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

BPIE

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EU BUILDINGS CLIMATE TRACKER

4TH EDITION

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

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**.

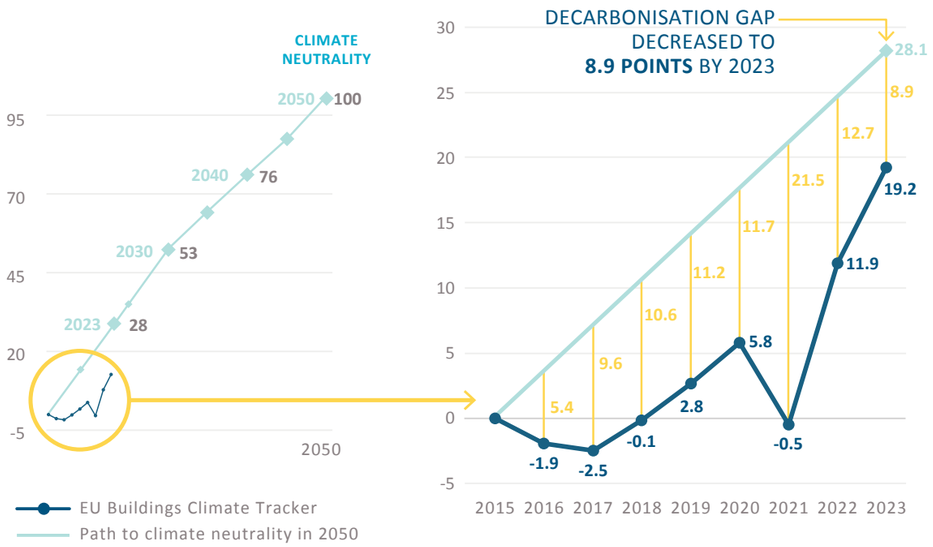

Figure 1: EU BCT results between 2015 and 2023

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.

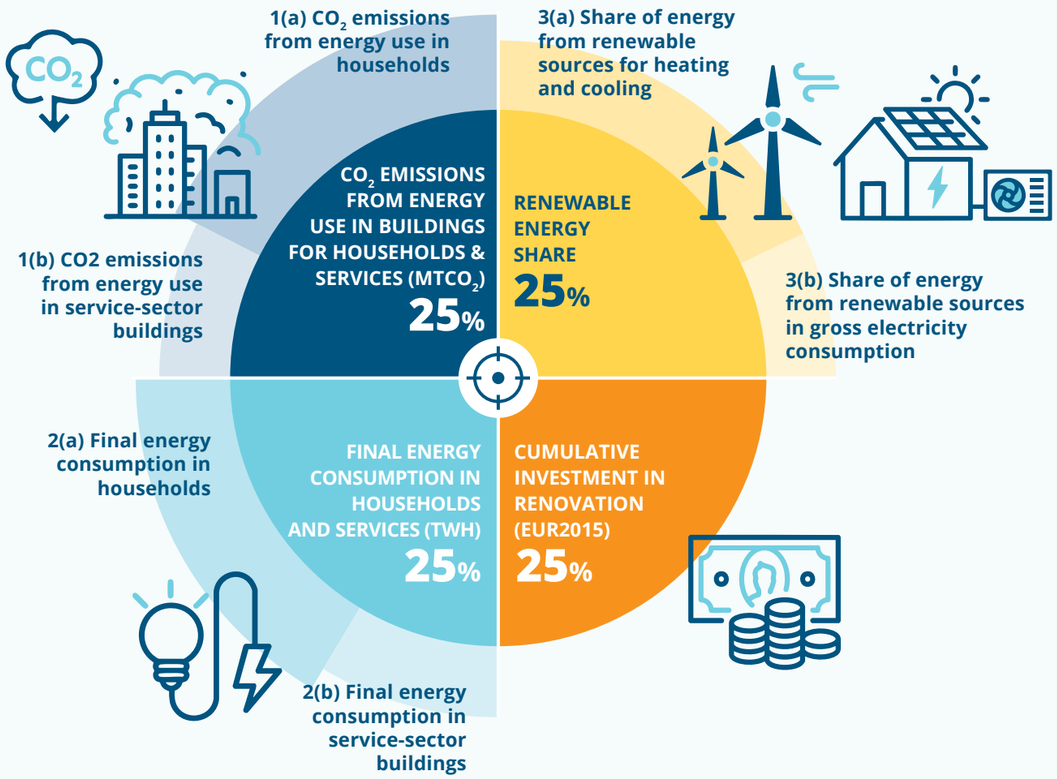

Figure 2: Indicators and their weighted contribution to the EU Buildings Climate Tracker[7]

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.

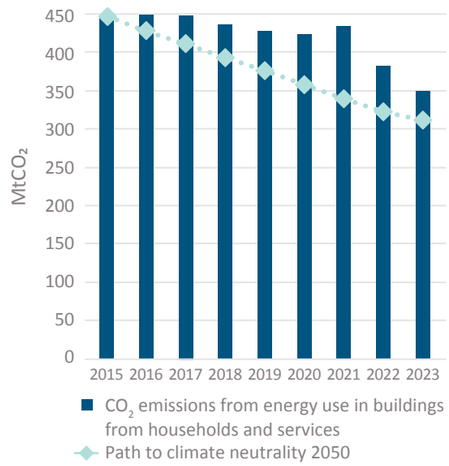

Figure 3: CO_2 emissions from energy use in buildings for households and services 2015-2023

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).

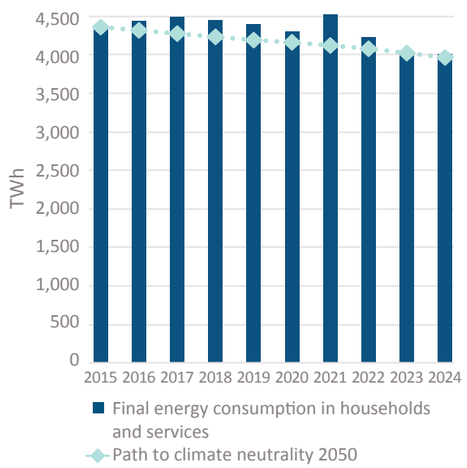

Figure 4: Final energy consumption in households and services 2015-2024

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.

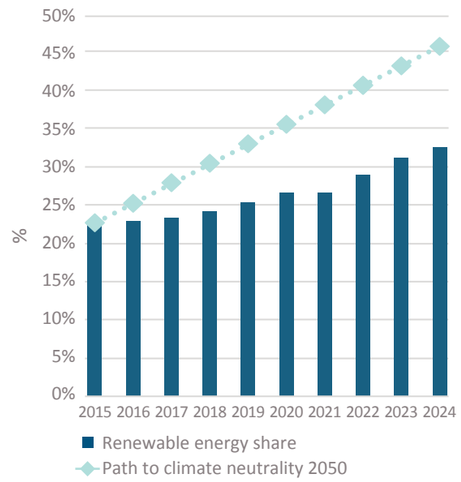

Figure 5: Renewable energy share 2015-2024

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.

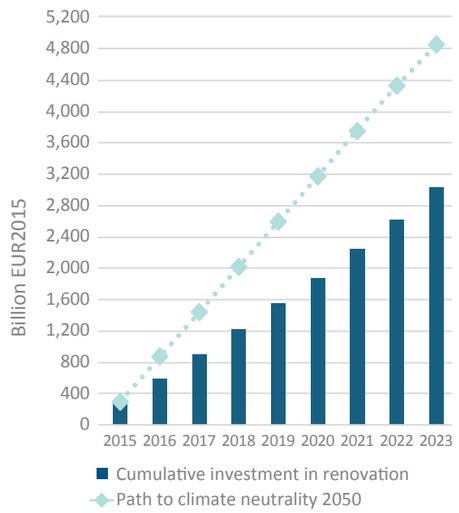

Figure 6: Cumulative investment in renovation 2015-2023

EXECUTIVE SUMMARY | ABBREVIATIONS | INTRODUCTION | METHODOLOGY |
EU BCT AND ITS INDICATORS | CONCLUSION | ANNEX |

ABBREVIATIONS

BCT	Buildings Climate Tracker
CO_2	Carbon dioxide
EEA	European Environment Agency
EED	Energy Efficiency Directive
EPBD	Energy Performance of Buildings Directive
ETS	Emissions Trading System
EU	European Union
FIEC	European Construction Industry Federation
PM2.5	Fine particulate matter with a diameter of 2.5 micrometres or less
RED	Renewable Energy Directive

INTRODUCTION

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

The EU BCT is a composite index designed to assess the pace of decarbonisation in the EU building stock on the pathway to climate neutrality by 2050. The tracker builds on earlier global monitoring approaches while adapting the methodology to the specific characteristics of the EU building stock, policy framework and available data sources.

WHAT ARE THE INDICATORS AND DATA SOURCES?

The EU BCT follows four core indicators that represent the main dimensions of decarbonisation in buildings: (1) CO_2 emissions from energy use, (2) final energy consumption, (3) the share of renewable energy, and (4) cumulative investment in building renovation. These indicators were selected based on the availability of consistent and reliable annual data. The analysis primarily relies on official datasets from sources such as Eurostat and the European Environment Agency (EEA), ensuring transparency and comparability across years.

HOW ARE INDICATORS WEIGHTED AND AGAINST WHICH TARGETS ARE THEY COMPARED?

The four indicators contribute equally to the EU BCT, each representing 25% of the composite score. Long-term targets (the reference path) are aligned with the **MIX scenario** used in the European Green Deal impact assessments, which outlines a trajectory consistent with achieving climate neutrality by 2050.[12] This includes the progressive elimination of CO_2 emissions from buildings and a full transition towards renewable energy sources for heating and cooling. However, the MIX scenario reflects assumptions and policy ambitions at the time it was developed, i.e. 2020. As climate science and policy continue to evolve, stronger mitigation pathways will be required to remain consistent with the EU's long-term climate objectives. While the EU BCT uses the current pathway as a reference for tracking progress, as it is based on the latest agreed long-term policy objective, future updates may need to reflect revised or more ambitious trajectories.

WHAT DOES THE EU BCT DO?

The EU BCT monitors developments from the base year of 2015 through to 2050. Reference pathways are defined to illustrate the level of progress required to meet intermediate milestones, including the 2030 targets, as well as the longer-term objective of climate neutrality. As EU climate policy evolves and new targets are agreed upon, the EU BCT framework can be updated to incorporate these developments, provided targets are accompanied by impact assessments[12] providing enough detail to derive the pathway target values.

12. While new targets such as the agreement on the 2040 GHG emissions reduction target have been set, impact assessments and scenarios have not been updated, meaning it is not possible to update the reference pathway of the EU BCT or its target values for the building stock.

TRACKING THE DECARBONISATION OF THE EU BUILDING STOCK

The European Union has introduced a wide range of initiatives and legislative measures to support the decarbonisation of the building stock and align the sector with the objectives of the Paris Agreement. Over the past years, this policy framework has expanded significantly, notably through the Renovation Wave strategy and the strengthening of key legislative instruments including the Energy Performance of Buildings Directive (EPBD), the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED III). Monitoring the impact and effectiveness of these policies is essential to determine whether current actions are sufficient to achieve the EU's climate objectives and to identify areas where further improvements or adjustments may be required.

To support this assessment, the **EU Buildings Climate Tracker** was developed as a monitoring framework to track the decarbonisation of the EU building stock. The EU BCT is a composite index built around four key indicators that reflect the main dimensions of the transition: (i) CO_2 emissions from energy use in buildings, (ii) final energy consumption, (iii) the share of renewable energy, and (iv) investment in building renovation. Rather than projecting future scenarios, the EU BCT serves as a benchmarking and analytical tool that evaluates the current trajectory of the building stock by comparing observed developments with a pathway aligned with achieving climate neutrality by 2050.

THROUGH THIS FRAMEWORK, THE EU BCT AIMS TO ANSWER SEVERAL KEY QUESTIONS:

- **How has the decarbonisation of the EU building stock evolved since 2015,** the year the Paris Agreement was adopted?
- **Is the current pace of improvement sufficient** to align the sector with the climate neutrality objective by 2050?
- **If progress is insufficient, what scale of improvement is required** between the most recent observations and 2050 to close the gap?

In this edition, the EU BCT also explores the social and economic consequences of the current decarbonisation gap for households, showing how building decarbonisation is central to long-term housing affordability.

The **EU BCT was first published in 2022**, analysing developments between **2015 and 2019** and establishing the methodological framework for monitoring building decarbonisation across the EU. The **second edition (2023)** extended the analysis to 2020 and included a deeper examination of developments in Central and Eastern Europe, as well as an initial assessment of the impacts of the COVID-19 pandemic on building stock decarbonisation. The **third edition (2024)** further expanded the analysis to **2022** and introduced a methodological refinement to the tracker. In that edition, the indicator framework was streamlined by reducing the number of indicators from five to four, removing the indicator on **household energy expenditure**. This adjustment was made to avoid overlapping with other indicators and to ensure that the tracker focuses more directly on structural aspects of building decarbonisation. In particular, energy expenditure can be strongly influenced by short-term fluctuations in energy prices, which may not necessarily reflect changes in the overall performance of the building stock. This **fourth edition of the EU BCT** extends the assessment to **2023 (and even 2024 for some indicators)**,[13] providing the most recent overview of the EU building stock trajectory towards climate neutrality.

In addition to updating the indicator analysis, **this edition places greater emphasis on the broader societal dimensions of building decarbonisation, particularly the links between energy efficiency, renewable progress, energy costs and housing affordability**. This reflects recent political attention to the subject with the publication by the European Commission of the Affordable Housing Plan (December 2025) and the Citizen Energy Package (March 2026). The Affordable Housing Plan seeks to combine affordability, sustainability and quality of housing and encourages Member States to prioritise the renovation of existing buildings in this regard. The Citizen Energy Package aims at providing solutions to lower energy bills for households, notably by boosting the use of clean and energy-efficient technologies in homes and tackling energy poverty more broadly. The overall societal cost of inaction on decarbonisation of buildings has risen in recent months, with the biggest energy crisis in years looming.[14] The EU BCT provides a more comprehensive understanding of the opportunities associated with decarbonising the EU building stock in line with climate neutrality.

13. 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.
14. 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

1	FIRST EDITION	2015-2019	**MAIN TOPICS** • Introduction and methodology of the EU BCT
2	SECOND EDITION	2015-2020	**MAIN TOPICS** • Decarbonisation progress across EU-27 with specific focus on Central and Eastern Europe • 2020-2021 outlook
3	THIRD EDITION	2015-2022	**MAIN TOPICS** • Decarbonisation progress across EU-27 • Building decarbonisation and building users' health and socioeconomic security • EPBD recast
4	CURRENT FOURTH EDITION	2015-2023	**MAIN TOPICS** • Decarbonisation progress across EU-27 • Building decarbonisation for long-term affordability

Figure 7: EU BCT editions summary

THE REPORT IS ORGANISED AS FOLLOWS:

- **METHODOLOGY** presents the EU BCT methodological framework, including the definition of the indicators, their weighting and the pathway target values used to assess progress towards climate neutrality.
- **THE EU BCT AND ITS INDICATORS: PROGRESS DURING 2015-2023** presents the overall results of the composite index and the individual indicators, gives explanations for the results, and analyses the remaining gaps between observed developments and the reference pathway.
- **CONCLUSION** summarises the key findings and reflects on the way forward for advancing the transformation of the European building stock towards climate neutrality.

Throughout, the report explores **building decarbonisation for long-term affordability** to highlight the economic and social consequences of the current decarbonisation gap for households, examining how energy expenditure, building quality and health outcomes together determine the true cost of housing. It shows how accelerating building decarbonisation towards set targets can reduce these costs and improve quality of life for households and society in the short and long term.

METHODOLOGY

This section explains the methodological framework used to develop the EU BCT. It describes the indicators included in the tracker, the approach used to combine them into a composite index, and the targets used to assess progress towards climate neutrality by 2050. The section also presents the main data sources used in the analysis.

I. WHAT IS THE EU BCT?

The EU BCT is a composite index built around four key indicators designed to monitor and evaluate the decarbonisation progress of the EU building stock on the pathway towards climate neutrality by 2050. The concept builds on earlier work carried out by BPIE. In 2020, BPIE developed a global tracking framework for climate action in the buildings and construction sector as part of the Global Status Report prepared for the Global Alliance for Buildings and Construction.[15] Based on this, BPIE developed the first EU-focused tracker in 2021–2022, adapting the methodology to reflect the specific characteristics of the EU building stock, the availability of European datasets, and specific EU policies.

Selection of indicators

The EU BCT is based on the four indicators presented in Table 2. During the development of the tracker, more than 60 European and international datasets related to the buildings sector[16] were reviewed in the process of selecting the indicators. Potential indicators were assessed against a set of criteria to ensure their suitability for monitoring progress over time. These criteria included EU-wide coverage, reliability and robustness of the data, consistency across years, regular updates (at least annually), availability of data from 2015 onwards, and overall data quality.

15. 2020 Global Status Report for Buildings and Construction: Towards a zero-emissions, efficient and resilient buildings and construction sector
16. Including the European Environment Agency (EEA), International Energy Agency (IEA), Eurostat, ODYSSEE and Tabula

Table 2: Summary of indicators included in the EU BCT

	Indicator	Description	Source
1	**CO_2 emissions from energy use in buildings for households and services**	CO_2 emissions from the direct use[17] of fossil fuel energy in buildings. Composed of two sub-indicators: 1(a) CO_2 emissions from energy use in households, and 1(b) CO_2 emissions from energy use in service-sector buildings, including institutional buildings.	European Environment Agency (EEA)
2	**Final energy consumption in households and services**	Energy consumption in households and service-sector buildings, excluding consumption by the energy sector itself and losses occurring during transformation and distribution of energy. Composed of two sub-indicators: 2(a) final energy consumption in households, and 2(b) final energy consumption in service-sector buildings.	Eurostat
3	**Renewable energy share[18]**	Composed of two sub-indicators:	Eurostat
	3(a) Share of energy from renewable sources for heating and cooling	Share of renewable energy used for heating and cooling,[19] including derived heat from solar thermal, geothermal energy, ambient heat captured by heat pumps, solid, liquid and gaseous biofuels, and the renewable part of waste.	Eurostat
	3(b) Share of energy from renewable sources in gross electricity consumption	Share of electricity produced from renewable energy sources including wind power, solar power, hydropower, tidal power, geothermal energy, biofuels and the renewable part of waste.	Eurostat
4	**Cumulative investment in renovation**	Cumulative investment in renovation[20] of the building stock expressed in 2015 Euros. Based on investment reported by Member States.	European Construction Industry Federation (FIEC)

17. Emissions from diverse economic sectors are reported according to the common reporting format classification used for reporting greenhouse gas inventories according to IPCC 2006 guidelines. https://sdi.eea.europa.eu/catalogue/datahub/api/records/83ee8f8c-1422-4e3f-af63-ba88146811e5/formatters/xsl-view?output=pdf&language=eng&approved=true https://rod.eionet.europa.eu/obligations/102
18. The full description of the two indicators can be found in https://ec.europa.eu/eurostat/documents/38154/4956088/SHARES+tool+manual.pdf/11701ebe-1dae-3b00-4da4-229d86d68744?t=1664793455773
19. The data available on Eurostat includes process heat as well.
20. Renovation investments from the MIX scenario are defined as "average renovation costs by climate type and renovation deepness, as used in the PRIMES buildings module. Investment costs are the energy related expenditures needed to implement the indicated level of renovation of a building, excluding usual renovation expenditures needed for other purposes (structure, finishing materials, decoration etc.)." See EU Reference Scenario 2020 which is the base for the MIX scenario and its modelling approach.

II. WEIGHTING OF INDICATORS

To calculate the EU BCT composite index, weights are assigned to each indicator. Following the methodological approach introduced in the previous editions, the tracker is based on four indicators, each contributing equally to the overall index with a weight of 25%, as illustrated in Figure 8.

Three of the indicators – CO_2 emissions, final energy consumption and renewable energy share – are composed of two sub-indicators. For CO_2 emissions and final energy consumption, the sub-indicators representing households and service-sector buildings are aggregated to obtain the total value of the indicator.

For the renewable energy share, the two sub-indicators are weighted to reflect their respective contribution to final energy consumption in buildings. In this case, heating and cooling account for 75% of the indicator, while renewable electricity represents the remaining 25%, reflecting the dominant role of heating and cooling in the energy use of the building sector.

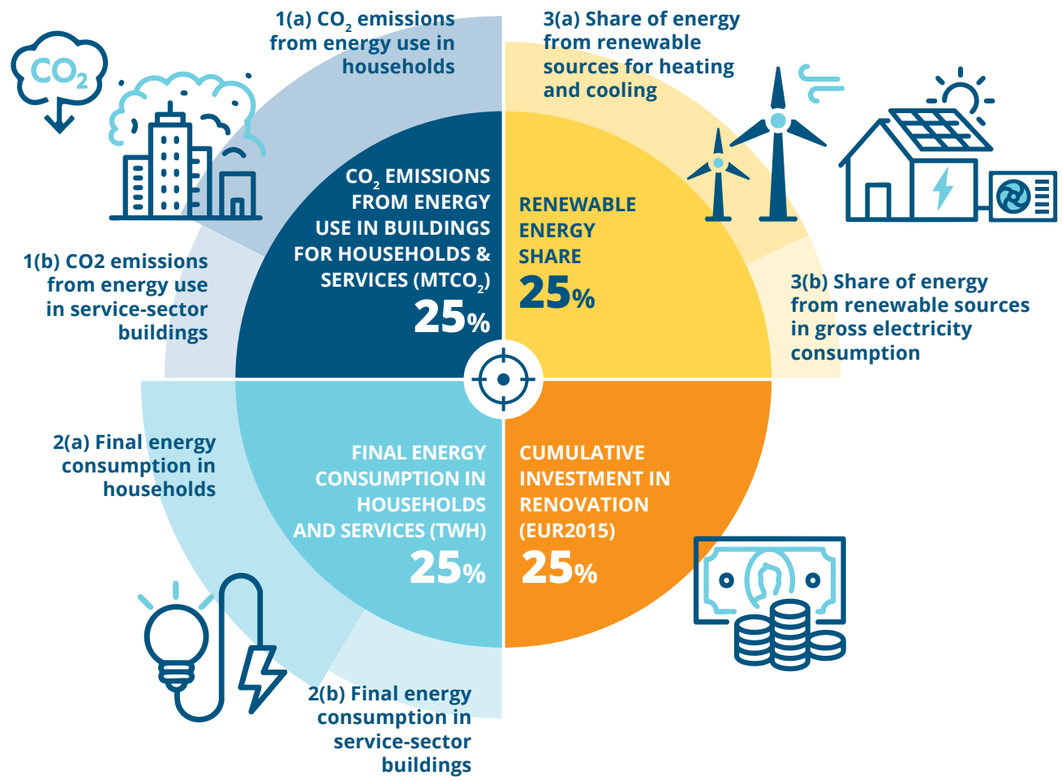

Figure 8: Indicators and their weighted contribution to the EU Buildings Climate Tracker

III. TRANSLATING CLIMATE NEUTRALITY BY 2050 INTO A PATHWAY TARGET VALUE FOR EACH INDICATOR

To assess the development of each indicator in relation to the objective of achieving climate neutrality by 2050, reference target values have been defined for all indicators. The pathway target values presented in Table 3 are derived from the MIX scenario,[21] which has been used in several impact assessments[22, 23], carried out by the European Commission in the context of the European Green Deal. These reference values provide a benchmark against which the observed progress of the indicators can be evaluated.

21. Due to a lack of a more up-to-date impact assessment and scenario accompanying new targets, such as the 2040 GHG emissions reduction target, an update to the reference path and adding new pathway target values for 2040 is not possible.
22. Impact assessment accompanying Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement
23. Impact assessment accompanying the Communication '*Stepping up Europe's 2030 climate ambition*'

EXECUTIVE SUMMARY | ABBREVIATIONS | INTRODUCTION | METHODOLOGY |
EU BCT AND ITS INDICATORS | CONCLUSION | ANNEX |

Table 3: Indicator pathway target values for the EU Buildings Climate Tracker

	Indicator	Pathway target value 2050	Methodology determining pathway target values
1	**CO_2 emissions from energy use in buildings for households and services**	0 $MtCO_2$	The MIX scenario plans for net zero greenhouse gas emissions in 2050. We assume that CO_2 emissions follow this trajectory,[24] so the pathway target value for 2050 is set as 0 $MtCO_2$.
2	**Final energy consumption in households and services**	3,315 TWh *(24% lower than in 2015)*	The MIX scenario[21] aims to reduce greenhouse gas emissions by 55% by 2030[2523] compared to 1990. It translates this pathway target value into a final energy consumption reduction (compared to 2015) of 17% by 2030 and 27% by 2050 (households), and 8% by 2030 and 18% by 2050 (services). The pathway target value is the sum of the remaining building energy consumption in 2050 for households and services.
3	**Renewable energy share**		
	3(a) Share of energy from renewable sources for heating and cooling	100% *(Compared to 20% in 2015)*	The MIX scenario translates the objective of net zero emissions in 2050 into 100% renewables in 2050.
	3(b) Share of energy from renewable sources in gross electricity consumption	85% *(Compared to 30% in 2015)*	Gross electricity production in the MIX scenario will be CO_2 neutral in 2050 but the assumptions in the scenario contain 15% nuclear power.[26] For 2030, the MIX scenario assumes 57% renewables and 19% nuclear power.
4	**Cumulative investment in renovation**	21,978 billion in EUR2015[27] *(Cumulative total from 2015 until 2050)*	In the MIX scenario, the envisaged energy-related renovation investment (in the residential sector) in the EU is on average €190 billion per year between 2021 and 2030 and €174 billion per year between 2031 and 2050. However, as not all Member States report their renovation investments (dataset available only for 16 Member States), the pathway target value is adjusted to account for this. The pathway target value is derived by comparing the values suggested for 2021-2030 and 2031-2050 in the MIX scenario with the value in the base scenario for 2011-2020.[28] Compared to 2011-2020, annual investments are expected to be 2.27 times greater during 2021-2030 and 2.08 times greater during 2031-2050. The average investments observed during 2015-2020 for the 16 Member States for which data is available are multiplied by these factors to estimate the equivalent expected investments during 2021-2030 and 2031-2050. Since the indicator is based on cumulative values, the final pathway target value is defined as the sum of the currently observed and scenario-based future investments during the period from 2015 to 2050.

24. This assumption is supported by the fact that non-CO2 emissions represent only around 6% of household greenhouse gas emissions (according to EEA data for 2015). In the MIX scenario, non-CO2 emissions are expected to reduce significantly (85%).
25 Impact assessment accompanying Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement
26. While the MIX scenario decarbonisation ambition could be called into question regarding the nuclear share, it has been selected as a benchmark as it guides the setting of energy and climate objectives at EU level.
27 The analysis excludes Croatia, Cyprus, Greece, Hungary, Latvia, Luxemburg, Malta, Poland, Romania, Slovenia and Slovakia due to the lack of available data.
28. Impact assessment accompanying the Communication '*Stepping up Europe's 2030 climate ambition*'.

The MIX scenario can be considered relatively conservative considering the ambition required to align with the Paris Agreement's 1.5°C objective and the EU's commitment to climate neutrality by 2050. Nevertheless, it has been selected as the benchmark for the EU BCT because it has played a central role in shaping the EU's energy and climate policy framework in the last years and has informed the development of several key legislative initiatives. Other, more recent scenarios, such as those underpinning the REPowerEU Communication,[29] were also reviewed when defining the pathway target values for the tracker. However, the level of publicly available data from these scenarios does not yet provide the detailed and consistent information required to derive comparable indicator targets. As EU climate ambition continues to evolve, and as new modelling results become available, the EU BCT may need to revisit and refine these targets to reflect more ambitious mitigation pathways compatible with the EU's long-term climate objectives.

IV. UPDATES TO INDICATOR DATASETS AND SOURCES

The same data sources used in the previous editions of the EU BCT were maintained for this edition. These sources have released updated datasets, including data for additional years as well as revisions to previously reported values (Table 4). In this new edition, the results for the composite index and the individual indicators reflect the period 2015–2023, providing the most recent assessment of the progress of the EU building sector towards climate neutrality.

Table 4: Updates on datasets for the EU BCT indicators[30]

	Indicator	Current data source	Change in data source	Data available until
1	**CO_2 emissions from energy use in buildings for households and services**	EEA[31]	No	2023
2	**Final energy consumption in households and services**	Eurostat[32]	No	2024
3	**Renewable energy share**	Eurostat, SHARES[33,34]	No	2024
4	**Cumulative investment in renovation**	FIEC[35]	No	2023

29. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en
30. Data availability differs across indicators. CO2 emissions and renovation investment data are available up to 2023, while more recent data for final energy consumption and renewable energy share has been released for 2024. To ensure consistency in the calculation of the EU BCT composite index and gap analysis, results are based on data up to 2023. Data for 2024 is used only to illustrate recent trends for specific indicators for which it is available but is not included in the calculation of the index or indicator gaps.
31 https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer
32 https://ec.europa.eu/eurostat/databrowser/view/ten00124/default/table?lang=en&category=cli.cli_dri.cli_dri_nrg
33 https://ec.europa.eu/eurostat/web/energy/database/additional-data#Short%20assessment%20of%20renewable%20energy%20sources%20(SHARES)
34 The SHARES tool followed the calculation provisions from Directive 2009/28/EC (RED I) for results until 2020. From 2021 on, results are based on Directive (EU) 2018/2001 (RED II) provisions. One of the main modifications concerns strengthened sustainability criteria for biofuels, which may affect reporting on renewables from certain Member States.
35 The data set includes 16 EU Member States: Austria, Belgium, Bulgaria, Czechia, Denmark, Finland, France, Germany, Estonia, Italy, Ireland, Lithuania, Netherlands, Portugal, Spain and Sweden.

THE EU BCT AND ITS INDICATORS:
PROGRESS DURING 2015-2023

THE DECARBONISATION GAP REMAINS SIGNIFICANT DESPITE RECENT PROGRESS

The EU Buildings Climate Tracker shows that although progress has accelerated in recent years, especially since 2022, the building stock remains behind the trajectory required to achieve climate neutrality. By **2023**, the EU BCT index reached **19.2 points**, while the reference pathway indicates that progress should have reached **28.1 points**. The decarbonisation of the EU building stock is still not advancing at the pace required.

The building decarbonisation gap bears a heavy toll for households

The slow pace of building decarbonisation has real consequences on people and a direct human cost. Around one in ten European households was not able to meet their energy needs in 2024.[36] Already in 2021, 15.5% of EU households spent more than twice the national median share of income on energy in their homes.[37] Residential buildings represent the largest share of the decarbonisation gap. The result is that too many citizens are struggling with the cost of heating and cooling their homes, because they have not been renovated and use fossil fuels energy systems. Staying below the decarbonisation trajectory keeps millions of households, disproportionately low- and middle-income households, structurally exposed to high and volatile energy costs.

CO_2 EMISSIONS REDUCTIONS REMAIN INSUFFICIENT

Between **2015 and 2023**, CO_2 emissions from energy use in buildings (households and services) declined from **447 $MtCO_2$ to 352 $MtCO_2$**, representing a reduction of **21%**. While this is a stronger reduction than in previous years, it still falls short of the **nearly 32% reduction required** by the reference pathway over the same period. The continued gap reflects the slow pace of structural changes in the building stock, particularly the persistent reliance on fossil fuels for heating and the limited renovation of inefficient buildings.

36. https://ec.europa.eu/eurostat/databrowser/view/ilc_mdes01/default/table?lang=en
37. https://www.odyssee-mure.eu/publications/policy-brief/european-energy-poverty.html

Inefficient buildings relying on fossil fuels are both culprit and victim of climate change

If the building sector stays off track on its decarbonisation targets, it will contribute further to an intensifying climate crisis. Over the past five years, 80% of Europeans have experienced at least one climate-related impact, and 20% of households lack any protective measure against extreme weather.[38] One in eight Europeans currently lives in areas potentially prone to river floods, and around 30% of people in southern Europe face permanent water stress.[39] Annual damages from coastal flooding in Europe could exceed €1 trillion by 2100, with 3.9 million people exposed to coastal flooding every year under current trajectories.[40] Between 1980 and 2023, weather and climate-related extremes caused economic losses of €738 billion in the EU, with over €162 billion in just the three years from 2021 to 2023.[41] For damages in 2023, between 50% and 90% of losses were uninsured, and this protection gap continues to grow. The European Climate Risk Assessment prepared by the European Environment Agency identifies risks related to buildings and long-lived infrastructure as requiring urgent action, with a particularly long policy horizon. While reducing CO_2 emissions from buildings entails costs, the economic and human cost of inaction is far greater.

FINAL ENERGY CONSUMPTION INDICATOR SHOWS IMPROVEMENT, BUT PROGRESS REMAINS UNEVEN ACROSS SECTORS

Final energy consumption in households and service-sector buildings decreased from **4,347 TWh in 2015 to 4,022 TWh in 2023**. This is a reduction of **7.5%**, which is in line with – and slightly exceeds – the reduction required by the reference pathway. However, this progress is uneven across sectors. Energy consumption in **service-sector buildings has decreased substantially**, even exceeding the reduction required by the pathway, while **household energy consumption remains significantly above the required trajectory**. This divergence indicates that structural efficiency improvements in residential buildings are still progressing too slowly. The strong reductions observed in the service sector may reflect a combination of factors, including COVID-induced changes in activity patterns, increased teleworking and milder weather conditions reflected in lower heating degree days,[42] rather than solely long-term structural improvements.

RENEWABLE ENERGY DEPLOYMENT IN BUILDINGS REMAINS FAR BELOW THE REQUIRED PACE

The share of renewable energy used in buildings increased from **22.6% in 2015 to 31.0% in 2023**, representing an increase of **8.4 percentage points**. However, the reference pathway indicates that the share should have reached over **43% by 2023**, leaving a substantial gap. This shortfall is primarily driven by the slow deployment of **renewable energy for heating and cooling**, which remains the most challenging segment of the energy transition in buildings.

38. https://www.eea.europa.eu/en/newsroom/news/climate-change-overheated-and-underprepared
39. https://www.eea.europa.eu/en/topics/in-depth/extreme-weather-floods-droughts-and-heatwaves
40. https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/key-eu-actions/european-climate-risk-assessment
41. https://www.eea.europa.eu/en/topics/in-depth/climate-change-impacts-risks-and-adaptation
42. https://ec.europa.eu/eurostat/databrowser/view/nrg_chdd_a/default/line?lang=en

Fossil fuel dependency in European homes is an expensive addiction

Heating and hot water account for around 78% of energy used by EU households.[43] In 2023, 40% of residential energy needs were covered by natural gas and petroleum.[44] As long as Europeans rely on imported fossil fuels to provide a comfortable living space, they remain exposed to geopolitical shocks far beyond their control. The spike in gas prices caused by the conflict in Iran highlights this: a doubling of the pre-crisis gas price could add around €100 billion to European gas import costs within the 12 months after April 2026,[45] costs that add directly to household energy bills and wider cost of living pressures. This makes the slow pace of building decarbonisation, especially in the residential segment, a societal issue that cannot be ignored. An investment in the building stock is an investment in energy sovereignty.

CONTINUED PROGRESS IN RENEWABLE ELECTRICITY SUPPORTING BUILDING DECARBONISATION

Among the indicators monitored by the EU BCT, the **share of renewable electricity shows the strongest progress**. The renewable share in electricity consumption increased from **29.7% in 2015 to 45.4% in 2023**, slightly exceeding the level required by the reference pathway. The rapid decarbonisation of the electricity sector provides an important foundation for the clean electrification of buildings, particularly through technologies such as heat pumps. However, for this progress to translate into deeper emissions reductions in buildings, electrification must be accompanied by improvements in energy efficiency and faster deployment of renewable heating solutions.

Renewable electricity progress does not reach people's bills

Significant progress has been made on renewable electricity, yet the benefits have not fully reached consumers. Electricity prices remain very high, and the reasons are structural. For example, wholesale electricity prices stabilised around €35-40/MWh in 2024-2025[46] yet spiked to €100/MWh in Q1 2025 when gas generation increased and renewables output fell.[47] This illustrates how gas continues to set the price for all electricity, even as renewables generated 47.3% of electricity in 2025.[48] Households paid on average €287/MWh in early 2025,[49] reflecting not only this gas-driven wholesale price but also taxes, network charges and levies that together make up over half the final bill.

The link between gas and electricity prices is weakening but not broken. Gas set the electricity price in 39.5% of hours in 2024, down from 72% in 2020.[50] This is due to the "merit order" system. According to this rule, electricity markets rank all power plants from the cheapest to the most expensive and call on them in that order until demand is met. The price for everyone is then set by the last and most expensive plant still needed, which in most hours is a gas-fired one, regardless of how much renewable electricity is on the grid. This means that even if renewable supply to the grid is high, electricity prices remain high to consumers given the tie to gas prices.

The EU Commission President, Ursula von der Leyen, recognised that this system is not fit for purpose in her 2022 State of the Union address.[51] The 2024 Electricity Market reform was designed to address this issue with the introduction of "Contracts for Difference",[52] but as full implementation is not expected before the end of 2026, the gap remains between what renewable electricity costs to produce and what citizens pay.

43. https://energy.ec.europa.eu/topics/energy-efficiency/heating-and-cooling_en
44. https://ec.europa.eu/eurostat/statistics-explained/SEPDF/cache/58200.pdf
45. https://www.bruegel.org/analysis/how-europe-should-respond-iran-gas-shock-and-how-it-shouldnt
46. https://energy.ec.europa.eu/data-and-analysis/market-analysis_en
47. https://energy.ec.europa.eu/news/quarterly-reports-highlight-solar-record-and-progress-away-russian-gas-2025-07-04_en
48. https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20260319-2
49. https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20251029-2
50. https://powerbarometer.eurelectric.org/wp-content/uploads/2025/09/Power-Barometer-2025-full-report.pdf
51. https://enlargement.ec.europa.eu/news/2022-state-union-address-president-von-der-leyen-2022-09-14_en
52. In a contract for difference, public authorities agree a fixed strike price with generators, and when market prices rise above it, producers pay the difference back, with those revenues passed on to consumers. However, as contracts for difference apply only to new investments, full implementation is not expected before end of 2026.

RENOVATION INVESTMENTS REMAIN BELOW THE REQUIRED SCALE

Investment in building renovation has increased steadily over the past years, reaching approximately **€3 trillion (2015 prices) in cumulative investments since 2015 by 2023**. However, this still represents only **59.4% of the level required** to remain on the climate neutrality pathway. The persistent investment gap reflects financial barriers, regulatory challenges and market constraints that continue to limit the pace of building renovation and decarbonisation across the EU.

The hidden health cost of underinvestment in renovations

The investment gap in building decarbonisation carries a cost that extends well beyond energy bills. Poor housing conditions do not only increase energy costs but are also closely linked to negative health outcomes and costs. Europeans spend around 85-95% of their time indoors, yet over 94% of the urban population in the EU remains exposed to fine particulate matter (PM2.5) above World Health Organization guideline levels, posing significant risks to respiratory and cardiovascular health.[53] Noise pollution affects more than 20% of Europeans, with over 110 million people exposed to harmful levels of transport noise, leading to chronic stress, sleep disturbance, and an estimated 66,000 premature deaths annually.[54] At the same time, 30 million citizens are affected by insufficient daylight in their homes.[55] Inadequate housing costs EU economies nearly €194 billion per year.[56] Healthier workplaces could deliver an additional €40 billion a year in gross added value to the European economy for every 1% improvement in employee performance.[57]

53. European Environment Agency, 2025, Air quality status report 2025
54. European Environment Agency, 2025, Environmental noise in Europe 2025
55. BPIE, 2024, Healthy Buildings Barometer 2024: How to deliver healthy, sustainable, and resilient buildings for people
56. https://www.eurofound.europa.eu/en/publications/all/inadequate-housing-europe-costs-and-consequences
57. https://press.velux.com/new-healthy-buildings-barometer-2024

EXECUTIVE SUMMARY | ABBREVIATIONS | INTRODUCTION | METHODOLOGY |
EU BCT AND ITS INDICATORS | CONCLUSION | ANNEX |

I. COMPOSITE INDEX OF THE EU BCT

The EU BCT combines the four indicators presented in the previous sections into a single index that reflects the overall progress of the EU building stock towards climate neutrality. Figure 9 compares the observed development of the index with the trajectory required to remain aligned with the climate neutrality pathway between 2015 and 2023. The orange lines illustrate the distance between the actual progress achieved (dark blue line) and the reference trajectory (grey dotted line), which aggregates the required progress across all indicators.

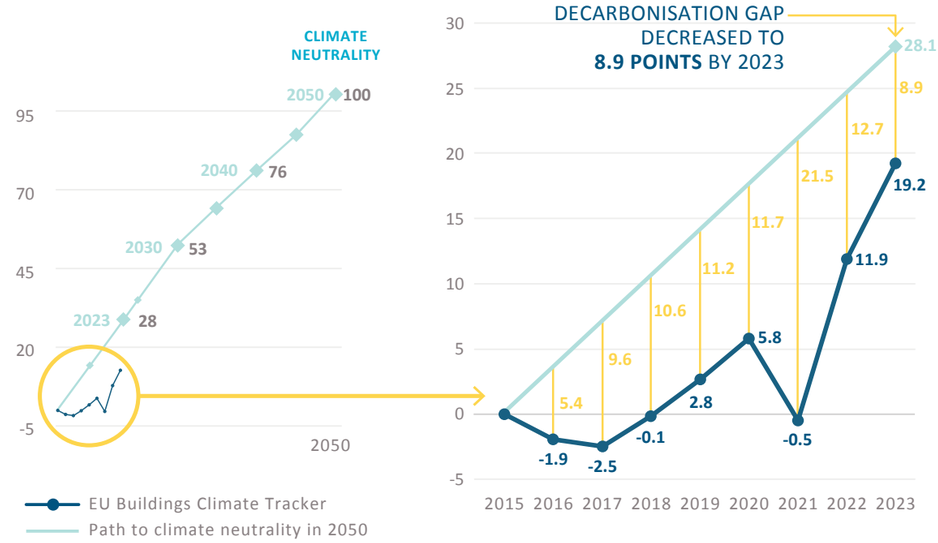

Figure 9: EU BCT results between 2015 and 2023

DEVELOPMENTS IN RECENT YEARS

In the first years after the base year of 2015, the index moved away from the reference trajectory. Between 2016 and 2018, the tracker registered negative values, reaching –2.5 points in 2017, indicating that overall decarbonisation progress in the building sector temporarily fell below the starting point. This early stagnation reflects the limited structural change occurring in the sector at the time, with only modest reductions in energy consumption and limited expansion of renewable energy in buildings.

A gradual improvement became visible between 2019 and 2020, when the index turned positive and reached 5.8 points, marking the first clear signs of progress in building decarbonisation. This improvement was mainly driven by reductions in final energy consumption and modest progress in renewable energy deployment. However, this upward trend was not sustained. In 2021, the index dropped again to –0.5 points. However, this result should be interpreted with caution, as the year was strongly influenced by the COVID-19 pandemic and associated restrictions, which affected energy demand and economic activity and may not reflect structural changes in the building sector.

DEVELOPMENTS SINCE THE LAST EDITION

The most recent years show a much stronger shift in the right direction. The index increased significantly to 11.9 points in 2022 and further to **19.2 points in 2023**, representing **the strongest improvement observed since the start of the tracker**. This acceleration reflects a combination of factors, including reductions in energy consumption and improvements in renewable electricity deployment.

Despite this improvement, **the EU building sector remains off track compared to the climate neutrality pathway**. By 2023, progress should have reached 28.1 points, leaving a gap of approximately 8.9 points between observed progress and the required trajectory.

Looking at the individual indicators helps explain this persistent gap. **CO_2 emissions from energy use in buildings remain clearly off track**, reflecting that reductions in energy demand and fuel switching are not yet happening fast enough across the building stock. Final energy consumption shows a mixed picture: while household energy consumption remains significantly off track, strong reductions in the service sector mean the overall **energy consumption in households and services is broadly aligned with the pathway**.

A similar contrast appears in the renewable energy indicators. **Renewable electricity deployment is progressing well and is already aligned with the pathway**, indicating that the decarbonisation of the electricity system is advancing relatively quickly. In contrast, **renewable heating and cooling remains far off track**, highlighting the continued dependence of buildings on fossil-based heating systems and the slow deployment of renewable heating technologies.

Finally, **investment in building renovation remains significantly below the required level**, representing one of the most important structural barriers to faster decarbonisation. The persistent investment gap limits the pace of energy efficiency improvements and delays the transformation of the building stock.

Taken together, the EU BCT results suggest that **the building sector has recently entered a phase of progress**, but this improvement remains uneven across the different dimensions of decarbonisation. Preliminary results for 2024 show a stagnation of progress for final energy consumption and renewable energy shares, indicating that progress in recent years might only be contextual and not structural – due to factors such as weather and consumer behaviour rather than strong policy implementation. The next edition of the EU BCT should enable analysis of whether progress will continue, stagnate or fall back.

POLICY IMPLICATIONS OF THE EU BCT RESULTS

The EU BCT results highlight the importance of effectively implementing the EU legislative framework for buildings. The **Energy Performance of Buildings Directive (EPBD) recast adopted in 2024**, which Member States must transpose by end May 2026, provides a key opportunity to address the structural gaps identified by the tracker, particularly by accelerating building renovation, improving the performance of the worst-performing buildings and pushing for decarbonising heating and cooling. At the same time, the **Energy Efficiency Directive (EED)** can support deeper reductions in final energy consumption, while the **Renewable Energy Directive (RED III)** is expected to accelerate the deployment of renewable heating and cooling solutions, an area where progress remains significantly behind the climate neutrality pathway. All these policies, while adopted in 2023/2024, still need to be fully implemented in Member States. Effective implementation should show a visible impact on the EU BCT indicators in the future.

Looking ahead, the effectiveness of this policy framework will also depend on how these instruments interact with measures designed to support the transition. The upcoming Emissions Trading System (ETS2) for buildings and road transport, scheduled to start in 2028, will introduce a carbon price signal that can incentivise energy efficiency improvements and the shift away from fossil fuels. The **Social Climate Fund**, becoming operational in 2026, is intended to help address social impacts of the ETS2 and support renovations and clean heating technologies. Ensuring that these policies are implemented in a coordinated and ambitious way will be essential to accelerate progress in the areas where the EU BCT shows the largest gaps, particularly renewable heating deployment and reductions in residential energy demand.

II. RESULTS FOR ALL SINGLE INDICATORS[58]

This section delivers a comprehensive technical overview of the trends and progress achieved by each of the EU BCT's four indicators over the full period from 2015 to 2023. To enable a precise quantitative assessment of the decarbonisation gaps, the indicators are analysed on a normalised scale to better understand the magnitude of the gaps observed until 2023.

1 CO_2 EMISSIONS FROM ENERGY USE IN BUILDINGS FOR HOUSEHOLDS AND SERVICES *SOURCE: EEA*

This indicator monitors the CO_2 emissions from the direct use of fossil fuel energy in buildings. It is composed of the simple addition of two sub-indicators: 1(a) CO_2 emissions from energy use in households, and 1(b) CO_2 emissions from energy use in service-sector buildings, including institutional buildings.

- As shown in Figure 10, CO_2 emissions from energy use in buildings for households and services followed a moderate downward trend between 2017 and 2020, and progress remained insufficient to meet the trajectory towards climate neutrality.

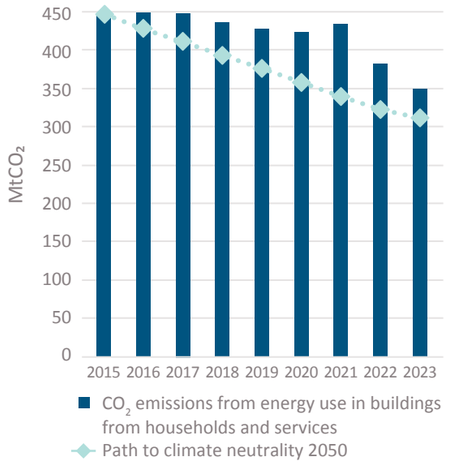

Figure 10: CO_2 emissions from energy use in buildings for households and services 2015-2023

- In 2021, the declining trend was interrupted, with emissions increasing by 2.5% compared to 2020, reaching 433.6 $MtCO_2$. This setback was mainly driven by higher final energy consumption in households due to colder weather conditions, together with a rebound in activity in the service sector following the lifting of COVID-19 restrictions.
- In 2022, CO_2 emissions dropped significantly to 382.3 $MtCO_2$, mainly due to reduced energy consumption. The downward trend continued in 2023, **with emissions falling further to 352.2 $MtCO_2$**, the lowest level recorded since 2015. Despite this progress, emissions remained **18.6% above the pathway level in 2022 and 15.7% above it in 2023**.
- Over the period 2015–2023, CO_2 emissions should have decreased by 31.9% to stay on track with the climate neutrality pathway. **However, the actual reduction achieved was only 21.2%**, indicating that the pace of decarbonisation remains below what is required.
- **Between 2015 and 2023, cumulative CO_2 emissions exceeded the level consistent with the climate neutrality pathway by approximately 419 $MtCO_2$**. These excess emissions have lasting environmental impacts and increase the scale of mitigation efforts required in the coming years to realign with the climate neutrality objective.

58. The 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.

1(a) CO_2 emissions from energy use in households

- As shown in Figure 11, CO_2 emissions from energy use in households increased in 2016, reaching a peak of 325.6 $MtCO_2$, before declining gradually between 2017 and 2019.
- In 2020 and 2021, the downward trend reversed and emissions increased again, reaching 316.0 $MtCO_2$ in 2021, 33.5% above the target level. This rise was likely driven by higher heating demand and behavioural changes, including more time spent at home due to COVID-induced restrictions.
- In 2022 and 2023, emissions fell significantly to 276.3 $MtCO_2$ and 251.6 $MtCO_2$, respectively, the lowest levels since 2015.[59] Despite this improvement, emissions in 2023 were still **19.6% higher than the pathway value**.
- Over the period 2015–2023, CO_2 emissions from households **should have declined by 33.5%**. However, the actual reduction **was only 20.4%**, showing that the pace of decarbonisation remains below what is needed.

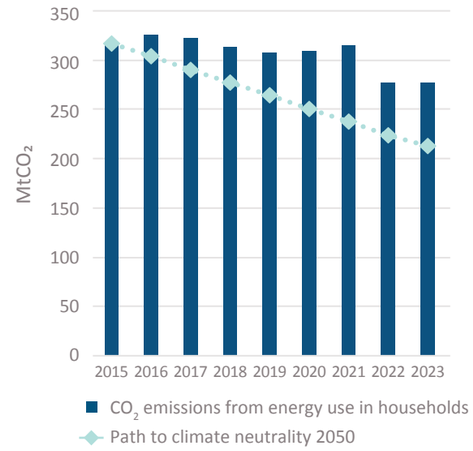

Figure 11: CO_2 emissions from energy use in households 2015-2023

59. Part of the sharp reduction in household emissions observed in 2022 and 2023 is likely linked to exceptionally high energy prices following the energy crisis, which encouraged households to reduce energy consumption in order to limit expenditure. This reduction was also driven by behavioural changes, such as lowering indoor temperatures, reducing heating duration or limiting overall energy use, sometimes at the expense of thermal comfort. See: European Commission, Energy prices and security of supply (COM(2025) 72 final), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0072; and Galvin, R. (2023), Worst first: Thermal retrofits, carbon prices, and inequality. Energy Research & Social Science.

1(b) CO_2 emissions from energy use in service-sector buildings

- As shown in Figure 12, CO_2 emissions from energy use in service-sector buildings decreased in 2016, increased slightly in 2017, and then followed a steady downward trend until 2020.
- In 2021, emissions rose to 117.6 $MtCO_2$, 13.7% higher than the pathway value. This increase coincided with the recovery of activity in the service sector following the easing of COVID-19 restrictions.
- Emissions resumed their decline in 2022 and continued in 2023, reaching 106.0 $MtCO_2$ and 100.6 $MtCO_2$, respectively. Although this indicates steady improvement, emissions in 2023 were still **6.8% above the pathway level. This partly reflects continued reliance on fossil fuels for heating, especially natural gas, which still supplies a large share of energy demand in services and other buildings**.[60]
- Over the period 2015–2023, emissions decreased by 23.3%, compared with a required reduction of 28.2% under the climate neutrality pathway. This remaining gap shows that further acceleration is needed to ensure sustained progress in the sector.

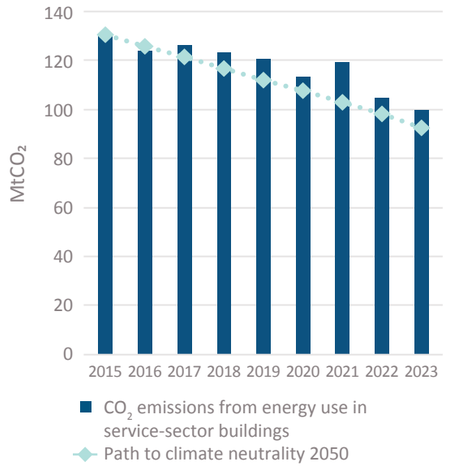

Figure 12: CO_2 emissions from energy use in service-sector buildings 2015-2023

60. Energy demand is falling faster than emissions because a large share of remaining heat demand is still met by fossil fuels, especially natural gas. In EU services in 2023, electricity accounted for 51.2% of final energy use, natural gas for 26.0%, and oil/petroleum products for 6.2%, meaning fossil fuels still directly supplied about one-third of the sector's energy, while heat contributed another 7.7%. (https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_s/default/table?lang=en).

2 FINAL ENERGY CONSUMPTION IN HOUSEHOLDS AND SERVICES *SOURCE: EUROSTAT*

This indicator describes the energy consumption of end-users in households and service-sector buildings. It is composed by the simple addition of two sub-indicators: 2(a) final energy consumption in households, and 2(b) final energy consumption in service-sector buildings.

- As shown in Figure 13, final energy consumption in households and services increased between 2015 and 2017, then declined steadily from 2017 to 2020.
- In 2021, the downward trend reversed and consumption increased to 4,548.5 TWh, 10.8% above the pathway level. This increase was driven by higher heating demand in households and the rebound in activity in the service sector after COVID-19 restrictions were lifted.
- In 2022 and 2023, consumption decreased to 4,206.7 TWh and 4,022.3 TWh, respectively. The reduction in 2022 was partly linked to lower heating needs, while the continued decline in 2023 brought consumption slightly below pathway level (0.1% below). **This indicates a clear return to the downward trend following the temporary increase observed in 2021**.
- Over the period 2015–2023, final energy consumption needed to decrease by **7.4%**, but the actual reduction **reached 7.5%. This shows that progress has largely converged with the required pathway, but with uneven developments between residential and service sectors.**[61]
- **Preliminary data for 2024**[62] shows a slight increase in consumption to 4,032 TWh, corresponding to a gap of approximately 1.2% above the pathway, suggesting that the recent alignment with the trajectory may not yet be fully sustained.

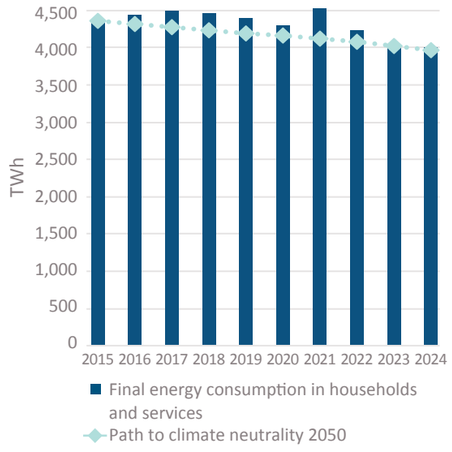

Figure 13: Final energy consumption in households and services 2015-2024

61. This overall result masks important differences between sub-indicators. While final energy consumption in the service sector has exceeded the required pathway, consumption in households remains off track. These diverging trends are discussed in more detail in the following section.
62. The 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.

2(a) Final energy consumption in households

- As shown in Figure 14, final energy consumption in households increased between 2015 and 2017, then declined moderately from 2017 to 2020.
- In 2021, consumption reached its peak at 3051.3 TWh, 14.7% above the pathway level. This increase was likely linked to higher residential energy use and behavioural changes, including more time spent at home, due to the COVID-19 pandemic.
- In 2022 and 2023, consumption decreased to 2,812.2 TWh and 2,657.7 TWh, respectively. In 2022, consumption fell below 2015 levels for the first time, and the decline continued in 2023. Despite this progress, consumption in 2023 remained **2.6% above the annual pathway value**.

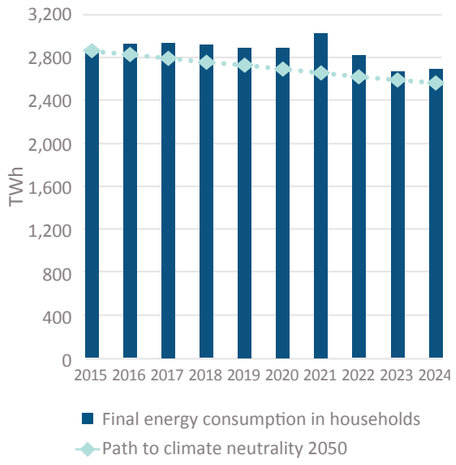

Figure 14: Final energy consumption in households 2015-2024

- Between 2015 and 2023, final energy consumption in households decreased by 208.1 TWh, compared to a required reduction of 275.5 TWh, leaving a gap of 67.4 TWh. This shows **about three-quarters (75.5%) of the required progress has been achieved**, but the pace of reduction still needs to strengthen to fully align with the climate neutrality pathway.
- Preliminary data for 2024[62] shows a slight further decrease **to 2,653 TWh**, although consumption remains above the pathway level, indicating that additional structural improvements are still required to close the gap.

2(b) Final energy consumption in service-sector buildings

- As shown in Figure 15, final energy consumption in the service sector increased between 2015 and 2017, then gradually declined. In 2019, consumption fell slightly below 2015 levels, and the decline became more pronounced in 2020, largely due to reduced economic activity during the COVID-19 pandemic.
- In 2021, the downward trend reversed and consumption increased to 1,497.2 TWh, broadly returning to pre-pandemic levels. This rebound reflected the recovery of economic activity across the service sector.
- In 2022 and 2023, consumption declined again to 1,394.5 TWh and 1,364.7 TWh, respectively. In both years, consumption remained below the pathway level, at **3.3% below the target in 2022 and 4.9% below it in 2023**.[63] The continued decline in 2023 suggests that some energy savings measures adopted because of high energy prices in 2022 continued in 2023. However, it remains unclear to what extent this trend reflects structural improvements or long-term measures in the sector. Part of the reduction is likely due to external factors, such as economic strain and milder weather, with heating degree days declining over the past four years. Continued monitoring is needed to determine whether the trend is lasting or temporary.

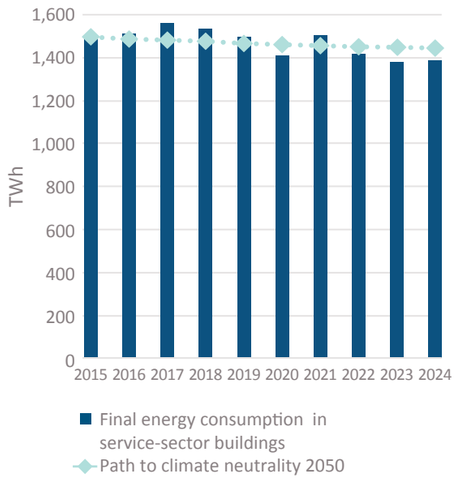

Figure 15: Final energy consumption in service-sector buildings 2015-2024

- Over the period 2015–2023, final energy consumption in the service sector decreased **by 7.9%**, compared to the required reduction of **3.1%** defined by the reference pathway. This means that the **observed reduction significantly exceeds the level needed to stay on track**. While this indicates notable progress overall, maintaining this trajectory will require consistent policy support and continued efficiency improvements.
- This is even more relevant as preliminary data for 2024[62] indicates a slight increase in consumption to 1,379 TWh, although levels remain below the pathway, suggesting that part of the recent reductions may not yet be fully sustained.

63. The continued reduction in final energy consumption in the service sector observed through 2023 brings this indicator further below the reference pathway, surpassing the pathway target value for 2023. However, there is limited evidence linking this trend to structural improvements or specific long-term measures in the sector. Part of the reduction may be influenced by external factors, including milder weather conditions, as heating degree days have steadily declined over the past four years. Continued monitoring will be important to assess whether this trend reflects lasting efficiency improvements or temporary conditions.

3 RENEWABLE ENERGY SHARE *SOURCE: EUROSTAT*

The renewable energy share indicator is composed of the weighted sum of two sub-indicators: 3(a) share of energy from renewable sources for heating and cooling (75%) and 3(b) share of energy from renewable sources in gross electricity consumption (25%).

- As shown in Figure 16, the share of renewable energy in electricity, heating and cooling has increased steadily since 2015, rising from 22.6% to 31.0% in 2023. Despite this continuous growth, the gap with the climate neutrality pathway remains substantial, particularly due to the slower uptake of renewables in heating and cooling.
- While the renewable energy share increased by only 4.1 percentage points between 2015 and 2021 (from 22.6% to 26.7%), it increased by 4.3 percentage points in just two years between 2021 and 2023. This indicates a clear acceleration in the deployment of renewable energy in recent years, although the overall level remains well below the pathway requirement.
- In 2023, the renewable energy share **reached 31.0%, which is 12.2 percentage points below the pathway value of 43.2%** for that year.
- Over the period 2015–2023, the renewable energy share should have increased by **20.5 percentage points**, but the actual increase was **only 8.4 percentage points**. This means that progress has reached **roughly 41% of the required increase**, highlighting the need for a significantly faster roll-out of renewable energy across the building sector.
- Preliminary data for 2024[64] shows a further increase in the renewable energy share to 31.9%, while the pathway reaches approximately 46%, indicating that the gap continues to widen despite recent progress.

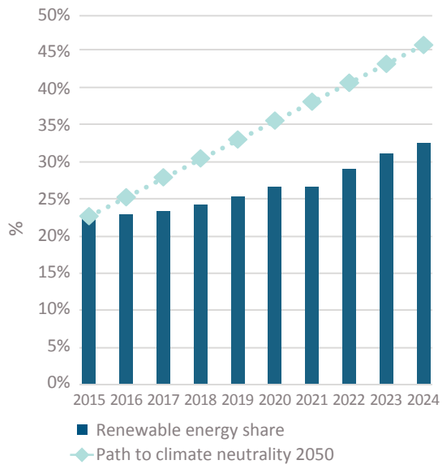

Figure 16: Renewable energy share 2015-2024

64. 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.

3(a) Share of energy from renewable sources for heating and cooling

- As shown in Figure 17, the share of renewable energy in heating and cooling increased gradually from 20.3% in 2015 to 26.2% in 2023. This steady growth, however, is far too slow, and the gap to the climate neutrality pathway continues to increase. In 2023, the renewable share in heating and cooling **was 16.6 percentage points below the pathway value of 42.8%**, indicating that progress is still far from sufficient.
- Growth was relatively modest between 2015 and 2021, with the share increasing by only 2.7 percentage points over six years. A stronger increase was observed in 2022 and 2023, when the share rose by 3.2 percentage points in just two years. This suggests some recent acceleration, although the overall level remains well below what is required, because of very slow progress between 2015 and 2021.
- Over the period 2015–2023, the share of renewable energy in heating and cooling should have increased by **22.5 percentage points**, but the actual increase reached only **5.9 percentage points**. This means that only 26% of the required increase has been achieved so far, highlighting the need for a much faster deployment of renewable solutions in heating and cooling systems.
- Preliminary data for 2024 shows a further increase to **26.7%**, while the pathway reaches **45.6%**, indicating that **the gap continues to widen despite recent progress**.

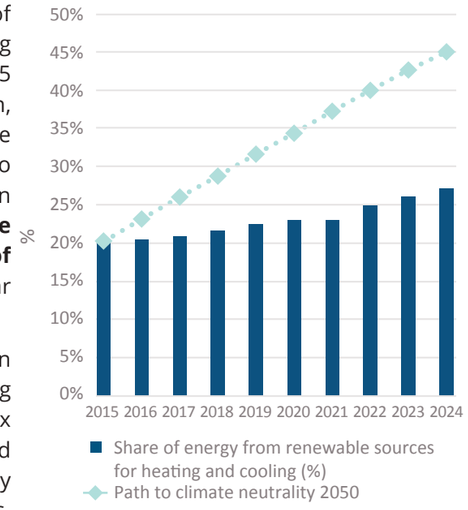

Figure 17: Share of energy from renewable sources for heating and cooling 2015-2024

3(b) Share of energy from renewable sources in gross electricity consumption

- As shown in Figure 18, the share of renewable energy in gross electricity production increased steadily from 29.7% in 2015 to 45.4% in 2023, with only a slight slowdown between 2020 and 2021. The overall trend indicates strong and sustained growth over the period.
- In 2023, t**he renewable electricity share reached 45.4%**, exceeding the **pathway value of 44%** by 1.4 percentage points. This marks a clear improvement compared to 2022, when the share was still 1.2 percentage points below the target.
- Over the period 2015–2023, the renewable share in electricity **increased by 15.7 percentage points**, compared with a required **increase of 14.6 percentage points** under the pathway. This means that progress in renewable electricity deployment is slightly ahead of the trajectory required for climate neutrality.
- Preliminary data for 2024[64] shows a further increase to **47.5%**, while the pathway reaches **46%**, indicating that renewable electricity continues to outperform the required trajectory.

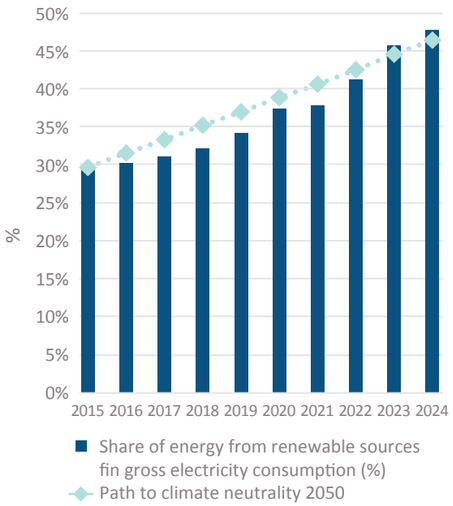

Figure 18: Share of energy from renewable sources in gross electricity consumption 2015-2024

4 CUMULATIVE INVESTMENT IN RENOVATION *SOURCE: FIEC*

This indicator describes cumulative investment in renovation of 85% of the building stock,[65] as reported by Member States[66] and expressed in 2015 Euros.

- As shown in Figure 19, cumulative investment in renovation has increased steadily from €289 billion in 2015 to €3,000 billion in 2023. Despite this continuous growth, the investment level remains substantially below the trajectory required for climate neutrality.
- By 2023, cumulative investments reached €3,000 billion, compared with a pathway target value of €4,853.9 billion, **leaving a gap of 40.6%**. Although annual investments have increased over time, the pace has not been sufficient to close the accumulated shortfall. Structural barriers such as high upfront costs, limited access to financing and split incentives continue to slow down renovation activity.
- The persistent investment gap means that renovation efforts are being delayed, contributing to a less efficient and ageing building stock relying on fossil fuels. Postponed action increases the risk of higher future costs and more disruptive transitions. A rapid and sustained scaling up of investments is essential to accelerate progress towards climate neutrality.

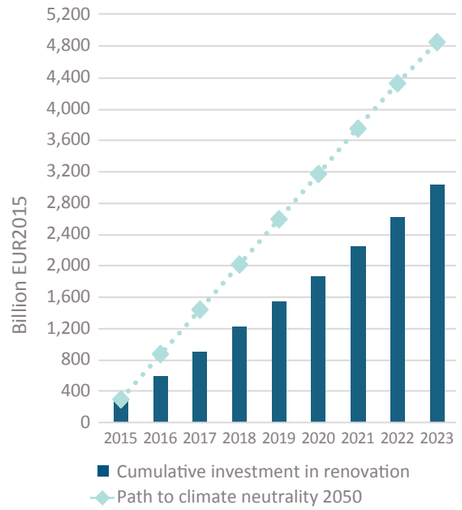

Figure 19: Cumulative investment in renovation 2015-2023

65. The analysis excludes Croatia, Cyprus, Greece, Hungary, Latvia, Luxemburg, Malta, Poland, Romania, Slovenia and Slovakia due to unavailable data.
66. When analysing the results for this indicator, it is important to note that while the goal is based on energy-related renovation, the dataset available does not explicitly differentiate between types of renovation – some countries also include the renovation of other urban infrastructure in their reports.

III. SUMMARY OF OBSERVATIONS

Table 5 summarises the results for all indicators, presenting the values for the base year (2015), the most recent year with available data (2023), and the corresponding value required in 2023 according to the reference pathway. It highlights the progress achieved between 2015 and 2023 and compares it with the level of progress needed to remain aligned with the climate neutrality trajectory. Progress is illustrated graphically in the final column using a scale of 10 houses, each representing 10% of the progress required during the analysed period.[67]

Table 5: Summary of observations and progress of the EU BCT composite index and single indicators

	Indicator	VALUES			DEVELOPMENTS		
		2015	2023 (achieved)	2023 (required)	2015-2023 (achieved)	2015-2023 (required)	How much of the required progress was achieved during 2015-2023?
1	**CO_2 emissions from energy use in buildings for households and services**	**447.2 $MtCO_2$**	**352.2 $MtCO_2$**	**304.43 $MtCO_2$**	**↓ 21.2%**	**↓ 31.9%**	
	households	316.0 $MtCO_2$	251.6 $MtCO_2$	210.26 $MtCO_2$	↓ 20.4%	↓ 33.5%	
	service-sector	131.2 $MtCO_2$	100.6 $MtCO_2$	94.16 $MtCO_2$	↓ 23.3%	↓ 28.2%	
2	**Final energy consumption in households and services**	**4,347.2 [TWh]**	**4,022.3 [TWh]**	**4,025.9 [TWh]**	**↓ 7.5%**	**↓ 7.4%**	
	households	2,865.8 [TWh]	2,657.7 [TWh]	2,590.3 [TWh]	↓ 7.3%	↓ 9.6%	
	service-sector	1,481.4 [TWh]	1,364.7 [TWh]	1,435.6 [TWh]	↓ 7.9%	↓ 3.1%	
3	**Renewable energy share**	**22.6%**	**31.0%**	**43.2%**	**↑ 8.4 percentage points**	**↑ 20.5 percentage points**	
	heating & cooling	20.3%	26.2%	42.8%	↑ 5.9 percentage points	↑ 22.5 percentage points	
	gross electricity consumption	29.7%	45.4%	44.2%	↑ 15.7 percentage points	↑ 14.6 percentage points	
4	**Cumulative investment in renovation**	**288.6**	**2,999.9**	**4,853.90**	**9.39 times the value in 2015**	**15.82 times the value in 2015**	

67. If the target was fully achieved, all 10 houses on the scale would be coloured.

IV. SUMMARY AND GAPS IN BUILDING STOCK DECARBONISATION

To better understand the magnitude of the gaps between the status of each indicator and the reference path for climate neutrality by 2050, Figure 20 to Figure 23 present the four main indicators on a normalised scale.68 This enables a harmonised analysis of the gaps across indicators.

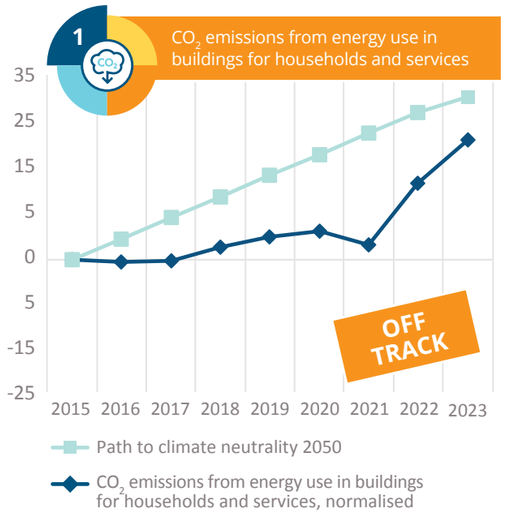

Figure 20: CO_2 emissions from energy use in buildings for households and services 2015-2023, normalised

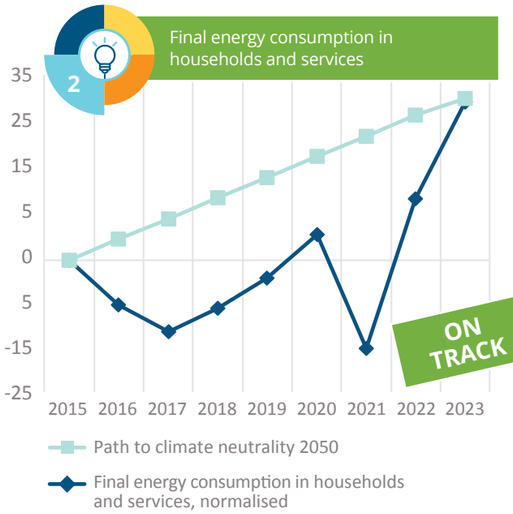

Figure 21: Final energy consumption and services 2015-2023, normalised

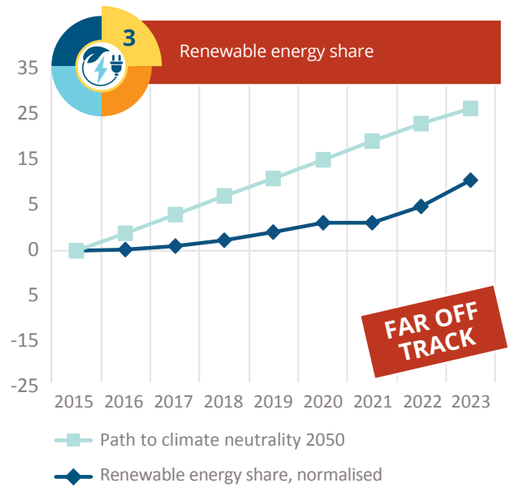

Figure 22: Renewable energy share 2015-2023, normalised

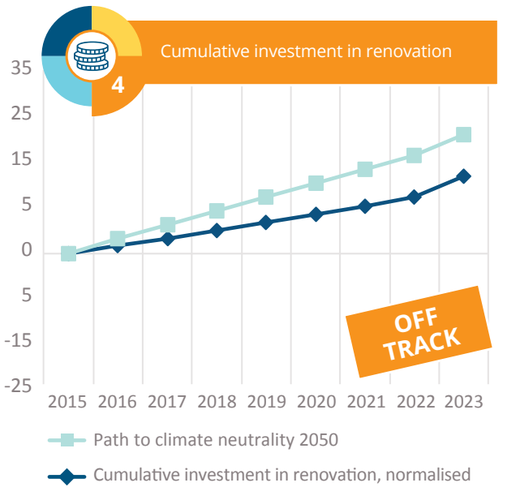

Figure 23: Cumulative investment in renovation 2015-2023, normalised

68. Normalising indicators means that they are translated into a common scale based on the path to climate neutrality and expected increase or decrease for each indicator, from 0 (levels in 2015) to 100 (final goal in 2050). See the EU BCT first edition. In general, 10 points on the normalised scale means that the indicator has achieved 10% of the reduction or increase that it should achieve during 2015-2050.

For each indicator, an assessment is carried out using the normalised scale, comparing the achieved progress over the period (2015-2023) with the corresponding progress required under the reference pathway. Based on this normalised value, the gap is calculated as the remaining share of required progress that has not yet been achieved. In this context, a positive gap value indicates that the indicator is off track, while a negative value reflects progress beyond the required pathway. Additional methodological details and the graphs for the sub-indicators are provided in Annex I. Although some progress can be observed across all indicators, and several trends are moving closer to or running parallel to the reference trajectory, the overall picture remains mixed. Some indicators are now on track or close to alignment with the pathway, while others remain significantly behind. This is a point of concern, as progress driven by only a limited set of indicators is unlikely to support a fair and robust building decarbonisation pathway across sectors and societal groups. Table 6 summarises the results for the four main indicators and their sub-indicators.

EXECUTIVE SUMMARY | ABBREVIATIONS | INTRODUCTION | METHODOLOGY |
EU BCT AND ITS INDICATORS | CONCLUSION | ANNEX |

Table 6: Summary of the existing gaps for the EU BCT indicators based on the normalised values

	INDICATOR	ASSESSMENT	GAP
1	**CO_2 emissions emissions from energy use in buildings for households and services**	OFF TRACK	33.5%
	1(a) CO_2 emissions from energy use in households	OFF TRACK	39.1%
	1(b) CO_2 emissions from energy use in service-sector buildings	OFF TRACK	17.5%
2	**Final energy consumption in households and services**	ON TRACK	-1.1%
	2(a) Final energy consumption in households	OFF TRACK	24.5%
	2(b) Final energy consumption in service-sector buildings	ON TRACK*	-155.1%
3	**Renewable energy share**	FAR OFF TRACK	59.2%
	3(a) Share of energy from renewable sources for heating and cooling	FAR OFF TRACK	73.7%
	3(b) Share of energy from renewable sources in gross electricity consumption	ON TRACK	-7.9%
4	**Cumulative investment in renovation**	OFF TRACK	40.6%

* The continued reduction in final energy consumption in the service sector observed through 2023 brings this indicator further below the reference pathway, surpassing the pathway target value for 2023. However, there is limited evidence linking this trend to structural improvements or specific long-term measures in the sector. Part of the reduction may be influenced by external factors, including milder weather conditions, as heating degree days have steadily declined over the past four years. Continued monitoring will be important to assess whether this trend reflects lasting efficiency improvements or temporary conditions.

Overall, the results reveal a **highly uneven transition across the different dimensions of building decarbonisation**. While some indicators have recently moved closer to the reference trajectory, others remain significantly behind, indicating that progress across the building system is not yet balanced.

The **largest gaps remain in renewable energy deployment and renovation investment**, both of which are structural drivers of long-term decarbonisation. The renewable energy indicator still shows a shortfall of almost **60% of the progress required** due to the very slow expansion of renewable energy in heating and cooling. With a gap of more than **70%**, this segment represents the most significant structural bottleneck in the transition of the building sector. **Buildings continue to rely heavily on fossil fuels for heat, and the deployment of renewable heating technologies has not yet accelerated sufficiently to match the required trajectory**.

The **investment indicator also remains clearly off track**, with a gap of **42%** compared to the pathway. Although renovation investments have continuously increased in absolute terms, the scale of investment remains insufficient relative to what is needed to transform the building stock at the required pace. This persistent investment shortfall delays improvements in energy performance and slows the adoption of clean heating solutions, which in turn affects other indicators in the tracker.

A different dynamic can be observed for **final energy consumption**. At the aggregated level, energy consumption for households and services taken together appears broadly aligned with the pathway, with only a small gap relative to the required trajectory. However, the sub-indicators reveal a strong divergence between sectors. Energy consumption in **service-sector buildings shows a strong reduction**, even exceeding the pathway in recent years. In contrast, **household energy consumption remains substantially above the required trajectory**, with a gap of nearly **30%**. This imbalance suggests that reductions in the service sector have compensated for slower progress in the residential sector, masking structural inefficiencies in the housing stock, which in turn have important consequences on households' health and economic situation.

The **CO_2 emissions indicator reflects a similar pattern**. Although emissions have declined overall, the gap relative to the required trajectory remains significant. Here again, the residential sector accounts for most of the shortfall, with the gap in household emissions reductions being more than twice as large as in the service sector. This indicates that decarbonisation efforts in residential buildings – particularly improvements in efficiency and the replacement of fossil-based heating systems – are not yet progressing fast enough.

In contrast, **renewable electricity deployment stands out as one of the strongest-performing component of the tracker**. The share of renewable electricity has reached a level broadly aligned with the pathway and even slightly exceeded the required trajectory in the most recent year. This reflects the rapid decarbonisation of the electricity system across the EU. However, the benefits of this progress will only fully translate into building decarbonisation if electrification of heating and energy efficiency improvements accelerate simultaneously.

Taken together, the results indicate that the decarbonisation of the EU building sector is currently being driven by **progress in electricity decarbonisation and reductions in service-sector energy consumption**, while **structural transformation of residential buildings and heating systems remains much slower**. Addressing these structural gaps, particularly in residential energy demand, renewable heating deployment and renovation investment, will be essential for bringing the overall trajectory of the building sector closer to the climate neutrality pathway. It will also ensure that the benefits of building decarbonisation are available to all in society.

CONCLUSION

EUROPE'S BUILDING DECARBONISATION IS GAINING MOMENTUM – BUT MUST ACCELERATE FURTHER, IN A MORE EQUITABLE WAY, BOTH FOR CLIMATE AND SOCIAL RESILIENCE

Transforming Europe's building stock is not only a climate imperative; it is also a key opportunity to strengthen long-term social resilience, economic stability and energy security. The latest results of the EU Buildings Climate Tracker show that progress in the decarbonisation of the building stock has accelerated in recent years. However, the sector still remains behind the trajectory required to achieve climate neutrality.

Compared with previous editions of the tracker, several encouraging developments can be observed. Reductions in final energy consumption and the growth of renewables in electricity have contributed to a stronger improvement in the EU BCT index between 2022 and 2023. Nevertheless, the results also reveal that progress remains uneven and that several key dimensions of transformation lag behind what is needed.

The latest data highlights the following key trends:

- **CO_2 emissions from energy use in buildings declined by 21% between 2015 and 2023,** reaching approximately **352 $MtCO_2$.** Although this represents an improvement compared with previous years, it still falls short of the **32% reduction required** to remain aligned with the climate neutrality pathway.
- **Final energy consumption in households and service-sector buildings decreased by 7.5%**, broadly in line with the pathway. However, this progress is largely driven by reductions in the **service sector**, while **energy consumption in households remains above the required trajectory**.
- **The renewable energy share in buildings increased from 22.6% to 31%,** but remains far below the **43% share required by the pathway**. The largest gap persists in the deployment of **renewable heating and cooling technologies**, which are essential for replacing fossil fuels in buildings.
- **Investment in building renovation has continued to grow**, reaching approximately **€3 trillion in cumulative investment since 2015.** Despite this progress, investments still represent only **59.4% of the level required to** remain on track for climate neutrality.

At the same time, some developments provide reasons for optimism. The **rapid expansion of renewable electricity** and the growing deployment of electrification technologies are beginning to support the decarbonisation of buildings. The recent acceleration observed in the EU BCT index shows that **progress is possible when policy action, technological deployment and behavioural changes align**.

However, without sustained and structural improvements, driven by policy implementation – particularly **in residential energy demand, renewable heating deployment and renovation investment** – the transformation of the building stock will remain incomplete. This is crucial, as a slow transformation of buildings not only affects our climate goals, but impacts the lives of Europeans, socially and economically, leaving them more vulnerable to external shocks.

ANNEX

ANNEX I – INDICATORS IN NORMALISED VALUES

Figures 24 to 33 present the EU BCT indicators on a normalised scale. For each indicator, an assessment is provided to evaluate the gap between the 2023 status, representing the most recent year with normalised data, and the reference path. The assessment follows the criteria summarised in Table 7. The analysis helps identify the indicators showing the least progress up to 2023 and highlights where current trends are not sufficient and additional efforts are needed to close the gap and stay aligned with the decarbonisation pathway.

Table 7: EU BCT indicators status assessment

Assessment	Colour code	Gap between the last year of observations and the target value for that year on the normalised scale[69]
ON TRACK		less than 5%
ALMOST ON TRACK		between 5 and 15%
OFF TRACK		between 15 and 50%
FAR OFF TRACK		more than 50%

69. Negative values indicate that the achieved progress exceeds the level required by the reference pathway. In such cases, the indicator has already met or surpassed the pathway target value for the assessed period and is therefore considered to be overachieving.

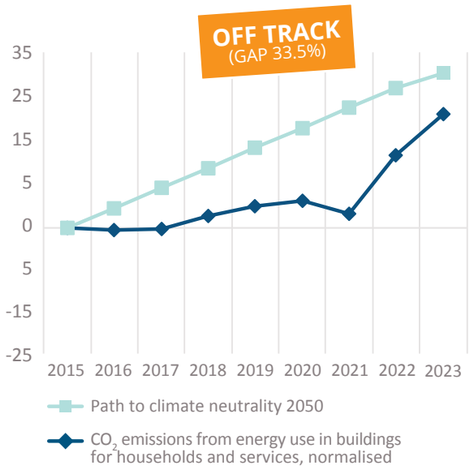

Figure 24: CO_2 emissions from energy use in buildings for households and services 2015-2023, normalised

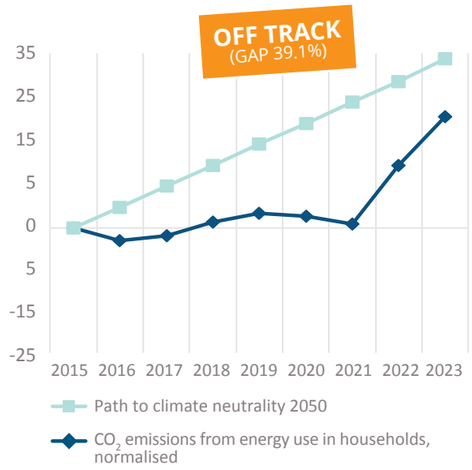

Figure 25: CO_2 emissions from energy use in households 2015-2023, normalised

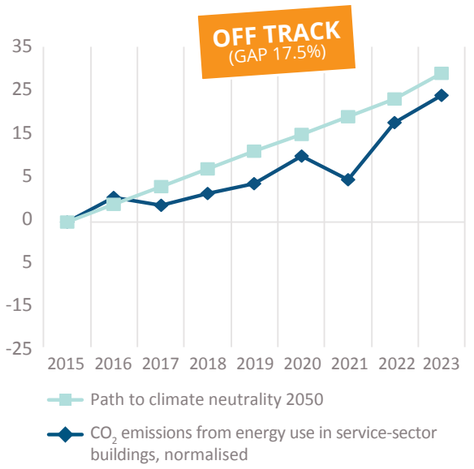

Figure 26: CO_2 emissions from energy use in service-sector buildings 2015-2023, normalised

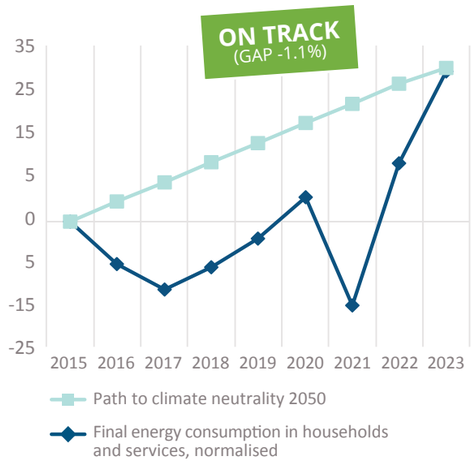

Figure 27: Final energy consumption in households and services 2015-2023, normalised

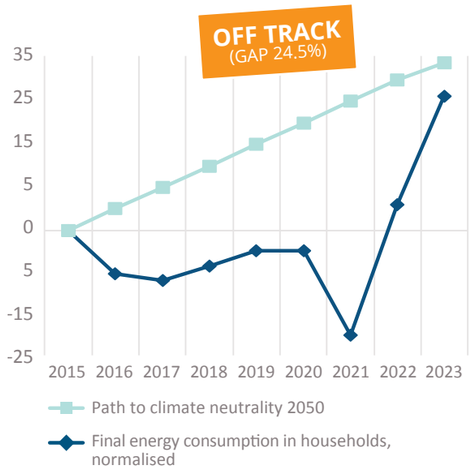

Figure 28: Final energy consumption in households 2015-2023, normalised

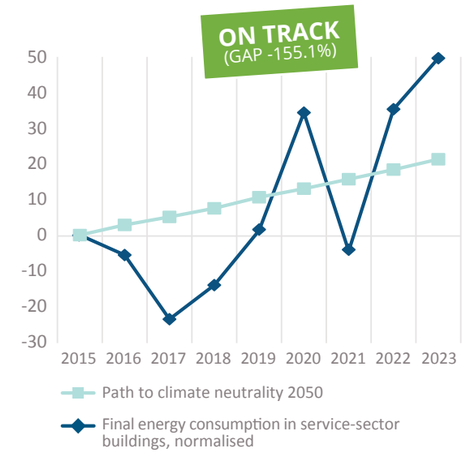

Figure 29: Final energy consumption in service-sector buildings 2015-2023, normalised

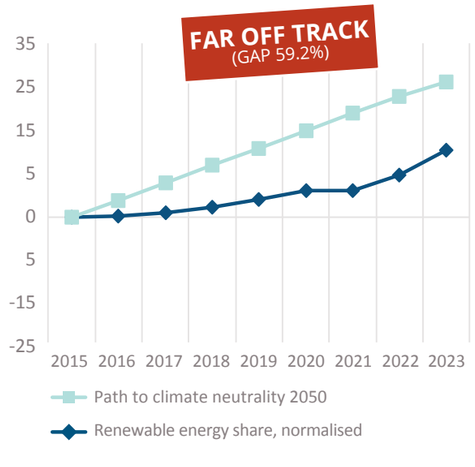

Figure 30: Renewable energy share 2015-2023, normalised

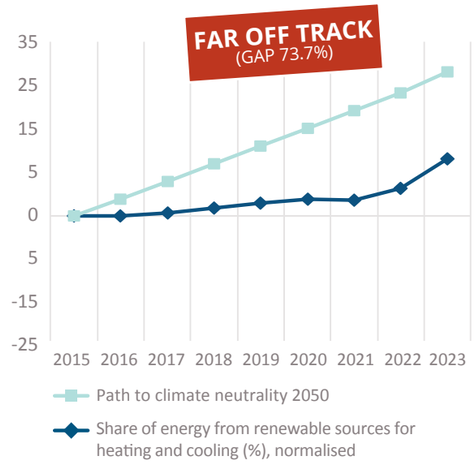

Figure 31: Share of energy from renewable sources for heating and cooling 2015-2023, normalised

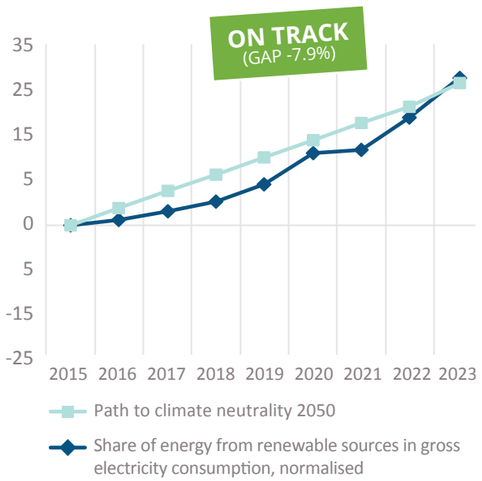

Figure 32: Share of energy from renewable sources in gross electricity consumption 2015-2023, normalised

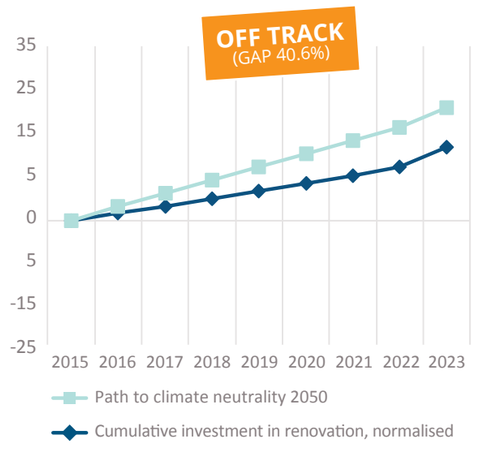

Figure 33: Cumulative investment in renovation 2015-2023, normalised

EXECUTIVE SUMMARY | ABBREVIATIONS | INTRODUCTION | METHODOLOGY |
EU BCT AND ITS INDICATORS | CONCLUSION | ANNEX |

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