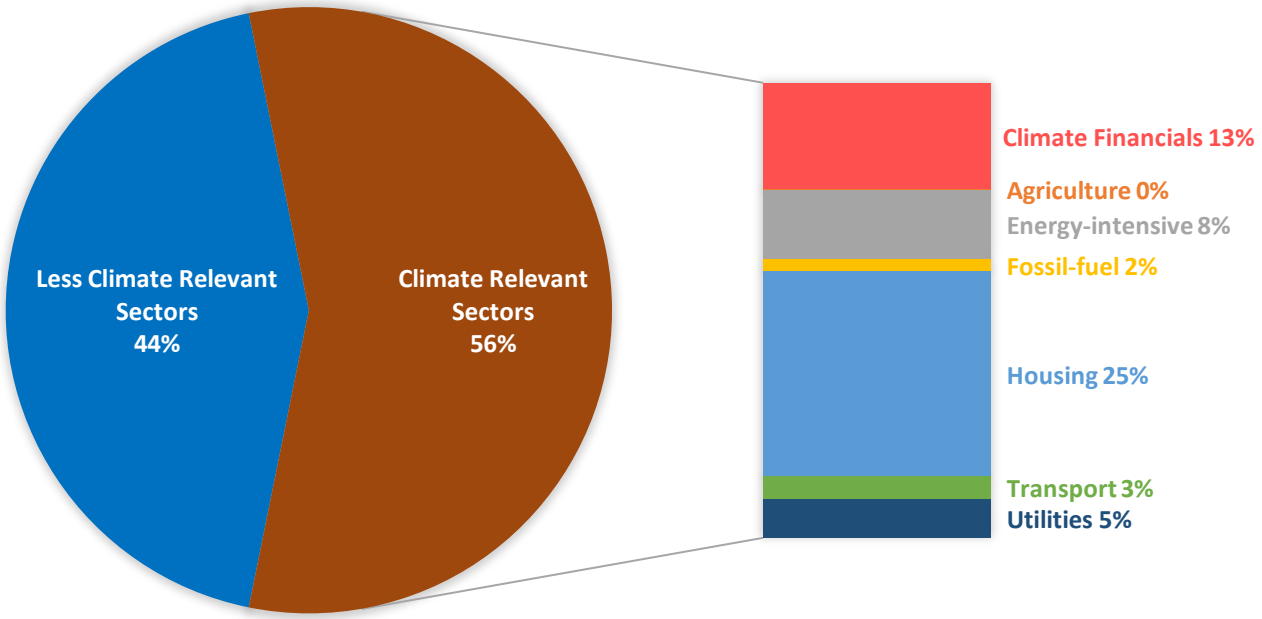
Belgian Banks' loan exposure to greenhouse gas intensive sectors (evolution 2019-2021)



Source: NBB

Real estate exposures is also a major source of transition risk for Belgian insurers

Belgian Insurance Companies' EQUITY/CORPORATE BONDS/LOANS/ MORTGAGES exposure to greenhouse gas intensive sectors (end 2021)



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.

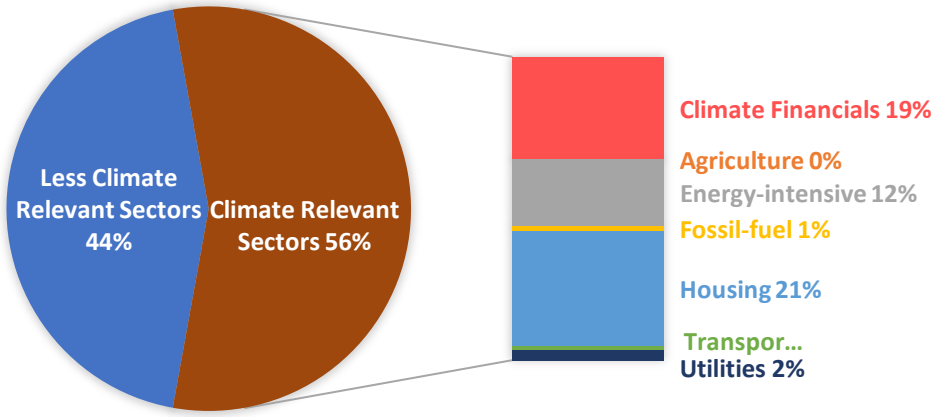
Those assets, include participation in other insurance companies or banks and holdings of investment funds, which are not looked through.

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.

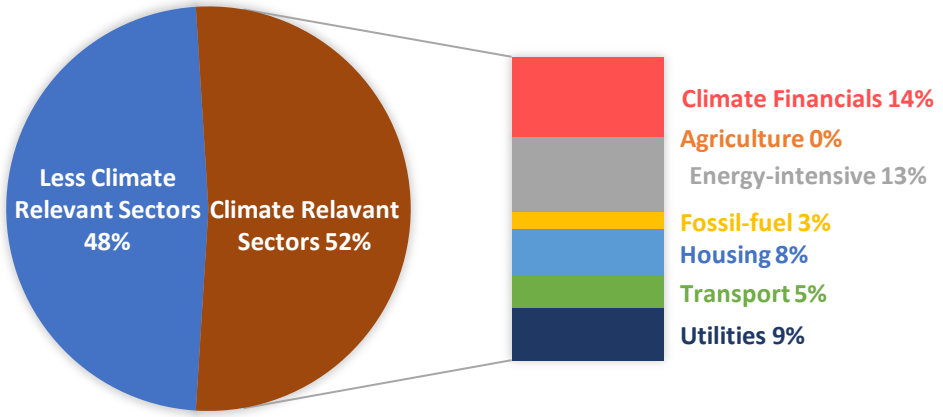
Real estate exposures is also a major source of transition risk for Belgian insurers

Belgian Insurance Companies' exposure to greenhouse gas intensive sectors (end 2021)

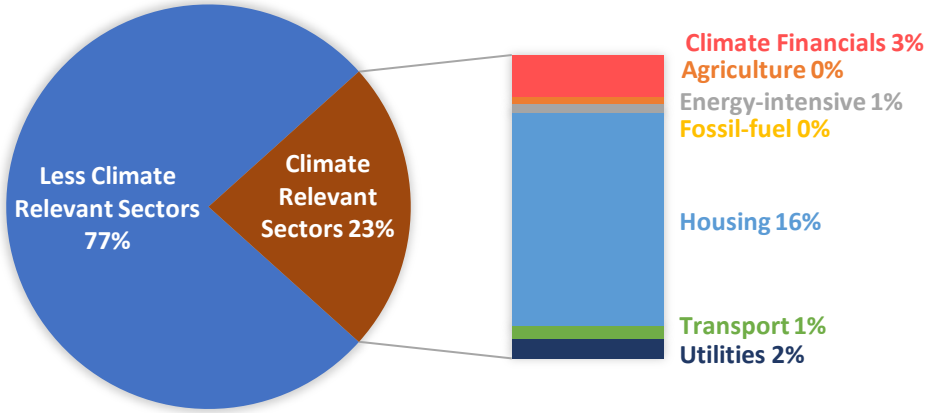
EQUITY



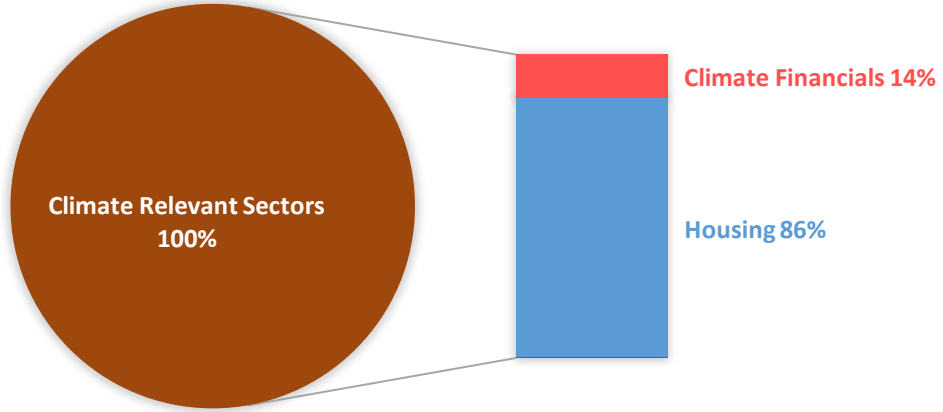
CORPORATE BONDS



LOANS

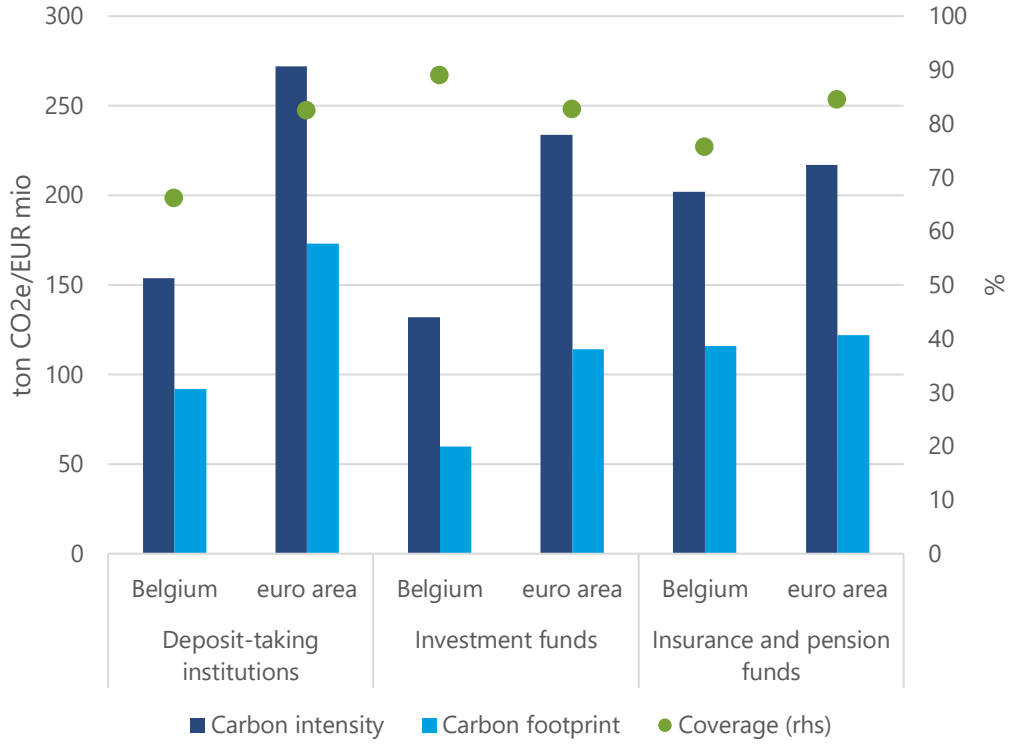


MORTGAGES

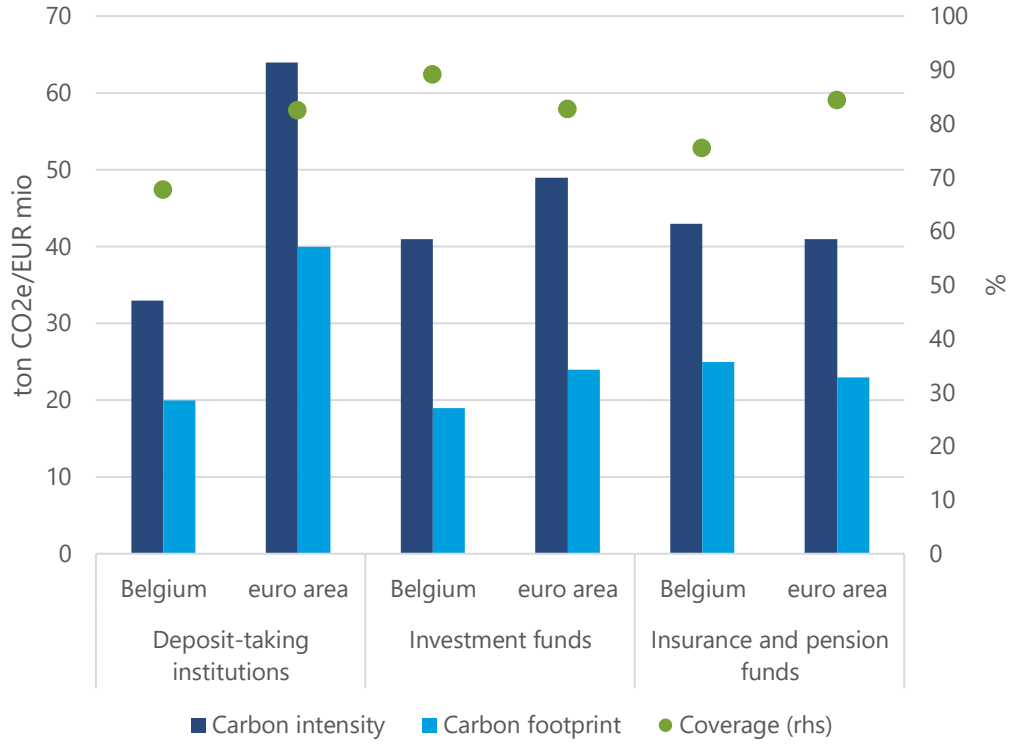


Carbon intensity and carbon footprint for securities holdings of the Belgian financial sector is lower than Euro Area average

Carbon intensity and footprint of Belgian vs Euro Area financial sector: Scope 1 emissions (2020)



Carbon intensity and footprint of Belgian vs Euro Area financial sector: Scope 2 emissions (2020)



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