On and off: buildings at the crossroads of the energy and climate crisis

BPIE

MAY 2026

EU BUILDINGS CLIMATE TRACKER

4TH EDITION

EXECUTIVE SUMMARY

PROGRESS IN BUILDING DECARBONISATION HAS ACCELERATED SINCE 2022 BUT REMAINS INSUFFICIENT TO CLOSE THE GAP

Despite stronger improvements observed in recent years, the EU Buildings Climate Tracker shows that the building sector is still not advancing fast enough to align with the climate neutrality pathway, remaining **approximately nine decarbonisation points behind the required trajectory**. The decarbonisation gap thus persists.

PROGRESS ACROSS INDICATORS IS INCREASINGLY UNEVEN

Electricity decarbonisation and reductions in service-sector energy consumption are progressing relatively well, while renewable ewable heating deployment, reductions in residential sector energy consumption and renovation investment remain major bottlenecks. This is a point of concern, as progress driven by only a limited set of indicators is unlikely to deliver fair and robust building decarbonisation across sectors and societal groups.

BUILDING DECARBONISATION IS CENTRAL TO LONG-TERM HOUSING AFFORDABILITY

Energy expenditure is one of the largest and most volatile components of housing costs. Inefficient buildings using fossil fuels expose households to persistent financial burdens through high energy bills and frequent repair needs, increasing vulnerability to price shocks and energy poverty. Poor building conditions also impose health costs. Dampness, poor air quality and thermal discomfort are linked to respiratory illness, cardiovascular problems and reduced mental wellbeing, translating into lost productivity and higher healthcare expenditure for households and society alike. With global energy markets increasingly volatile in the current oil and gas crisis triggered by political tensions in the Middle East, the cost of continued dependence on fossil fuels in buildings falls hardest on those least able to absorb it. **Accelerating building decarbonisation is a social imperative**.

THE EU POLICY FRAMEWORK MUST BE THOROUGHLY IMPLEMENTED NOW TO DELIVER RESULTS

The legislative framework adopted at EU level in recent years (recast Energy Performance of Buildings Directive (EPBD), Energy Efficiency Directive (EED) and Renewable Energy Directive (RED III) establishes the policy architecture needed to accelerate renovation, electrification and renewable heating in buildings. The critical task now is to ensure **strong national implementation of these directives, translating rules into real transformation of the building stock**. This will ensure that progress in building decarbonisation will be structural and long-lasting. It will also ensure that external shocks will not hamper progress made so far. **The European Commission should also take stock of these developments in its Heating and Cooling Strategy and Electrification Action Plan**.

THE EU BUILDINGS CLIMATE TRACKER: PROGRESS, BUT INSUFFICIENT AND UNEVEN

The EU Buildings Climate Tracker (EU BCT) monitors the decarbonisation of the EU building stock by combining four indicators that reflect the main dimensions of decarbonisation: CO2 emissions, final energy consumption, renewable energy deployment and renovation investment.

The results for this edition show that the building sector has recently entered a phase of stronger improvement, particularly between 2022 and 2023, which reduced the decarbonisation gap. However, these recent improvements remain insufficient to completely close the gap with the climate neutrality trajectory.

On the EU BCT scale – which measures progress from 0 in 2015 to 100 in 2050 – the tracker reached **19.2 points in 2023**, while the reference pathway indicates that progress should have reached **28.1 points**. This leaves a **decarbonisation gap of approximately nine points**.

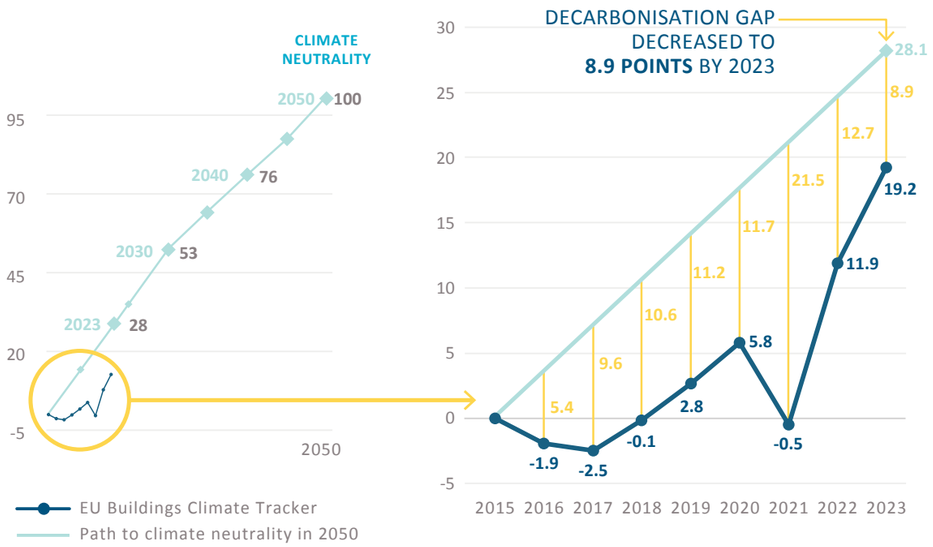

Figure 1: EU BCT results between 2015 and 2023

The EU BCT shows a marked acceleration of building decarbonisation in recent years. After the index fell to –0.5 points in 2021, it increased sharply to **11.9 points in 2022** and further to **19.2 points in 2023**, representing the strongest consecutive improvements since the start of the tracker. However, part of this progress reflects warmer weather and short-term adjustments following the energy crisis, including reduced energy demand and behavioural changes in energy use. While some structural improvements are visible, particularly in electricity decarbonisation, **progress across the different drivers of building decarbonisation remains uneven**.

Another important challenge to assess building decarbonisation progress concerns the definition of the reference pathway itself. The target values used in the EU BCT to define the path to climate neutrality 2050 are based on the **MIX scenario**, which has informed EU climate and energy policies in recent years. However, these targets were defined several years ago and do not fully reflect the increasing urgency of climate mitigation. At present, there are no new politically endorsed scenarios providing updated target values for the decarbonisation of the building sector, meaning that the current benchmark (dotted line in the graphs), which is the latest available, may already underestimate the level of transformation required.[1]

KEY FIGURES

- **CO_2 emissions from energy use in buildings declined by 21% between 2015 and 2023**, reaching approximately 352 $MtCO_2$. However, the climate neutrality pathway would have required a reduction of nearly 32% over the same period.
- **Final energy consumption in households and services fell by 7.5%**, broadly aligning with the pathway. However, this progress is largely driven by reductions in **service-sector buildings**, while residential **energy consumption remains significantly above the required trajectory**.
- **Renewable energy deployment increased from 22.6% to 31%**, but the pathway requires a share of **over 43% by 2023**. The largest gap remains in renewable heating and cooling, which continues to expand, but much too slowly.
- **Renewable electricity shows the strongest progress**, reaching **45.4% of electricity consumption in 2023** and exceeding the reference pathway (set at 44.2%).
- **Renovation investment remains insufficient,** with cumulative investments reaching around **€3 trillion (2015 prices)** by 2023 — which represents only **59.4% of the level required** to remain on track.

1. Due to a lack of a more up-to-date impact assessment accompanying new targets, such as the agreement on the 2040 greenhouse gas (GHG) emissions reduction target, it is not possible to insert new target values for the building stock in the EU BCT.

BUILDING DECARBONISATION AND HOUSING AFFORDABILITY: TWO SIDES OF THE SAME OPPORTUNITY

The results of this EU BCT edition underline that **falling behind on building decarbonisation also has significant and growing economic and social costs for households**.

Housing affordability cannot be determined solely by rents or property prices. It must account for the total cost of living in a home, of which energy is one of the largest and most volatile components. When buildings are inefficient and use fossil fuels, households must spend more on heating and cooling to maintain adequate comfort levels. This makes them particularly vulnerable to energy price fluctuations and external shocks. Across the EU, **more than 41 million people were unable to keep their homes adequately warm in 2024**,[2]and many households have had to reduce heating consumption in response to rising energy prices. The European Affordable Housing Plan (December 2025) and Citizen Energy Package (March 2026) published by the European Commission, both reflect this understanding and recognise that improving the affordability of housing also means improving energy affordability in homes.

In addition, poor housing conditions, including damp walls, leaking roofs and structural deficiencies, affect **around 16% of Europeans**,[3] with significant consequences for respiratory, cardiovascular and mental health. Indoor air pollution, noise pollution, insufficient daylight and, increasingly, buildings that cannot cope with extreme heat also have significant impacts on health. These factors translate into lost productivity and higher healthcare costs for households and public systems alike.

Improving building decarbonisation is a prerequisite for achieving affordability, now and in the long term. **Building decarbonisation is not only a climate objective but also a key lever to improve quality of life and social equity, and reduce the cost of living for households across Europe**. Especially now, with global energy markets increasingly volatile since the start of the war in the Middle East in early 2026 and an energy crisis looming, potentially worse than all recent ones combined,[4] the cost of inaction on buildings cannot be ignored.

Building decarbonisation is not only a climate objective but also a key lever to improve quality of life and social equity.

2. https://ec.europa.eu/eurostat/databrowser/view/ILC_MDES01__custom_19825594/default/table
3. https://ec.europa.eu/eurostat/databrowser/view/ILC_MDHO01__custom_16256767/default/table?lang=en.
4. IEA director Fatih Birol in https://www.lefigaro.fr/conjoncture/fatih-birol-directeur-de-l-agence-internationale-de-l-energie-la-crise-actuelle-est-plus-grave-que-celles-de-1973-1979-et-2022-reunies-20260406

TURNING EU POLICY AMBITION INTO REAL PROGRESS ON THE GROUND

The EU has established a comprehensive legislative framework to accelerate the decarbonisation of buildings. Measures adopted in recent years, including the **recast Energy Performance of Buildings Directive (EPBD)** together with the Energy Efficiency Directive (EED) and the **Renewable Energy Directive (RED III)**, provide the regulatory foundation to scale up building renovation, improve energy performance and accelerate the deployment of renewable heating technologies across the EU. **Member States have translated this EU framework into national policies and implementation measures**. Now, the time has come to transform EU and national policies into tangible actions on the ground, and real progress.

Based on the EU BCT results, the priority is now clear: **actions must be more targeted, more ambitious and more effective**. Policymakers and stakeholders should use the insights from the EU BCT to direct investments where they are most needed: towards the residential building stock, where progress remains insufficient, and towards the most vulnerable households, who are most exposed to high energy costs. At the same time, accelerating the deployment of renewable heating and cooling solutions must become a central focus, given the persistent and widening gap in this area.

With the overall decarbonisation gap still significant, with progress being uneven across indicators, and with the current risks to energy security and resilience, there is no room for delay or rollback, especially considering the preliminary results for some indicators in 2024.[5] The coming years will be decisive to turn policy ambition into tangible and sustained progress.

5. The EU BCT calculations are based on data up to 2023, which is the latest year for which consistent data across all indicators is available and allows for the calculation of the composite index. For the final energy consumption and renewable energy share indicators, data for 2024 has recently been released by Eurostat. This data is used in this report only to illustrate recent trends on these indicators, but it is not included in the calculation of gaps or in the composite EU BCT index, since the other two indicators only have data available until 2023.

WHAT IS THE EU BUILDINGS CLIMATE TRACKER (EU BCT)?

The EU BCT is a composite index developed by BPIE to measure whether and how fast the EU building stock is decarbonising on the way to climate neutrality by 2050. It brings together four equally weighted indicators that are directly linked to the main dimensions of the transition: (i) CO_2 emissions, (ii) final energy consumption, (iii) renewable energy share, and (iv) investment in renovation.[6] By analysing these indicators, the EU BCT provides insights into how the decarbonisation of the building stock is progressing and where additional efforts will be required to align the sector with the climate neutrality objective by 2050. The EU BCT tracks building decarbonisation progress since the adoption of the Paris Agreement in 2015 and now covers developments up to 2023, the latest year of available data for all indicators.[5]

In recent years at EU level, building decarbonisation has been shaped by the Renovation Wave strategy and subsequently strengthened through legislation such as the Energy Performance of Buildings Directive recast, the Energy Efficiency Directive and the Renewable Energy Directive III. In the coming years, additional instruments – including the Social Climate Fund and the updated Emissions Trading System (ETS2) for buildings and road transport, expected to start in 2028 – are also expected to influence the pace of decarbonisation in the sector.

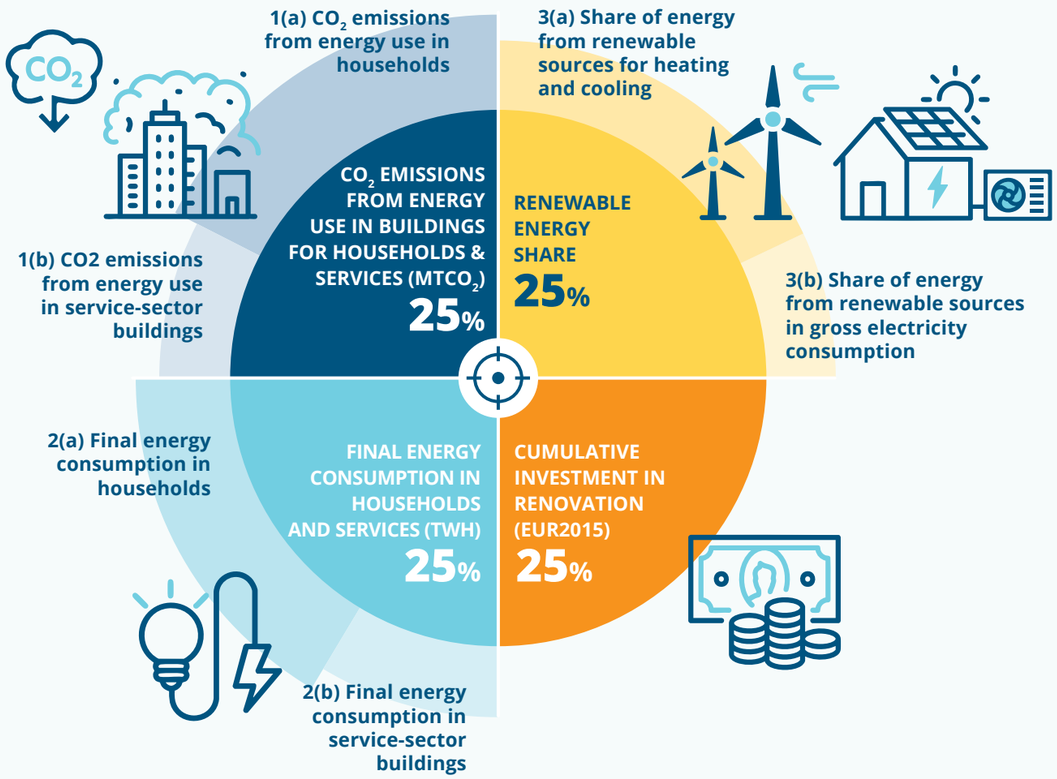

Figure 2: Indicators and their weighted contribution to the EU Buildings Climate Tracker[7]

6. Based on the MIX scenario from the impact assessment accompanying the Communication *'Stepping up Europe's 2030 climate ambition'* (September 2020)
7. A detailed description of the weighting of the indicators is provided in Section II.

RESULTS OF THE EU BCT 4TH EDITION: PROGRESS FROM 2015 TO 2023[8]

Overall, the results between 2015 and 2023 show that progress across the four main indicators is increasingly uneven. While some areas have moved closer to the climate neutrality pathway, others remain significantly behind. This contrasts with previous editions, where all four indicators showed gaps of more than 40%. **Final energy consumption for households and services is now aligned with the reference trajectory**, and even slightly exceeds the required reduction, with a slight overachievement of 1.1%. However, this overall result is primarily driven by reductions in the service sector, while residential buildings remain off track. In contrast, **the other three indicators remain substantially off track**. CO_2 emissions from buildings still show a gap of 33.5%, while cumulative renovation investments remain 40.6% below the required level. The largest divergence continues to be observed in the renewable energy share, which remains 59.2% away from the pathway, mainly due to the slow deployment of renewable heating and cooling technologies.[9]

Table 1 summarises the progress achieved by each indicator between **2015 and 2023** and compares it with the corresponding reference values for 2023. To better illustrate the magnitude of the remaining gaps, the indicators are also assessed using a normalised scale.[10]

The largest divergence continues to be observed in the renewable energy share, which remains 59.2% away from the pathway, mainly due to the slow deployment of renewable heating and cooling technologies.

8. EU BCT calculations use data up to 2023. Available 2024 data for final energy consumption and renewable energy shares is shown for trends only and is not included in gap calculations or the composite index.
9. The gaps are calculated based on the difference between the achieved progress and the required progress, expressed relative to the required progress. They show how much of the required change has not been achieved over the period. For example, for CO2 emissions, 33.5% of the required emissions reductions have not been achieved.
10. A detailed analysis and description of the indicators can be found in chapter I of the full report.

Table 1: Summary of indicator results

	Indicator	Achieved progress 2015-2023	Required progress 2015-2023	STATUS	How much of the required progress was achieved during 2015-2023?
1	**CO_2 emissions from energy use in buildings for households and services**	↓ 21.2%	↓ 31.9%	OFF TRACK	
	1(a) CO2 emissions from energy use in households	↓ 20.4%	↓ 33.5%	OFF TRACK	
	1(b) CO2 emissions from energy use in service-sector buildings	↓ 23.3%	↓ 28.2%	OFF TRACK	
2	**Final energy consumption in households and services**	↓ 7.5%	↓ 7.4%	ON TRACK	
	2(a) Final energy consumption in households	↓ 7.3%	↓ 9.6%	OFF TRACK	
	2(b) Final energy consumption in service-sector buildings	↓ 7.9%	↓ 3.1%	ON TRACK*	
3	**Renewable energy share**	↑ 8.4 percentage points (increased from 22.6% to 31.0%)	↑ 20.5 percentage points (should have increased from 22.6% to 43.2%)	FAR OFF TRACK	
	3(a) Share of energy from renewable sources for heating and cooling	↑ 5.9 percentage points (increased from 20.3% to 26.2%)	↑ 22.5 percentage points (should have increased from 20.3% to 42.8%)	FAR OFF TRACK	
	3(b) Share of energy from renewable sources in gross electricity consumption	↑ 15.7 percentage points (increased from 29.7% to 45.4%)	↑ 14.6 percentage points (should have increased from 29.7% to 44.2%)	ON TRACK	
4	**Cumulative investment in renovation**	9.39 times the value in 2015	15.82 times the value in 2015	OFF TRACK	

* The continued reduction in final energy consumption in the service sector observed between 2022 and 2023 brings this indicator to a result that is much more ambitious than the reference pathway. However, there is limited evidence linking this trend to structural improvements or specific long-term measures in the sector. Part of the reduction may reflect COVID-induced changes in activity patterns, including increased teleworking, as well as milder weather conditions, with heating degree days steadily declining over the past four years. Continued monitoring will be important to assess whether this trend reflects lasting efficiency improvements or temporary conditions.

HOW TO READ THE RESULTS IN TABLE 1

- The **achieved progress** corresponds to the difference between the observations in 2023 and 2015.
- The **required progress** corresponds to the difference between the required target for 2023 on the reference path and the starting point in 2015.
- In the last column to the right, each house in the scale represents 10%. If the required progress was fully achieved, all 10 houses on the scale would be bold.

Indicator 1
CO_2 EMISSIONS

CO_2 emissions remain **off track**.

Between 2015 and 2023, emissions decreased by **21.2%**, compared to a required reduction of **31.9%**. This shortfall resulted in approximately **419 $MtCO_2$ of cumulative excess emissions** since 2015.

- In 2023, emissions fell to **352.2 $MtCO_2$**, the lowest level since 2015, but still 1**5.7% above** the pathway value.
- Although the pace of reduction accelerated in 2022 and 2023, it remains insufficient to realign with the required trajectory.
- Without sustained additional reductions, delayed action will increase future mitigation pressure.

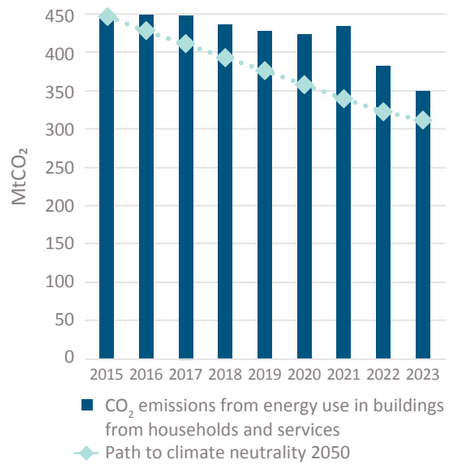

Figure 3: CO_2 emissions from energy use in buildings for households and services 2015-2023

Indicator 2

FINAL ENERGY CONSUMPTION

Final energy consumption in households and services is now assessed as **on track**.

Between 2015 and 2023, consumption declined by 7.5%, compared to a required reduction of **7.4%**, indicating that the pathway has even been slightly exceeded.

This overall result however masks important differences between sectors. The observed reduction is largely driven by the service sector, while energy consumption reduction in households remains below the required pace. The reduction, especially in the service sector, may be linked to a combination of factors, including changes in activity patterns, behavioural adjustments in energy use and milder weather conditions reflected in lower heating degree days.[11]

- In 2023, consumption reached **4,022.3 TWh**, slightly overachieving the pathway (**0.1% below** the reference value).
- After increasing in 2021, consumption decreased significantly in 2022 and continued to decline in 2023.
- While alignment has been achieved with the reference path, maintaining this trajectory will require continued structural efficiency improvements, particularly in the residential sector.
- Preliminary data for 2024 indicates a slight increase in final energy consumption to **4,032 TWh**, compared to **4,022 TWh** in 2023, a result **approximately 1.2% above the pathway value**. This highlights the importance of continued monitoring to assess whether the recent alignment with the pathway can be sustained, and the importance of policy implementation to ensure structural improvements, independent from favourable contexts (e.g. milder weather).

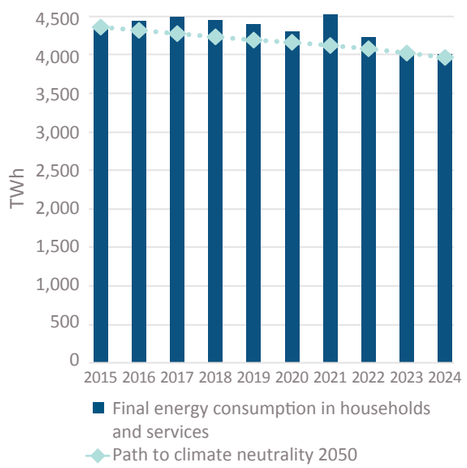

Figure 4: Final energy consumption in households and services 2015-2024

11. Eurostat– Heating degree days by country – annual data. Available at: https://ec.europa.eu/eurostat/databrowser/view/nrg_chdd_a/default/line?lang=en

Indicator 3

RENEWABLE ENERGY SHARE

The renewable energy share remains **far off track**.

Between 2015 and 2023, the share increased by **8.4 percentage points to 31.0%**, compared to a required increase of **20.5 percentage points to 43.2%**.

- Growth accelerated after 2021, but the overall gap continues to widen.
- Progress in renewable electricity has been strong and is aligned with the pathway, whereas the **slow expansion of renewables in heating and cooling** continues to hold back overall performance of this indicator.
- Preliminary data for 2024 shows a **further increase of the overall renewable energy share indicator to 31.9%**, while the pathway reaches **46%. Despite recent improvements, there is a slowdown in progress**, resulting in a continued and widening gap.

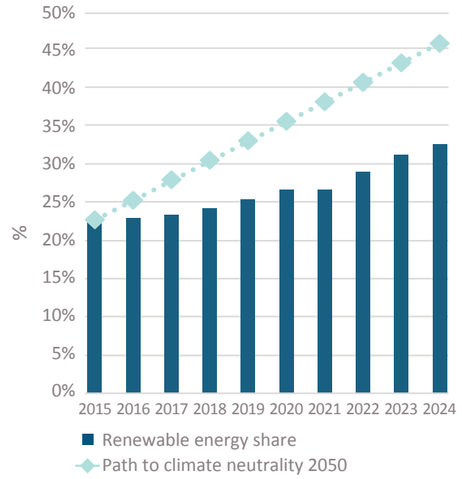

Figure 5: Renewable energy share 2015-2024

Indicator 4

INVESTMENT IN RENOVATION

Cumulative renovation investments remain **off track**.

By 2023, investments reached **€3,000 billion**, compared to a required cumulative level of **€4,853.9 billion**. This represents a shortfall of approximately 40.6%.

- Although investments have increased steadily each year, the absolute gap with the pathway continues to widen.
- Around **59.4% of the required cumulative progress** since 2015 has been achieved.
- Without a structural and sustained acceleration in annual investment volumes, the renovation gap will persist and delay emissions reductions.

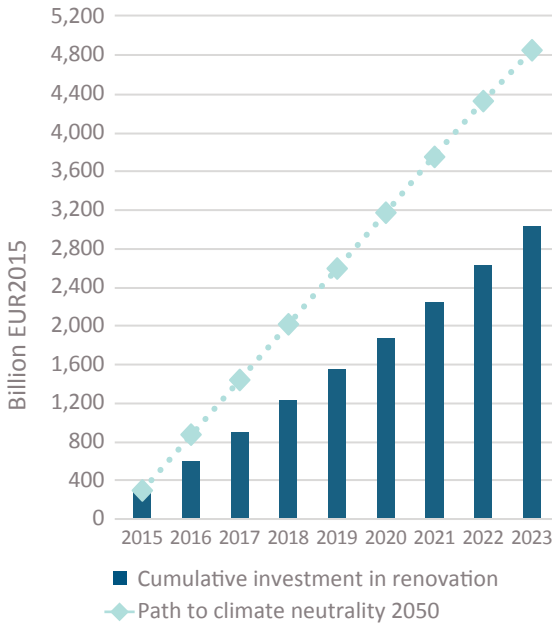

Figure 6: Cumulative investment in renovation 2015-2023