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ITALY BUILDINGS CLIMATE TRACKER

IS ITALY ON TRACK TO DECARBONISE ITS BUILDING STOCK?

1ST EDITION

BPIE

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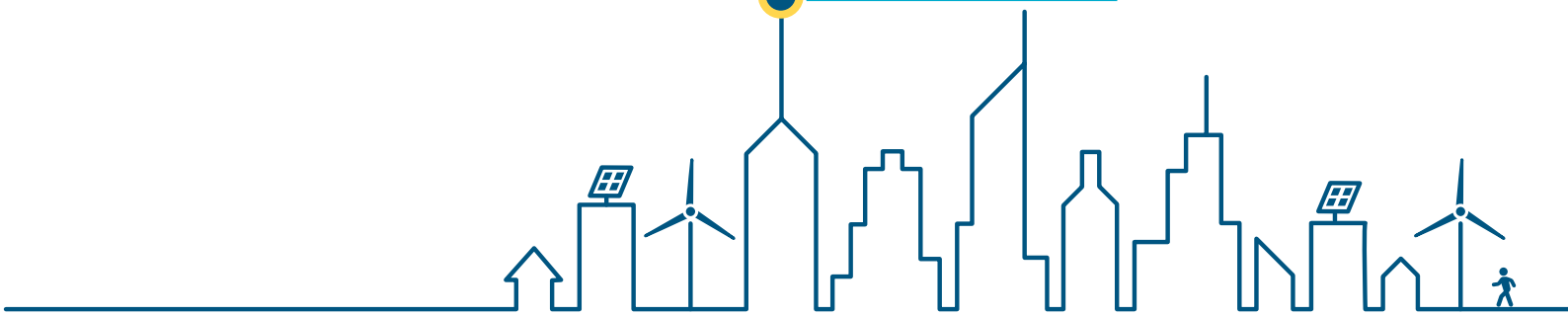

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EXECUTIVE SUMMARY

WHAT IS THE ITALIAN BUILDINGS CLIMATE TRACKER (ITA BCT)?

This is the first edition of the Buildings Climate Tracker for Italy (ITA BCT). The ITA BCT is a composite index that measures progress towards decarbonising the Italian building stock, a crucial step for achieving climate neutrality by 2050. Developed by BPIE, the tracker evaluates four key indicators: (i) CO_2 emissions, (ii) final energy consumption, (iii) renewable energy share, and (iv) investment in renovation. These feed into a single index number representing the overall progress of the building stock in Italy toward the climate goals for 2030 and 2050, as currently foreseen in the national strategies.

The ITA BCT tracks progress since the adoption of the Paris Agreement in 2015, enabling policymakers to evaluate the effectiveness of energy and climate policies and regulations targeting buildings, such as the Energy Performance of Buildings Directive (EPBD), the Energy Efficiency Directive (EED) and the Renewable Energy Directive (RED III). By analysing these metrics, the tracker answers critical questions regarding the evolution of building decarbonisation and the improvements needed to achieve climate neutrality by 2050.

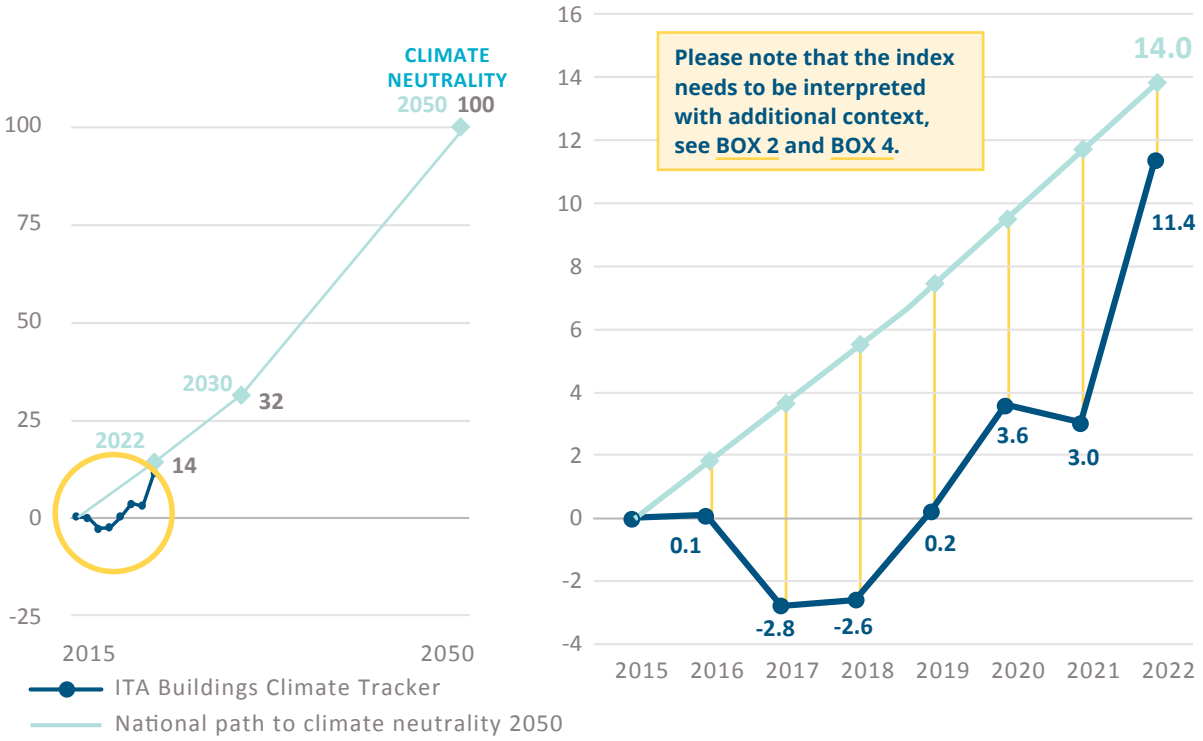
WHAT PROGRESS WAS MADE SINCE 2015?

Figure 1 provides an overview of the results and progress of the index. The index reveals that the Italian buildings sector is not on track to meet its climate goals. Overall, the four key indicators are not following the necessary decarbonisation pathway to 2030. **Italy aims to reduce buildings emissions by only 31% by 2030, leaving the larger portion (69%) of the reductions to happen between 2030 and 2050.** But with 2022 marking the halfway point between the Paris Agreement, the starting point of our tracking, and 2030, the current rate of progress will not achieve these targets. In 2022, the difference between the tracker and the climate neutrality path highlights **inadequate progress towards a target that foresees most decarbonisation efforts after 2030, disregarding the need for well-timed action and early CO_2 emissions reduction to avoid irreversible impacts**. This choice translates into insufficient reductions in final energy consumption and a very slow rollout of renewable heating and cooling and electricity. There have been massive renovation investments injected in recent years, but their results are uncertain and need further investigation.

When considering the progress of the four indicators, four main interventions are recommended:

1. Increase action to avoid the release of extra CO_2 before 2030 and greater future mitigation and adaptation risks and related costs.
2. Invest in a faster deployment of renewable energy in buildings for heating and cooling by breaking the dependence on natural gas, and an increased share of renewables in electricity. This would also improve energy security and reduce imports of fossil fuels.
3. Design and direct investments for renovation towards the worst-performing buildings to achieve the required energy savings and emissions reductions where they are most needed, along with the benefits connected with renovation, including energy savings, increase renewables for heating and cooling, improved health and comfort and energy poverty alleviation.
4. Transpose and implement the Energy Performance of Buildings Directive in a timely, effective way to set the right conditions for a faster and more effective decarbonisation of the building stock by 2050.

Figure 1: ITA BCT results between 2015 and 2022



KEY FIGURES

- **CO_2 EMISSIONS** had a target reduction of 14.3% from 2015 to 2022. However, only a 12.4% reduction was achieved, with nearly 1.4 $MtCO_2$ of additional emissions being released in the atmosphere.

- **FINAL ENERGY CONSUMPTION** in buildings has dropped by only 3%, while the target was an 8.1% reduction. The reduction is happening at less than half of the required pace.

- **RENEWABLE ENERGY SHARE** has increased by a mere 1.9 percentage points compared to a target increase of 9.3 percentage points. Renewable uptake for heating and cooling must increase sixfold.

- **INVESTMENT IN BUILDING RENOVATION** is the outlier as it is almost double the required investment of €45 billion for 2022. This is connected to the introduction of the Superbonus scheme which injected uncommon annual investments for renovation in 2021 and 2022 – 7 and 15 times the average observed until 2019, respectively. Despite this significant increase, however, the investments in Italy's building sector are not yet delivering the expected results, with little change in final energy consumption and CO_2 emissions recorded in 2022. Monitoring of investments in renovation, emissions and final energy consumption in the upcoming years will be essential to understand the effects of the Superbonus scheme. This highlights the importance of properly designing, targeting and monitoring policies and the deployment of available resources. The effectiveness of investments in renovation depends on establishing a robust framework, applying a "higher impact, higher support" principle, and having clear requirements and mechanisms to show emissions reductions, energy savings and the social benefits achieved.

Table 1 provides an overview of the results and progress of all the indicators between 2015 and 2022, compared to the target values for 2022 from the reference path. The indicators are also analysed on a normalised scale to understand better the magnitude of the gaps observed.[1]

Table 1: Summary of observations and progress of the ITA BCT indicators[2]

	Indicator	Achieved progress 2015-2022	Required progress 2015-2022	How much of the required progress was achieved during 2015-2022?
1	**CO_2 emissions emissions from energy use in buildings for households and services***	**↓ 12.4%**	**↓ 14.3%**	
	households	↓ 13%	↓ 14.9%	
	service-sector	↓ 11.2%	↓ 13.1%	
2	**Final energy consumption in households and services**	**↓ 3.0%**	**↓ 8.1%**	
	households	↓7.7%	↓ 8.5%	
	service-sector**	↑ 7.1%	↓ 7.3%	
3	**Renewable energy share**	**↑ 1.9 percentage points (increased from 22.6% to 28.9%)**	**↑ 9.3 percentage points (should have increased from 22.6% to 40.6%)**	
	heating & cooling	↑ 1.3 percentage points	↑ 7.8 percentage points	
	gross electricity consumption	↑ 3.6 percentage points	↑ 14 percentage points	
4	**Cumulative investment in renovation*****	**28 times the value in 2015**	**13 times the value in 2015**	

HOW TO READ THE RESULTS IN TABLE 1?

- The **achieved progress** corresponds to the difference between the observations in 2022 and 2015.
- The **required progress** corresponds to the difference between the required target for 2022 in 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 target was fully achieved, all 10 houses on the scale would be bold.

[1] A detailed analysis and description of the indicators can be found in section Selection of indicators

[2] * Although this indicator is only 2.3% higher than the target in the reference path for 2022, this target reflects Italy's lack of ambition for emissions cuts for the period up to 2030. A higher target would be preferable to encourage earlier action. See Box 2 in Translating climate neutrality by 2050 into a goal for each indicator. **The final energy consumption in the service sector increased over the period from 2015 to 2022, which explains the 7.1% increase in the table, when a 7.3% reduction was required. This indicator is not just off-track but is moving in the wrong direction. This stands in contrast to the required decrease in energy consumption, resulting in a negative ratio between the required and achieved pace. ***The cumulative investment in renovation up to 2022 is above the required target, but various considerations need to be taken into account when analysing these results. See 4. Cumulative investment in renovation and Box 4.

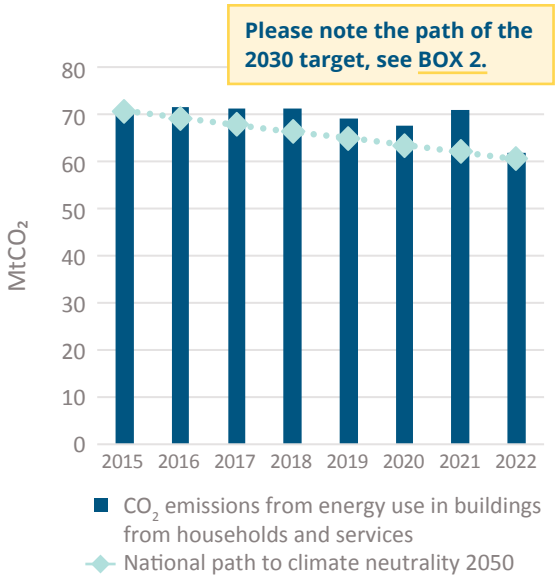
Indicator 1

CO_2 EMISSIONS

CO_2 emissions from energy use in buildings for households and services are decreasing but are still higher than the climate neutrality target.

Emissions in 2022 reached the lowest level recorded since 2015. This reduction occurred alongside a decline in final energy consumption, which also reached its lowest point in 2022. This reduction was partly due to measures aimed at curbing domestic heating, implemented to address the energy crisis caused by the Russian invasion of Ukraine and high gas prices.[3] These measures included shortening the heating season by 15 days and lowering maximum temperature settings by one degree Celsius.

Figure 2: CO_2 emissions from energy use in buildings for households and services 2015-2022

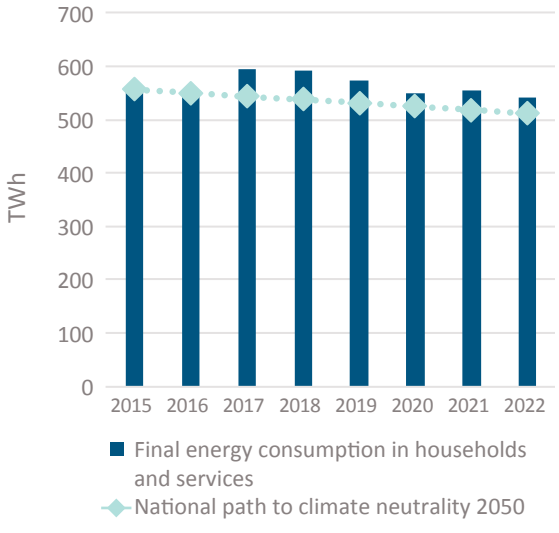


Indicator 2

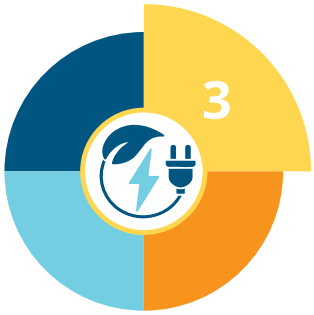
FINAL ENERGY CONSUMPTION

Between 2015 and 2022, final energy consumption for households and services was expected to decrease by 8.1%. **However, only a 3% reduction was achieved, indicating that the rate of decline is less than half of what is needed to meet the climate goals.**

Figure 3: Final energy consumption in households and services 2015-2022



[3] https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_203$defaultview/default/line?lang=en

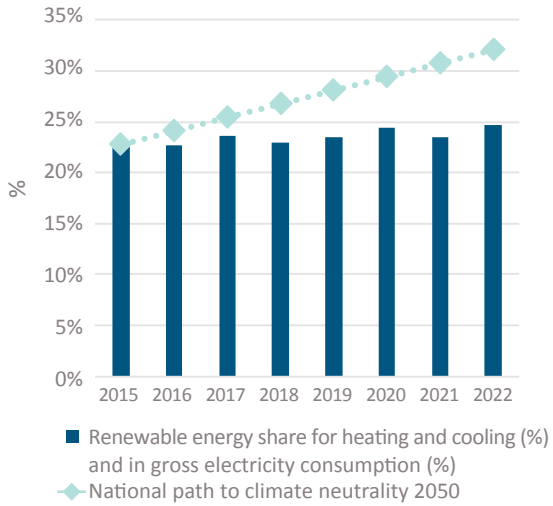


Indicator 3

RENEWABLE ENERGY SHARE

During the period from 2015 to 2022, the share of renewable energy increased by only 1.9 percentage points, significantly below the expected increase of 9.3 percentage points. **This reflects a very slow transition towards renewable energy sources, way below the expected path.**

Figure 4: Renewable energy share 2015-2022



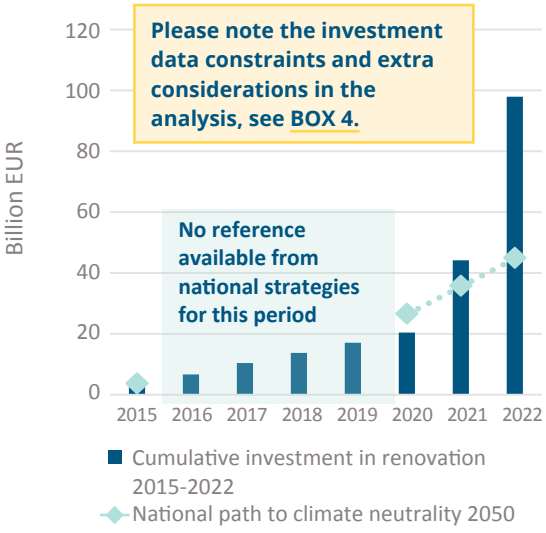
Indicator 4

INVESTMENT IN RENOVATION

The cumulative investment in renovation has grown significantly since 2015, reaching €97.7 billion in 2022, more than doubling the required investment of €45 billion for the same year.

This sudden increase is due to the introduction of the Superbonus scheme which in 2021 and 2022 injected annual investments much higher than the average observed in previous years. However, the effects of such investments on the CO_2 emissions and final energy consumption for residential buildings are not yet fully visible. For more details on how to interpret and analyse these results, please see box 4.

Figure 5: Cumulative investment in renovation 2015-2022[3]



[4] As Italy did not have objectives for renovation rates and investments in 2015-2019, we could not apply goal values for this period. To enable calculation of the following periods we have assumed investments in 2015-2019 to be based on the observed deep renovation rate.

ABBREVIATIONS

BCT	Buildings Climate Tracker
CDD	Cooling degree days
EED II	Energy Efficiency Directive II
EPC	Energy performance certificate
ENEA	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile
EPBD	Energy Performance of Buildings Directive
EU	European Union
EU BTC	European Union Buildings Climate Tracker
EUROSTAT	Statistical Office of the European Union
EEA	European Environment Agency
HDD	Heating degree days
ITA BCT	Italian Building Climate Tracker
LTS	Long-Term Strategy
MEPS	Minimum energy performance standards
NECP	Integrated National Energy and Climate Plan
RED II	Renewable Energy Directive II
ZEB	Zero-Emission Building

INTRODUCTION

In Italy, advancing towards the decarbonisation of the building sector is essential for achieving the climate goals of the Paris Agreement and ensuring climate neutrality by 2050. This effort is supported by key national strategies, including the Integrated National Energy and Climate Plan (NECP) for 2030 goals, the national Long-Term Strategy (LTS) for 2050 goals, and the strategy for energy retrofitting of the national building stock. These plans outline Italy's commitment to reducing carbon emissions and enhancing energy efficiency across various sectors, including buildings. Monitoring the effectiveness and impact of these policies is vital for understanding progress, refining strategies and unlocking all the benefits derived from the decarbonisation of buildings.

The **Italian Buildings Climate Tracker (ITA BCT)** has been developed to track the progress of building decarbonisation in Italy, following the methodology of the **EU Buildings Climate Tracker (EU BCT)**.[5] This index incorporates four indicators monitoring (i) CO_2 emissions, (ii) final energy consumption, (iii) renewable energy share, and (iv) investments in renovation.

THE ITALIAN BUILDINGS CLIMATE TRACKER ANSWERS THE FOLLOWING QUESTIONS:

- **How has the decarbonisation of the building stock in Italy evolved since 2015?**
- **Is the current trajectory of the Italian building sector aligned with the 2050 climate neutrality goals?**
- **What level of improvement is required between the latest data and 2050 to achieve these climate targets?**

By offering a focused analysis of Italy's building decarbonisation efforts, the ITA BCT aims to provide stakeholders and policymakers with clear insights into the current rate of progress. It will highlight discrepancies between Italy's existing pathways and the 2050 goals to guide policy decisions and accelerate the implementation of necessary measures. This report complements ongoing discussions about the role of buildings in improving health and quality of life, aligning with the objectives of new initiatives such as the Healthy Buildings Barometer 2024 framework.

[5] https://www.bpie.eu/publication/eu-buildings-climate-tracker-a-call-for-faster-and-bolder-action/

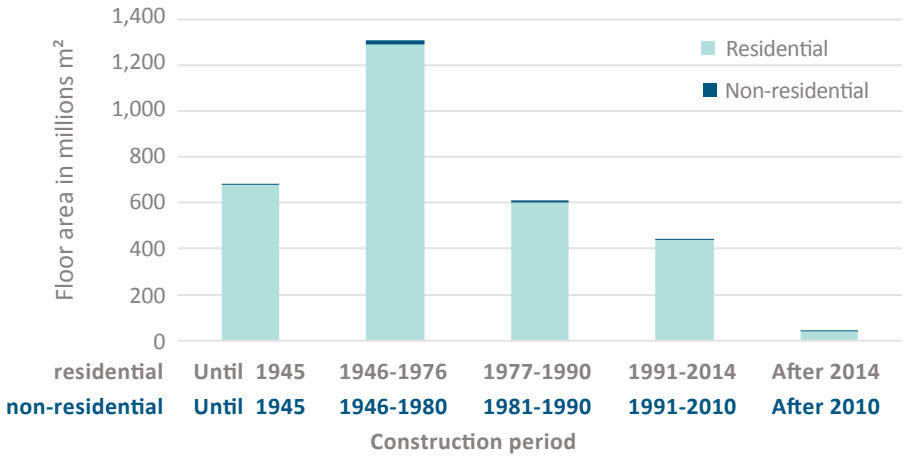
THE REPORT IS ORGANISED AS FOLLOWS:

- **ITALIAN BUILDING STOCK** presents key facts about the building stock in Italy, providing an overview of its characteristics and progress in decarbonisation represented by Energy performance certificates (EPCs).
- **METHODOLOGY** presents the BCT methodology, including the definition of the indicators and their goal values.
- **ITA BCT AND ITS INDICATORS: PROGRESS DURING 2015-2022** presents the results of the composite index, which reflects the overall progress of the Italian building stock toward decarbonisation. It also details the outcomes of individual indicators.
- **HOW THESE RESULTS RELATE TO THE BUILDING STOCK AND ITS USERS** highlights the gaps in progress across the indicators and interprets what these observed developments mean for the people who live and work in these buildings, shedding light on the social implications of the transition.
- **MAIN FINDINGS AND RECOMMENDATIONS** summarise the conclusions, key remarks and observations, including an overview of all results.

ITALIAN BUILDING STOCK

The Italian building stock consists of more than 13 million buildings.[6] About 89% (more than 12 million buildings) are used for residential purposes and about 11% (around 1.6 million buildings and combinations of non-residential buildings) by the service sector. After a strong increase in the second half of the 20th century, building construction has steadily declined over the decades. The data in Figure 6 indicates that 22% of the floor area was built before 1945, with a significant portion (42%) added during the post-war period up to the 1980s. An additional 20% was constructed by 1990, followed by 14% between 1990 and 2014, and only 1% since. This highlights that much of Italy's building infrastructure is old, with over half of the floor area constructed before 1980, underscoring the substantial need for renovation efforts in the coming years. The high ownership rate in Italy, which stood at 74.3% in 2022,[7] presents a potential advantage for renovation initiatives, as homeowners are more likely to invest in upgrading their properties, further driving the renovation efforts necessary to ensure the sustainability and energy efficiency of Italy's building infrastructure.

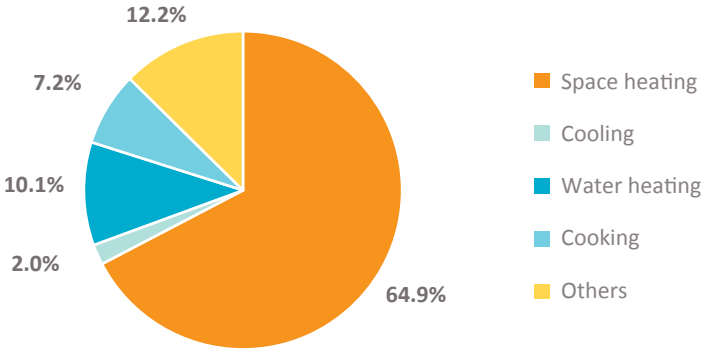
Figure 6: Floor area and construction period in the year 2018 for Italy [Based on NECP]



[6] Based on NECP (According to the ISTAT census of 2011)
[7] Based on EUROSTAT

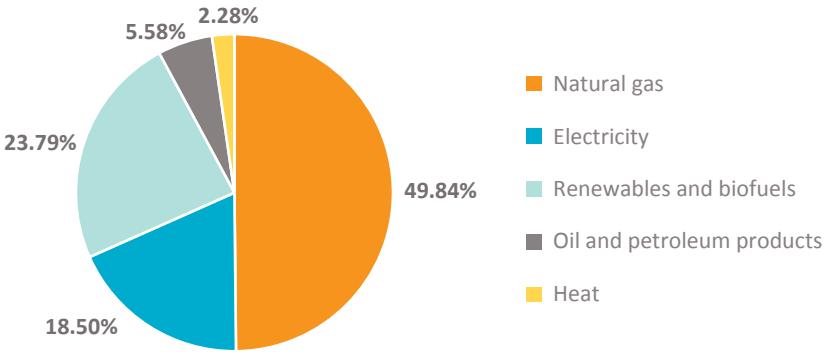
While deploying decarbonisation actions for the building sector, it is important to understand not only the age and status of the building stock but also its operation and energy requirements. For instance, in the residential sector, more than 60% of final energy consumption is for space heating (Figure 7).[8] This emphasises the importance of enhancing the thermal performance of buildings through renovation measures and more efficient heating systems. Even though cooling represents a small portion of the final energy consumption, passive and active cooling strategies are more and more needed, especially in the context of recent intense weather conditions. For instance, in 2022, Italy registered the highest cooling degree days since 2004.[9]

Figure 7: Share of final energy end-uses in residential buildings in Italy in 2022 [Based on EUROSTAT]



The energy supply of the building stock plays a key role in the decarbonisation process. Improving the energy performance of buildings should be combined with the phase-out of fossil fuels and rollout of clean energy for buildings. This is a crucial aspect in the context of Italy since it has the second highest reliance in Europe on natural gas for residential buildings.[10] As presented in Figure 8, around half of the final energy in residential buildings is supplied by natural gas.

Figure 8: Share of fuels in the final energy consumption of residential buildings in Italy in 2022. [Based on EUROSTAT]



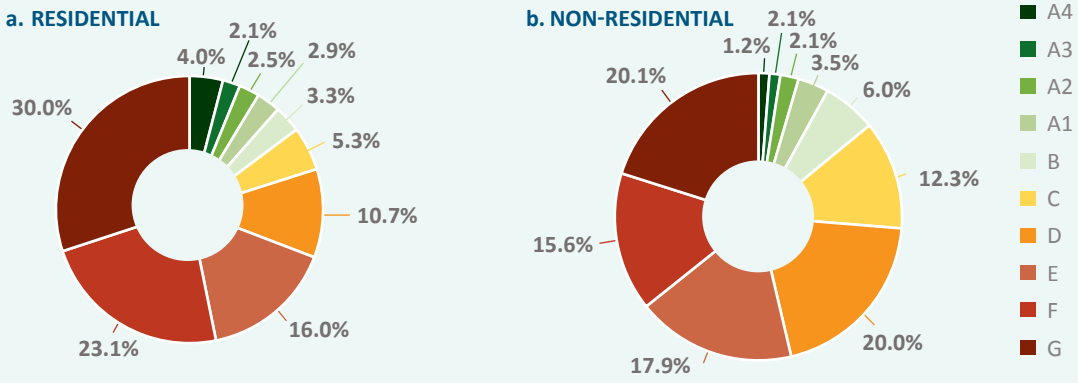
Besides the energy characteristics of the building stock, Italy is exposed to other vulnerabilities, including high seismic risks, which need to be considered in the construction, renovation and operation of buildings.[11] The Italian building stock is also encountering more frequent and intense extreme weather events. In 2023, there were 378 extreme weather events in Italy,[12] a 22% increase compared to 2022, including floods, landslides, storms, hailstorms and exceptional temperatures. All these particularities play a role in the decarbonisation of the Italian building stock, and should be kept in mind when analysing the results and recommendations in this report.

[8] Based on EUROSTAT
[9] Based on EUROSTAT
[10] Based on EUROSTAT
[11] https://rischi.protezionecivile.gov.it/it/sismico/
[12] https://www.legambiente.it/comunicati-stampa/2023-anno-da-bollino-rosso-per-il-clima/

BOX 1 Energy performance certificates

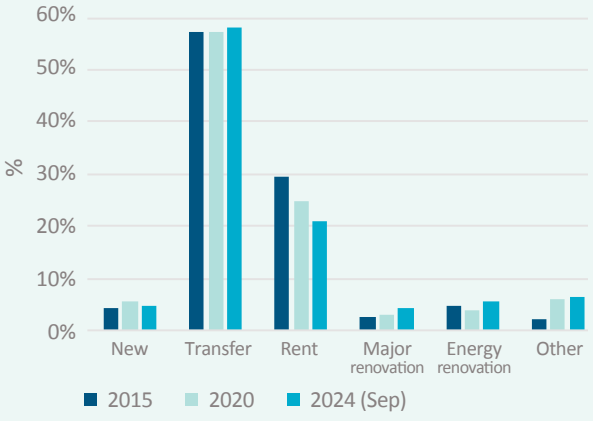
Energy performance certificates (EPCs) provide general information about the energy performance of a property and are one of the main sources of bottom-up information on the energy performance of individual buildings. EPCs in Italy[13] consider 10 classes (A4, A3, A2, A1, B, C, D, E, F, G) and are based on the reference building method, which compares the building being analysed and a reference building with predefined requirements. Other Member States such as Portugal, Spain, Greece, Cyprus and Sweden use this method. Up to September 2024,[14] there were around 5,330,390 EPCs for the residential sector and 757,120 for the non-residential sector. Figure 9 shows the distribution of the EPCs. In both cases, classes E to G represent more than half of the existing EPCs (69% of residential and 54% of non-residential).

Figure 9: Distribution of EPC classes (a) in the residential sector, (b) in the non-residential sector. Up to September 2024. [Based on SIAPE]



The reason for issuing an EPC may influence the type of buildings covered. For instance, in the residential sector, most EPCs are linked to property sales and transfer to new owners (Figure 10). Even though the distribution has evolved over time, this remains the main reason to obtain an EPC. In terms of major renovations and energy renovations,[15] EPCs have increased from 760 due to major renovations and 1,498 due to energy renovation in 2015 to around 234,900 and 295,190 in 2024, respectively.[16] Even though the numbers have increased, EPCs issued due to major renovations and energy renovations represent only 4% and 5% of the total. The issue of EPCs in these cases is crucial to monitor the improvements in the building stock. Similarly, obtaining EPCs for regular existing buildings (not only those being sold) is essential to understand the energy performance of the building stock and identify buildings where renovation is required.

Figure 10: Share of EPCs according to the trigger to issue the certificate. [Based on SIAPE]



[13] More details can be found: https://publications.jrc.ec.europa.eu/repository/handle/JRC135473
[14] Sistema Informativo sugli Attestati di Prestazione Energetica (SIAPE) https://siape.enea.it/caratteristiche-immobili
[15] **Major renovation:** the intervention involving the elements and integrated components constituting the building envelope which delimit a volume at a controlled temperature from the external environment or from non-air-conditioned environments, with an incidence greater than 25% of the overall gross dispersing surface of the building. **Energy requalification:** those which have an impact on the energy performance of the building. These interventions therefore involve a surface area less than or equal to 25% of the overall gross dispersing surface of the building and/or consist of the new installation, the renovation of a heating system serving the building or other partial interventions, including the replacement of the generator. https://fvgenergia.it/notizie/faq/Come-sono-classificati-gli-interventi-edilizi-nel-DM-requisiti-minimi/
[16] The increase observed for the number of EPCs issued due to renovations in residential buildings may be linked to the roll-out of schemes such as the Superbonus, which expected beneficiaries to improve the energy performance of their households by at least two EPC classes. However, obtaining an EPC afterwards is not mandatory.

METHODOLOGY

WHAT IS THE ITALIAN BUILDINGS CLIMATE TRACKER?

The ITA BCT gathers the performance of four indicators in a composite index to monitor and assess the progress of decarbonisation in Italy's building stock towards climate neutrality by 2050. Based on the EU BCT, which BPIE developed in 2021-2022 following its work on a global tracker for the Global Status Report of the Global Alliance for Buildings and Construction,[17] the ITA BCT adapts the methodology to Italy's national context. It considers key national policies like the Integrated National Energy and Climate Plan (NECP) for 2030 and the Long-Term Strategy (LTS) for 2050.

SELECTION OF INDICATORS

The ITA BCT is based on the four indicators outlined in Table 2.[18]

Table 2: Summary of indicators included in the ITA BCT

	Indicator	Description	Source
1	**CO_2 emissions from energy use in buildings for households and services**	CO_2 emissions from the direct use[19] 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 excludes consumption by the energy sector itself and losses occurring during the 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[20]	Eurostat
3	**Renewable energy share**	Composed of two sub-indicators:	Eurostat
	A **Share of energy from renewable sources for heating and cooling**	Share of renewable energy used for heating and cooling,[21] 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
	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 investments in renovation of the residential building stock, based on annual investment.	ENEA

[17] 2020 Global Status Report for Buildings and Construction: Towards a zero-emissions, efficient and resilient buildings and construction sector

[18] These indicators are aligned with the EU BCT methodology. In selecting these indicators for the EU tracker, over 60 European and global data sources that monitor the buildings sector were reviewed. The potential data sources were evaluated based on criteria including EU coverage, reliability, consistency, continuity (with data updated at least annually), timeline (data availability from 2015 onwards) and overall quality. The four indicators and data sources provide the same coverage for Italy as well.

[19] 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://www.eea.europa.eu/themes/climate/eu-greenhouse-gas-inventory/read-me-eea-ghg-data-viewer

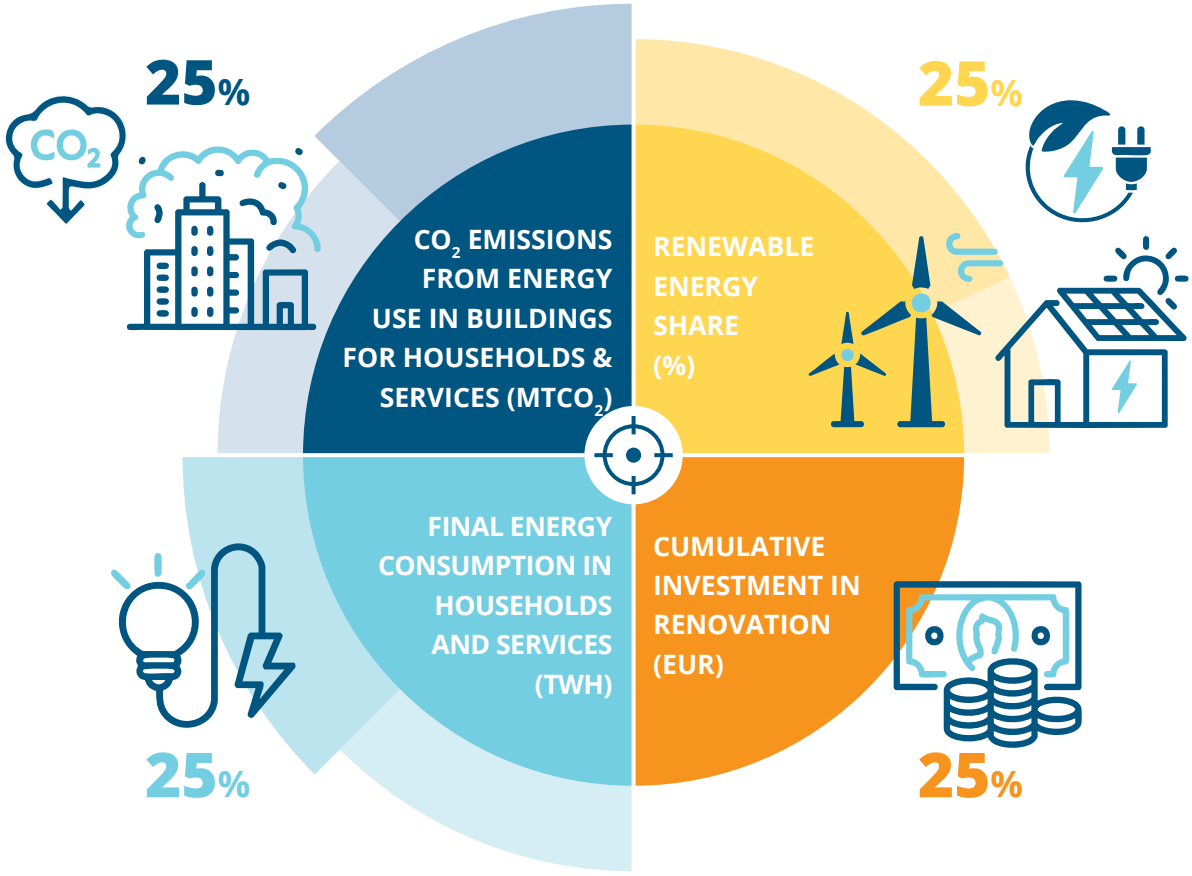
[20] Eurostat data includes outdoor lighting for the service sector.

[21] Eurostat data also includes process heat.

WEIGHTING OF INDICATORS

The same methodology used for the EU BCT was applied to create the composite index for the ITA BCT.[22] The four indicators were assigned a 25% weight each, as summarised in Figure 11. The CO_2 emissions, final energy consumption and renewable energy share indicators each consist of two sub-indicators. In the case of CO_2 emissions and final energy consumption, the sub-indicators are simply added together. The renewable energy share uses a weighted addition, with 75% of the weight given to heating and cooling and 25% to gross electricity consumption, reflecting their respective share in final energy consumption.

Figure 11: Indicators and their weighted contribution to the EU and ITA Buildings Climate Tracker



[22] See www.bpie.eu/publication/eu-buildings-climate-tracker-3rd-edition

TRANSLATING CLIMATE NEUTRALITY BY 2050 INTO A GOAL FOR EACH INDICATOR

To assess the development of various indicators towards the objective of climate neutrality by 2050, goal values have been established for each indicator based on the national strategies. The goal values presented in Table 3 are based on the decarbonisation scenario[23] which is derived from Italy's Integrated National Energy and Climate Plan[24] (NECP) targets up to 2030, and subsequently aligned with the national Long-Term Strategies[25] (LTS) aimed at achieving net zero emissions by 2050. The strategy for energy retrofitting of the national building stock[26] was also considered, specifically for the cumulative investment indicator. The decarbonisation scenario was selected as the benchmark due to its influence on setting national energy and climate objectives and guiding policy measures.

The ITA BCT evaluates progress by comparing observed values with the national goals that were legally adopted within the timeframe covered (2015 to 2022). As new national goals and targets are established (e.g., during the transposition and implementation of the EPBD recast), including those related to mid-century climate objectives and their legal integration into national legislation, we will review and update indicators and goal values accordingly. The national strategies from which the goals presented in this tracker are derived are supposed to align with the EU climate neutrality target for 2050. A detailed evaluation of the alignment and level of ambition for the 2030 and 2050 milestones is beyond the scope of this report, but various considerations relating to Italy's strategies are discussed in the analysis.

Table 3: Indicator goal values for the ITA BCT

	Indicator	Goal value 2030	Goal value 2050	Methodology determining goal values
1	**CO_2 emissions from energy use in buildings for households and services**	49 $MtCO_2$ (31% lower than in 2015)	0 $MtCO_2$	The decarbonisation scenario for Italy aims to achieve net zero emissions in the buildings sector by 2050, setting the CO_2 emissions goal for 2050 at 0 $MtCO_2$. For 2030, the target is to lower emissions by 31%,[27] reaching 49 $MtCO_2$[28] across the entire buildings sector. This comprises 32.6 $MtCO_2$ for the residential sector and 16.4 $MtCO_2$ for the service sector.[29]
2	**Final energy consumption in households and services**	461 TWh (17% lower than in 2015)	273 TWh (51% lower than in 2015)	In the decarbonisation scenario for Italy, the goal for households is to reduce final energy consumption (compared to 2015) by 18% by 2030 and 62% by 2050. For the service sector, the target is a 16% reduction in final energy consumption by 2030 and 29% reduction by 2050. The overall final energy consumption for both households and the service sector combined is projected to reach 273 TWh by 2050.

[23] The decarbonisation scenario is based on the NECP target up to 2030 and then on national long-term strategies for 2050. Italy aims to achieve net zero emissions by 2050. The strategy highlights various levers for reducing energy demand and transitioning to renewable energy.
[24] Integrated National Energy and Climate Plans (NECP) for the period 2021-2030, Final updated NECP (submitted in 2024)
[25] National long-term strategy for Italy as of 1 February 2023
[26] The strategy for energy retrofitting of the national building stock was used solely for determining the goal value of the cumulative investment indicator.
[27] This 31% reduction is compared to the historical values of 2015 and applies to the whole buildings sector, encompassing both the residential and service sectors.
[28] The value of 49 $MtCO_2$ was calculated using Italy's 2019 and 2024 Integrated National Energy and Climate Plans (NECP). The 2024 plan reported 56 $MtCO_2$ for the civil sector, including agricultural consumption, while the 2019 plan indicated that agricultural consumption accounts for 7 $MtCO_2$, leading to the adjusted value of 49 $MtCO_2$
[29] The 49 $MtCO_2$ goal covers the entire buildings sector. To calculate the individual values for the residential and service sectors, the average share of CO_2 emissions between 2015 and 2022 is used: 66.4% for the residential sector and 33.4% for the service sector.

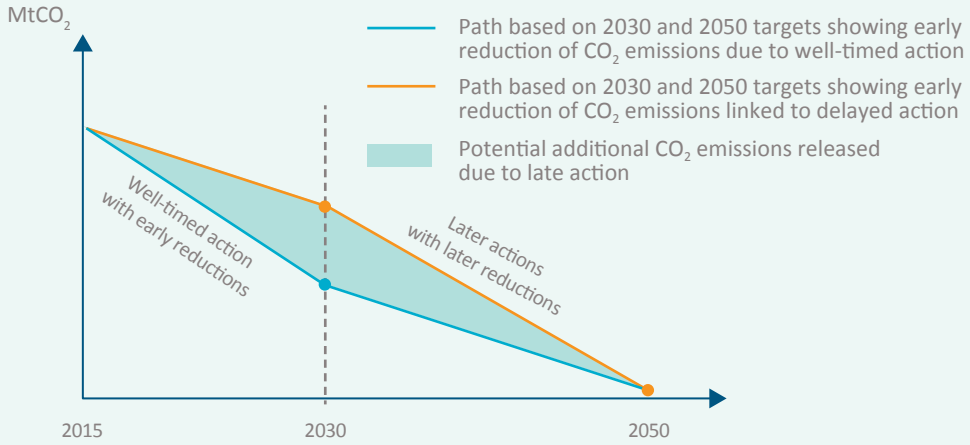
		Indicator	Goal value 2030	Goal value 2050	Methodology determining goal values
3		**Renewable energy share**			
	A	**Share of energy from renewable sources for heating and cooling**	36%	80%	The decarbonisation scenario sets a goal for the share of renewable energy in heating and cooling to reach around 36% by 2030 and 80% [30] by 2050.
	B	**Share of energy from renewable sources in gross electricity consumption**	63%	97.5%	For gross electricity production in the Italian decarbonisation scenario, the goal value is 95-100%[31] carbon neutral by 2050. For 2030, the goal is to achieve a renewable energy share of around 63%.
4		**Cumulative investment in renovation**	€118 billion	€394 billion	The Italian strategy for energy retrofitting of the building stock[32] considers different alternatives to achieve the NECP targets.[33] Even though it is not an established goal, the strategy considers that applying cost-optimal deep renovations[34] to fulfil the NECP target for the residential sector would translate into investing €9.18 billion a year during 2020-2030 at an annual deep renovation rate of 0.8%. For the period 2030-2050, the strategy sets the renovation rate at 1.2%. We have used the ratio (1.2:0.8) to estimate the annual investments for the period 2030-2050, set at €13.77 billion. The strategy does not include a requirement for the period 2015-2019, so it is not possible to establish a reference path for this period. Instead, the actual renovation rate (0.3%[35]) during this period was used. The annual investments for this period were estimated at €3.44 billion (based on the ratio 0.3:0.8). The values for 2015-2019 are considered in the calculation of the overall targets for 2030 and 2050, but are not depicted as part of the reference path. Since the indicator is based on cumulative values, the final goal is defined as the sum of the annual values during the different periods, from 2015 to 2050.

[30] The numbers reported in Italy's National Long-Term Strategies (NTLS) show that, the share of renewable energy in final energy consumption is projected to be between 85-90%, with an average of 87.5% by 2050. However, this figure is not specific to heating and cooling. To calculate the approximately 80% goal for heating and cooling, an increase factor of 2.22—based on the percentage increase in the share of renewable energy in overall final energy consumption from 2030 to 2050—is applied.
[31] The range of 95-100% carbon-neutrality depends on whether the hypothesis of complete abandonment of fossil fuels is adopted both in electricity generation and in the steel industry.
[32] https://energy.ec.europa.eu/system/files/2021-12/2020_ltrs_italy_-_en.pdf
[33] The strategy is based on the 2019 NECP and the Long-Term Strategies.
[34] Even though the goal for this indicator is based on the deep renovation rate, as in the Italian strategy for retrofitting, the relevance of all kind of renovations should not be disregarded.
[35] https://energy.ec.europa.eu/system/files/2019-12/1.final_report_0.pdf

BOX 2 The relevance of well-timed actions

When analysing the goals and results (see Results for all single indicators), it is important to consider the level of ambition established in the NECP for 2030 and the LTS for 2050. **Some of the goals do not reflect the need for well-timed action. While decarbonisation scenarios at the global (worldwide) and EU levels take into account that early actions are required, the goals set in Italy leave the major portion of the targets to be achieved at a later stage.** For instance, at the global level,[36] more than 50% of the reduction of CO_2 emissions in the building sector is expected to be achieved in the early period of 2015-2030. Similarly, at the EU level, CO_2 emissions from the building sector are expected to be reduced by around 60% during 2015-2030.[37] In contrast, **Italy aims to reduce these emissions by only 31% by 2030**, leaving more than two-thirds of the reductions to happen in the later period 2030-2050. As illustrated in Figure 12, well-timed action based on sufficient targets is essential to avoid extra CO_2 emissions and their irreversible environmental impacts.

Figure 12: Targets should reflect the need for early action to avoid additional CO_2 emissions



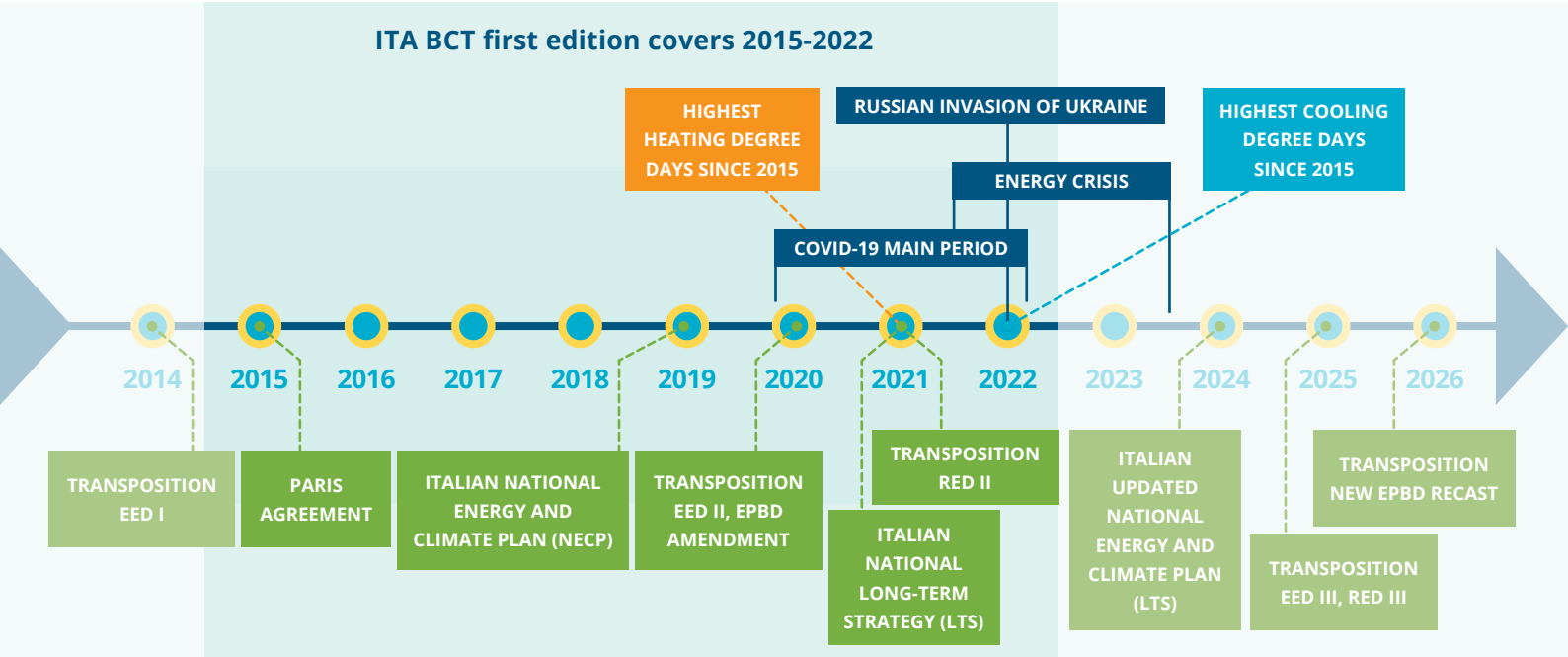
[36] As explained in Global Status Report for Buildings and Construction
[37] Based on the MIX scenario from the impact assessment accompanying the Communication 'Stepping up Europe's 2030 climate ambition'

ITA BCT AND ITS INDICATORS:

PROGRESS DURING 2015-2022

The results presented in the following sections should be read in the context of the diverse events, weather conditions and EU directives that may have influenced the trends monitored by the ITA BCT. As presented in Figure 13, in the period 2015-2022, key legislative frameworks such as Italy's LTS (published in 2021), alongside the transposition of the EED II, RED II and the EPBD recast, came into place. In addition, events such as the COVID-19 pandemic, the Russian invasion of Ukraine and the resulting energy crisis had a significant impact. These were accompanied by specific weather conditions observed during 2020-2022. Italy's updated NECP, with more ambitious decarbonisation goals, is also considered when assessing future trends. All these elements should be considered when analysing the results, and some are explicitly mentioned. The timeline below summarises key policies and events during the period but is not exhaustive.

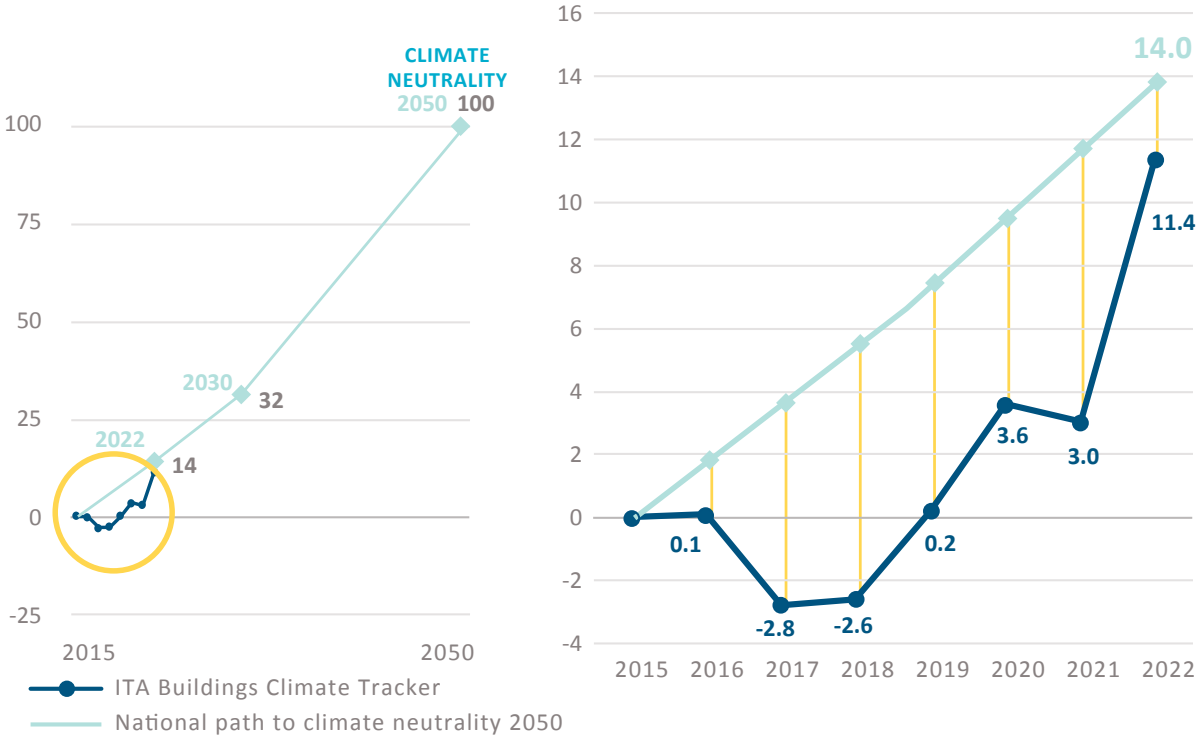
Figure 13: Timeline and context of the period covered by the ITA BCT



COMPOSITE INDEX OF THE ITA BCT

The ITA BCT integrates the four indicators described above to give a single index number representing the overall progress of the building stock in Italy toward the climate goals for 2030 and 2050. Figure 14 shows the difference between the observed results and the necessary progress between 2015 and 2022. The gap between the actual progress made until 2022 (dark blue line) and the reference path (light blue line) is significant.

Figure 14: ITA BCT results between 2015 and 2022



Between 2016 and 2018, Italy's building decarbonisation progress dropped below the 2015 baseline, reaching negative index values in 2017 (-2.8) and 2018 (-2.6). These values indicate a setback in achieving decarbonisation goals, with emissions levels worsening compared to the starting point in 2015. The trend shifted slightly in 2019 with a minor recovery to 0.2, marking a return to levels comparable to the baseline year.

From 2019 onwards, progress became more consistent, with steady increases in the index. By 2020, the index reached 3.6, showing some momentum toward decarbonisation, despite external challenges such as the ongoing pandemic at that time. However, this upward trend slowed slightly in 2021, with a marginal decline to 3.0. This deviation could be partially attributed to increased heating demand during a colder year in 2021.

By 2022, the ITA BCT reached 11.4, reflecting notable progress compared to previous years. Nevertheless, the country remains off track in achieving its decarbonisation targets. This gap underscores the need for accelerated measures and stronger policy implementation to align with Italy's climate neutrality goals. While the overall trend has shown improvement, slow progress since 2015 highlights the urgency of intensifying efforts to decarbonise Italy's building stock.

At the start of the index in 2015, around 1.8 points[38] of progress in decarbonisation were required each year for Italy to align with the reference path to climate neutrality. This requirement has increased to 2.5 points from 2022 onwards to get back on track by 2030.

[38] The required progress increased to 2.2 points per year between 2020 and 2022 due to an increase in the target annual deep renovation rate to 0.8% in 2020 (see Translating climate neutrality by 2050 into a goal for each indicator)

RESULTS FOR ALL SINGLE INDICATORS

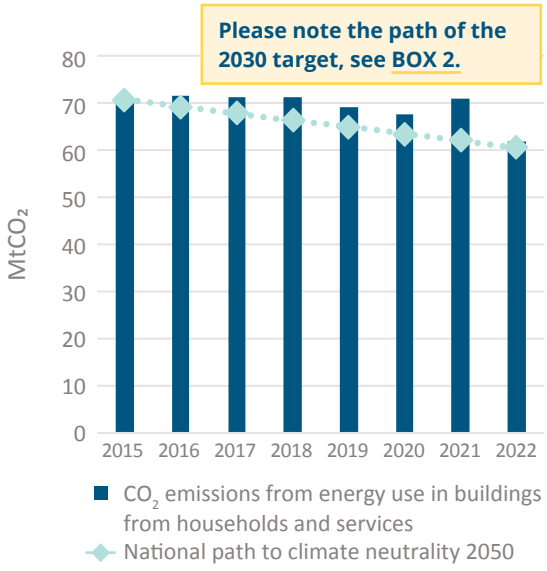
This section provides an overview of the results (quantitative values observed) and progress of all the indicators between 2015 and 2022 in terms of the target values required to be on track towards the final goal of achieving climate neutrality by 2050. A short description of the indicators is included. For more details on the definitions of each indicator, please refer to Selection of indicators. It is important to note that the national path to climate neutrality presented for each indicator is based on goals derived from national strategies and depends on the milestones for 2030 and 2050 defined by Italy to be aligned with the EU climate neutrality by 2050, as outlined in NECP and LTS.

CO_2 EMISSIONS FROM ENERGY USE IN BUILDINGS FOR HOUSEHOLDS AND SERVICES

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_2emissions from energy use in service-sector buildings, including institutional buildings (see details in the next page).

- As shown in Figure 15, CO_2 emissions from households and services remained relatively stable between 2015 and 2017, with minor fluctuations.
- From 2018 to 2020, a minimal decrease in CO_2 emissions was observed. Emissions decreased by **2.9%** from 71.3 $MtCO_2$ in 2018 to 69.2 $MtCO_2$ in 2019 and by a further **2.5%** to 67.5 $MtCO_2$ in 2020. Despite this decrease, emissions remained above the climate neutrality path by **7.4%** in 2018 and **6.3%** in 2020.
- In 2021, a notable increase in emissions occurred, rising by **5.3%** to reach 71.1 $MtCO_2$, **which was 14.6% above the climate neutrality target for that year**. This spike coincided with 2021 recording the highest heating degree days (HDD), indicating increased energy demand for heating during a colder winter.

Figure 15: CO_2 emissions from energy use in buildings for households and services 2015-2022



- The trend reversed in 2022, with CO_2 emissions decreasing significantly by **12.9%** to 62 $MtCO_2$, marking **the lowest level recorded since 2015**. This reduction in emissions occurred alongside a decline in final energy consumption, which also reached its lowest point in 2022. However, emissions in 2022 were still **2.3%** higher than the climate neutrality target. This reduction was partly due to measures aimed at curbing domestic heating, implemented to address the energy crisis caused by the Russian invasion of Ukraine and high gas prices.[39] These measures included shortening the heating season by 15 days and lowering maximum temperature settings by one degree Celsius.
- Overall, from 2015 to 2022, the target reduction in CO_2 emissions was **14.3%**, aiming to lower emissions from 70.7 $MtCO_2$ to 60.6 $MtCO_2$. However, only a **12.4%** reduction was achieved. **This shortfall equates to nearly 1.4 $MtCO_2$ of additional emissions**.

[39] https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_203$defaultview/default/line?lang=en

BOX 3 Heating degree days and cooling degree days in Italy and the EU

The **highest heating degree days (HDD)[40] occurred in 2021,** reaching a value of **1,916**, signalling a colder winter. In **2021**, energy used for space heating was **6.83% higher** than in **2020**, which had a lower HDD value of **1,748**. This increase in heating energy consumption directly reflects the colder winter in 2021, highlighting the strong relationship between HDD and heating demand.

In contrast, the **highest cooling degree days (CDD)[41] occurred in 2022**, with a value of **375.20,** marking an exceptionally hot summer. This surge in CDD led to a significant rise in cooling energy consumption. The cooling energy use in **2022** was **148% higher** than in **2021**, which had a lower CDD value of **288.62**. This sharp increase underscores the growing trend of rising cooling requirements as summer temperatures continue to climb.

Figure 16: Heating degree days for Italy and EU between 2015 and 2022 [Based on EUROSTAT]

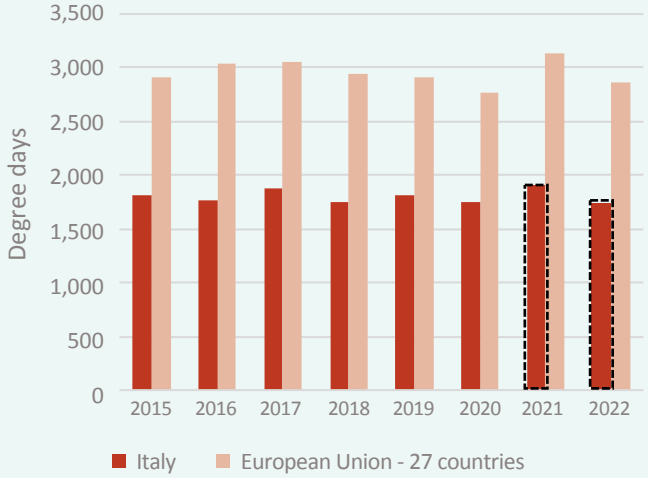
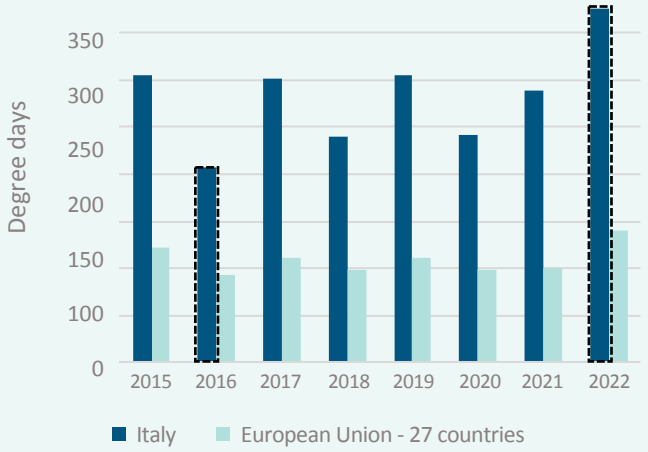


Figure 17: Cooling degree days for Italy and EU between 2015 and 2022 [Based on EUROSTAT]



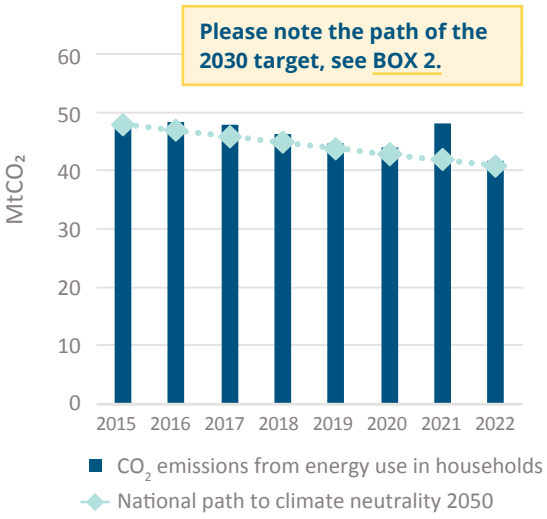
[40] **Heating degree days** is a weather-based technical index designed to quantify the heating energy requirements of buildings. It is calculated by subtracting the average daily outdoor temperature from a reference temperature, typically 18°C. A positive result indicates a need for heating, and a higher HDD number suggests increased demand for heating energy during colder periods. In the reported period, the highest HDD recorded in Italy was in 2021, followed by 2017, while the lowest was in 2022.

[41] **Cooling degree days (CDD)** is a weather-based index that measures the demand for cooling energy in buildings. It is calculated by subtracting a reference temperature, usually 18°C, from the average daily outdoor temperature. When the average temperature exceeds this reference, the result is a positive value, indicating a need for cooling. A higher CDD number reflects increased demand for cooling energy during warmer periods. The highest CDD recorded in the reporting period was in 2022, followed by 2015, while the lowest was in 2016.

1(a) CO_2 emissions from energy use in households

- From 2015 to 2017, CO_2 emissions from household energy use remained relatively stable, as shown in Figure 18. During this period, emissions were consistently above the climate neutrality path, **with emissions in 2017 being 4.5% higher than the target of 45.9 $MtCO_2$ for that year.**
- Between 2018 and 2020, emissions from household energy use decreased **by 5%**.
- In 2021, household CO_2 emissions showed **a significant increase, rising by 9.4% from 44.1 $MtCO_2$ in 2020 to 48.2 $MtCO_2$,** exceeding the target by 15.3%. This surge can be attributed to 2021 being the year with the highest HDD, coupled with the post-COVID period, which led to increased energy consumption in households.

Figure 18: CO_2 emissions from energy use in households 2015-2022

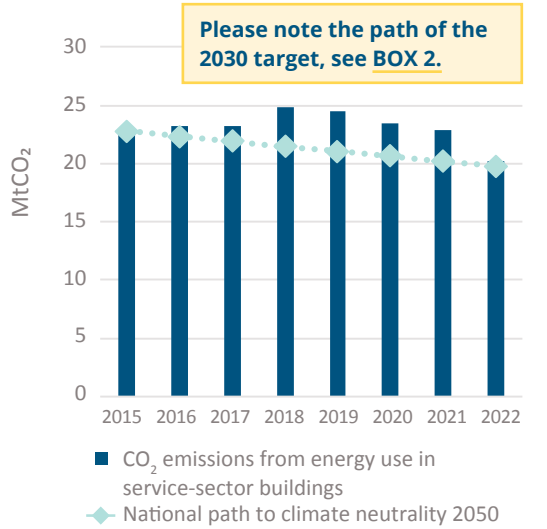


- In 2022, CO_2 emissions dropped sharply b**y 13.4%,** reaching 41.8 $MtCO_2$, but **remained 2.3% above the climate neutrality target.**
- Between 2015 and 2022, **CO_2 emissions were expected to decrease by 14.9%. However, a reduction of only 13% was achieved.**

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

- As shown in Figure 19, from 2015 to 2017, CO_2 emissions in the service sector were relatively stable, with 2017 emissions **6%** above the target of 21.9 $MtCO_2$.
- Between 2018 and 2020, emissions initially increased in 2018 but then decreased by **5.8%** to 23.5 $MtCO_2$ in 2020. N**otably, 2019 had the highest gap, with emissions 16.2% above the climate neutrality target.**
- In 2021, emissions dropped slightly by **2.4%** to 22.9 $MtCO_2$, **remaining 13.3% above the target of 20.2 $MtCO_2$**. However, unlike the household sector, the impact of higher HDD and post-COVID conditions did not cause a significant rise in emissions for the service sector.
- In 2022, CO_2 emissions fell by **11.7%** to 20.2 $MtCO_2$, still **2.2%** above the target of 19.8 $MtCO_2$.

Figure 19: CO_2 emissions from energy use in service-sector buildings 2015-2022



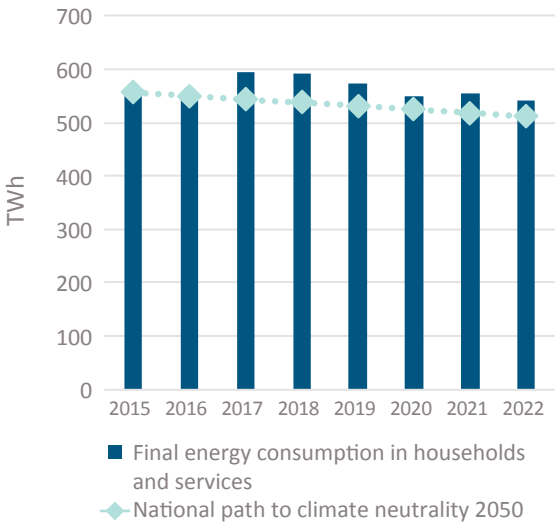
- From 2015 to 2022, emissions were expected to fall by 13.1%, from 22.8 $MtCO_2$ to 19.8 $MtCO_2$. Only an 11.2% reduction was achieved, **leaving a 1.6 $MtCO_2$ shortfall, or 1.9% below the target.**

FINAL ENERGY CONSUMPTION IN HOUSEHOLDS AND SERVICES

This indicator describes the energy consumption of end-uses in households and service-sector buildings. It is composed by the simple addition of two sub-indicators, whose results are described in more detail on the next page: 2(a) final energy consumption in households and 2(b) final energy consumption in service-sector buildings.

- As shown in Figure 20, the final energy consumption in households and services decreased slightly between 2015 and 2016, from 557 TWh to 554 TWh, in line with the targets set for those years.
- In 2017, however, consumption increased by 7.4% to 595 TWh, marking a shift in the trend, followed by a steady decline until 2020. During this period, energy consumption decreased by 7.7%, from 595 TWh in 2017 to 549 TWh in 2020.
- In 2021, this downward trend was disrupted, with energy consumption increasing slightly by 0.9%, reaching 554 TWh. **This figure exceeded the target value for the year by around 7%.**
- In 2022, energy consumption resumed its decline, dropping to 540 TWh. **Although lower than the previous year, it remained 5.5% above the target for 2022.**

Figure 20: Final energy consumption in households and services 2015-2022

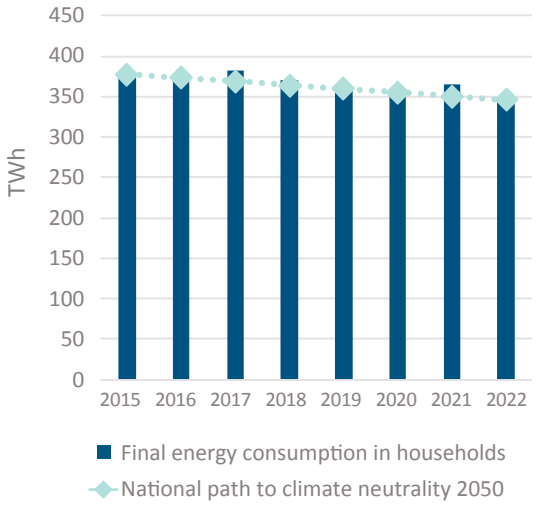


- Between 2015 and 2022, final energy consumption for households and services was expected to decrease by 8.1%. **However, only a 3% reduction was achieved, indicating that the rate of decline is less than half of what is needed to meet the climate goals.**

2(a) Final energy consumption in households

- As shown in Figure 21, final energy consumption in households decreased slightly from 378 TWh in 2015 to 374 TWh in 2016, aligning with the established targets for that period. In 2017, consumption increased by 2.2%, indicating a shift in the trend.
- From 2017 to 2020, energy consumption then decreased by 6.8%, showing a continuous downward trend over these years.
- In 2021, energy consumption rebounded to 366 TWh, increasing by 2.5% compared to 2020. This was the year with the highest gap from the target, as consumption was 4.3% above the target for 2021
- In 2022, energy consumption declined again, reaching 349 TWh, which was 4.6% below the previous year and only 0.8% lower than the target for 2022.

Figure 21: Final energy consumption in households 2015-2022

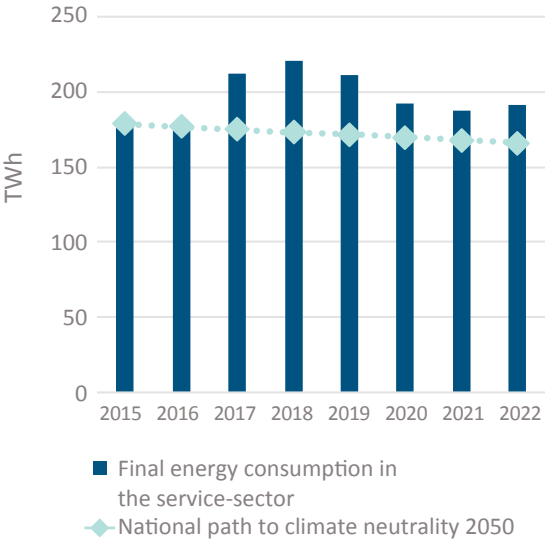


- Between 2015 and 2022, final energy consumption in households was projected to decrease by 8.5%, **while the actual reduction was 7.7%**. This indicates a positive overall trend towards climate neutrality, though is still below the rate required.

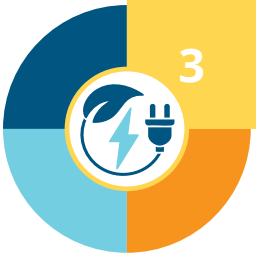
2(a) Final energy consumption in households

- As shown in Figure 22, final energy consumption in service-sector buildings remained relatively stable between 2015 and 2016, in line with the targets for those years. In 2017, consumption rose significantly by 18.1%.
- In 2018, the upward trend continued, with consumption increasing by 4.2% to 221 TWh, 27.4% higher than the target value for that year.
- From 2018 to 2021, consumption steadily decreased by 15%, dropping from 221 TWh to 188 TWh in 2021. In 2021, consumption was 12% higher than the target for that year.
- In 2022, energy consumption rebounded slightly to 192 TWh, an increase of 1.9% compared to 2021. It remained 15.4% above the target for 2022.

Figure 22: Final energy consumption in service-sector buildings 2015-2022



- **Between 2015 and 2022, this indicator increased by 7%. According to the climate neutrality pathway, it should have decreased by 7.3% to 166 TWh by 2022, resulting in a gap of 14.3% above the target.**

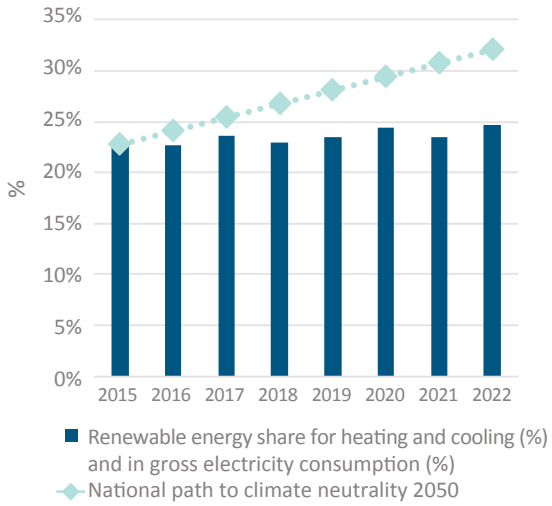


RENEWABLE ENERGY SHARE

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

- As shown in Figure 23, the share of energy from renewable sources for heating, cooling and electricity remained relatively stable between 2015 and 2016, with a slight decrease from 22.8% in 2015 to 22.7% in 2016.
- In 2017, the share increased to 23.6%, but it decreased to 22.9% in 2018.
- Between 2018 and 2020, the share of renewable energy gradually rose, reaching 24.5% in 2020.
- In 2021, the share fell slightly to 23.5%, but in 2022 it increased again to 24.7%, indicating renewed progress towards the target. The 2022 value remains 7.3 percentage points lower than the 32% target for that year.

Figure 23: Renewable energy share 2015-2022

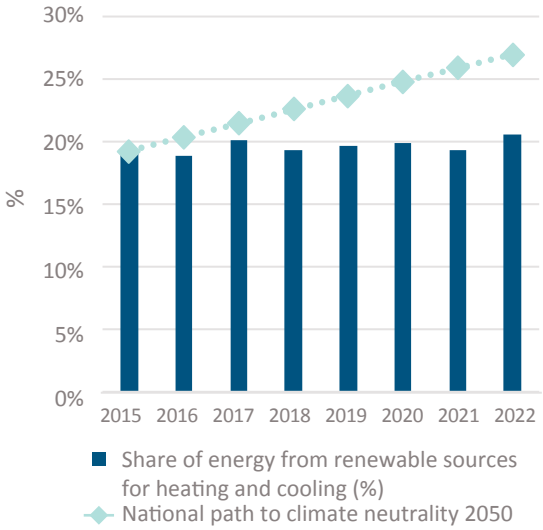


- During the period from 2015 to 2022, the share of renewable energy increased by only 1.9 percentage points, from 22.8% to 24.7%, compared to a target increase of 9.3 percentage points. **This reflects a slower-than-expected transition towards renewable energy sources.**

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

- As shown in Figure 24, the share of renewable energy for heating and cooling fluctuated between 2015 and 2022, starting at 19.3% in 2015 and dropping slightly in 2016.
- From 2020 to 2022, the share of renewable energy in heating and cooling showed slight improvements. In 2020, it reached 19.9%, below the 24.8% target, while in 2021, it dropped slightly to 19.3%. By 2022, the share increased to 20.6%, marking an improvement, but still 6.4 percentage points lower than the 27% target for that year.
- Over the entire period from 2015 to 2022, the share of renewable energy for heating and cooling **increased by only 1.3 percentage points, compared to a target increase of 7.7 percentage points.**

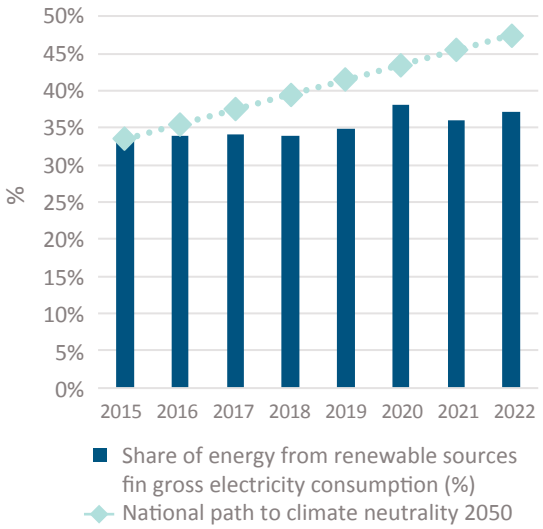
Figure 24: Share of energy from renewable sources for heating and cooling 2015-2022



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

- As shown in Figure 25, the share of renewable energy in gross electricity consumption showed a marginal increase from 33.5% in 2015 to 34.1% in 2017 before dropping back to 33.9% in 2018.
- From 2019 to 2020, the share experienced a more noticeable rise, reaching 38.1% in 2020, before declining again to 36.0% in 2021, largely due to a rebound in gross electricity consumption in Italy following the economic recovery after the COVID-19 pandemic.
- By 2022, the renewable energy share had risen to 37.1%,[42] still trailing behind the target of 47% set for that year as part of the climate neutrality path.

Figure 25: Share of energy from renewable sources in gross electricity consumption 2015-2022



- Over the entire period from 2015 to 2022, the share of **renewable energy in gross electricity consumption increased by 3.6 percentage points**, from 33.5% to 37.1%, whereas **the target increase was 14 percentage points.**

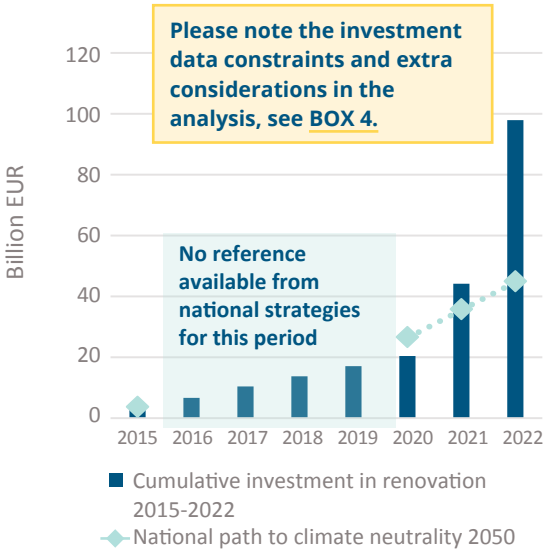
[42] Consider that the gap for this indicator may be even larger, other national data sources such as Comuni-Rinnovabili-2023.pdf and Reporto mensile sul sistema elettrico report a lower share (around 31%) of renewables in gross electricity for 2022.

4 CUMULATIVE INVESTMENT IN RENOVATION

This indicator describes cumulative investments in renovation of the residential building stock, as reported by Italy[43] and expressed in 2015 Euros.

- As shown in Figure 26, the cumulative investment in renovation has grown significantly since 2015, reaching €97.7 billion in 2022. This exceeds the required investment of €45 billion for the same year.
- Since investment was not associated with a target in the Italian renovation strategy for 2015-2019, the reference path is not presented for this period (for more details see Table 3).
- In 2020, the gap widened as investments totalled €20.3 billion, falling €6.1 billion short of the target of €26.4 billion.
- In 2021, investments increased significantly to €44.2 billion, exceeding the target of €35.6 billion by €8.6 billion. This is related to the deployment of the Superbonus scheme[45] during the second half of 2020.

Figure 26: Cumulative investment in renovation 2015-2022[43]



- In 2022, investments soared to €97.7 billion, more than double the required €44.8 billion – also linked to the Superbonus scheme. For more details on how to interpret and analyse these results, please see box 4.

[43] When analysing the results for this indicator, it is important to note that while the goal is based on deep renovation, the dataset available does not specify the depth of the renovations (see Box 4).
[44] As there are no goal values for this period in the reviewed national strategies there are no reference values to show here. To enable calculation of the following periods we have assumed investments in this period to be based on the observed deep renovation rate.
[45] For more detail see https://www.casaitalia.governo.it/generali/approfondimenti/superbonus-110

BOX 4 Interpreting the investment in renovation

A number of considerations needed to be borne in mind when interpreting the results for the indicator on investment in renovation.

First, the Italian strategy for energy retrofitting of the building stock relies on deep renovations, so the reference path for the investment indicator is based on the rate and cost of deep renovations needed to obtain the energy and emissions savings required for the climate goals.[46] In contrast, the data for the indicator includes all the investments from the different funding mechanisms in Italy (Ecobonus, Superbonus and Bonus Facciate), with no distinction between the depth of the renovations. Not all the recorded investment will be dedicated to deep renovations. This is important since, even though the observed investment seems to be on track with the reference path, **a portion of this investment is being allocated to renovations that may not be achieving the energy and emissions savings required by the target.**

Second, the last two years of observations (2021 and 2022) are outliers, with investment 7 and 15 times higher respectively than the average observed until 2019. In 2020, the special Superbonus scheme was launched, mobilising a large volume of investment. In 2022 alone, the Superbonus represented around €46 billion of investments. [47]The annual investment from all the schemes amounted to around €53 billion in that year. Again, it is difficult to track what portion of this was actually allocated to deep renovation. The effects on CO_2 emissions and final energy consumption remain uncertain: both these indicators for residential buildings were above the target values for 2022, which remained in line with the trends observed until 2019 (see Figure 18 and Figure 21).

Overall, since some of the renovation projects covered by the Superbonus may still be ongoing, and 2021 and 2022 experienced other particular circumstances, as discussed, it is too early to draw conclusions. Monitoring of the investments in renovation, emissions and final energy consumption in the upcoming years will be essential to understanding the actual emissions and energy savings obtained through the Superbonus scheme.

This highlights the importance of properly targeting and monitoring the deployment of available resources. The effectiveness of investment in renovation depends on establishing a robust framework, applying a "higher impact, higher support" principle, and having clear requirements and mechanisms to show the emissions reductions, energy savings and social benefits achieved.

[46] Other types of renovation also contribute to climate targets and should not be disregarded. The discussion here is intended to highlight the limitations of the data, since it is not possible to directly compare the observed investment (for all types of renovation) with the reference path (based on deep renovation).

[47] Based on ENEA 2022 to 2023 reports https://www.efficienzaenergetica.enea.it/pubblicazioni/rapporto-annuale-detrazioni-fiscali.html

Table 4: Summary of observations and progress of the ITA BCT indicators

Indicator		VALUES			DEVELOPMENTS		
		2015	2022 (achieved)	2022 (required)	2015-2022 (achieved)	2015-2022 (required)	How much of the required progress was achieved during 2015-2022?
1	**CO_2 emissions emissions from energy use in buildings for households and services***	**70.7 $MtCO_2$**	**62 $MtCO_2$**	**60.6 $MtCO_2$**	**↓ 12.4%**	**↓ 14.3%**	
	households	48 $MtCO_2$	41.8 $MtCO_2$	40.8 $MtCO_2$	↓ 13%	↓ 14.9%	
	service-sector	22.8 $MtCO_2$	20.2 $MtCO_2$	19.8 $MtCO_2$	↓ 11.2%	↓ 13.1%	
2	**Final energy consumption in households and services**	**556.9 [TWh]**	**540.3 [TWh]**	**511.9 [TWh]**	**↓ 3.0%**	**↓ 8.1%**	
	households	377.9 [TWh]	348.6 [TWh]	345.9 [TWh]	↓7.7%	↓ 8.5%	
	service-sector**	179.0 [TWh]	191.6 [TWh]	166.0 [TWh]	↑ 7.1%	↓ 7.3%	
3	**Renewable energy share**	**22.8%**	**24.7%**	**32.1%**	**↑ 1.9 percentage points**	**↑ 9.3 percentage points**	
	heating & cooling	19.3%	20.6%	27%	↑ 1.3 percentage points	↑ 7.8 percentage points	
	gross electricity consumption	33.5%	37.1%	47.4%	↑ 3.6 percentage points	↑ 14 percentage points	
4	**Cumulative investment in renovation*****	**3.4 [EUR billion]**	**97.7 [EUR billion]**	**44.8 [EUR billion]**	**28 times the value in 2015**	**13 times the value in 2015**	

* Although this indicator is only 2.3% higher than the target in the reference path for 2022, this target reflects Italy's lack of ambition for emissions cuts for the period up to 2030. A higher target would be preferable to encourage earlier action. See Box 2 in Translating climate neutrality by 2050 into a goal for each indicator.

**The final energy consumption in the service sector increased over the period from 2015 to 2022, which explains the 7.1% increase in the table, when a 7.3% reduction was required. This indicator is not just off-track but is moving in the wrong direction. This stands in contrast to the required decrease in energy consumption, resulting in a negative ratio between the required and achieved pace.

***The cumulative investment in renovation up to 2022 is above the required target, but various considerations need to be taken into account when analysing these results. See 4. Cumulative investment in renovation and Box 4.

HOW THESE RESULTS AFFECT BUILDING USERS

UNDERSTANDING THE GAPS IN THE PROGRESS OF THE INDICATORS

To better understand the status of each indicator, we assess each indicator by comparing the actual progress with the reference path, as determined by Italy's national strategies and milestones for 2030 and 2050. More details on the methodology for this assessment can be found in the EU BCT third edition.[48] This analysis helps identify are where dedicated efforts are required to bridge the gap and bring these indicators back on track. The results are summarised in Table 5.

Table 5: Summary of the existing gaps for the ITA BCT indicators based on normalised values[49]

	Indicator	Assessment	Gap between the last year of observations and the target value for that year on the normalised scale
1	**CO_2 emissions from energy use in buildings for households and services**	ALMOST ON TRACK*	14%
2	**Final energy consumption in households and services**	FAR OFF TRACK	63%
3	**Renewable energy share**	FAR OFF TRACK	80%
4	**Cumulative investment in renovation**	ON TRACK?**	-

* Although this indicator is only 2.3% higher than the target in the reference path for 2022, this target reflects Italy's lack of ambition for emissions cuts for the period up to 2030. A higher target would be preferable to encourage earlier action. See Box 2 in Translating climate neutrality by 2050 into a goal for each indicator.

** The cumulative investment in renovation up to 2022 is above the required target, so there is no gap. However, various considerations need to be taken into account when analysing these results. See 4. Cumulative investment in renovation and Box 4.

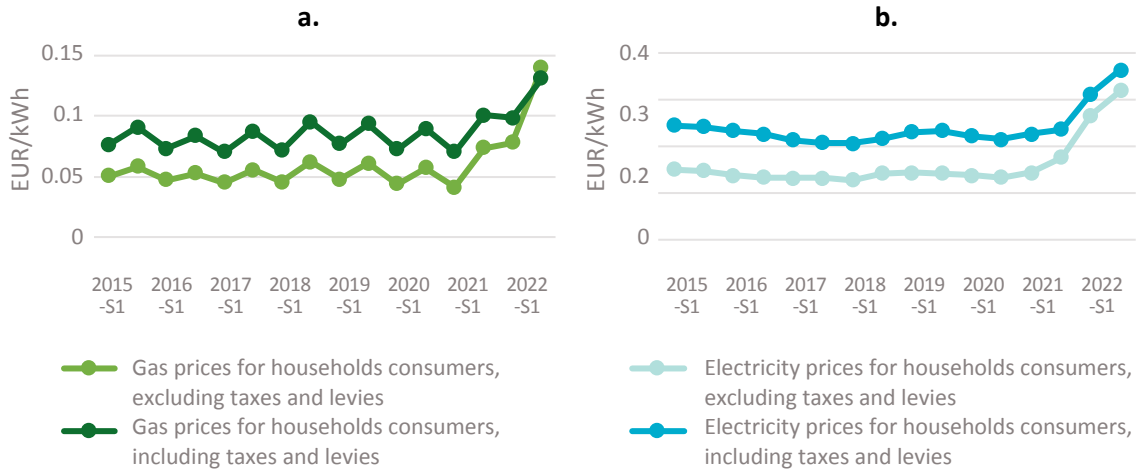
[48] https://www.bpie.eu/publication/eu-buildings-climate-tracker-3rd-edition
[49] The assessment criteria are explained in Table 6

WHAT DO THE OBSERVED DEVELOPMENTS MEAN FOR PEOPLE?

The indicators monitoring CO_2 emissions from energy use in buildings for households and services are almost on track, achieving around 86% of the progress needed between 2015 and 2022. However, as explained in Box 2, this reflects the low level of ambition in national strategies for the period up to 2030.

Two of the main indicators are far off track. The slow progress observed for the final energy consumption indicator is due mainly to the increase in final energy consumption in service-sector buildings: by 2022, final energy consumption is 7.1% higher than in 2015, although some reductions have occurred since 2019.

Figure 27: (a) Gas prices for household consumers, (b) Electricity prices for household consumers [Based on EUROSTAT]



The increase in the renewable energy share is *far off track* due to the slow progress of the decarbonisation of both energy for heating and cooling and electricity supply. The share of renewables is growing at only a sixth of the required pace for heating and cooling, and less than a third of the required progress for gross electricity consumption. This slow progress prolongs the use of fossil fuels, especially natural gas, leaving building users highly exposed to fluctuating energy prices, often affected by geopolitical circumstances, such as the Russian invasion of Ukraine.

This is a crucial aspect for Italy since, among EU countries, it is the second most reliant on natural gas for the energy supply of residential buildings. Natural gas makes up around half of the energy supply in the residential sector, leaving building users heavily exposed to fluctuating energy prices. As presented in Figure 27(a), gas prices reached levels 60% higher than the average observed during 2015-2019.

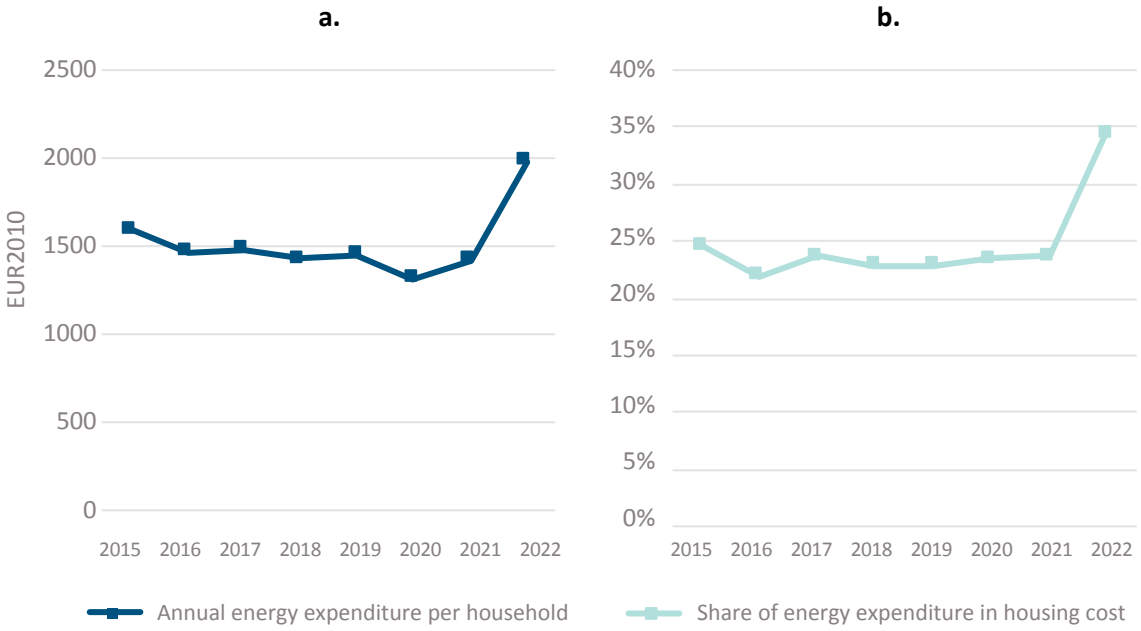
The price of natural gas also affects the electricity market.[50] At the end of 2022, the electricity price was 61.4% higher than the average during 2015-2019, as shown in Figure 27(b). Italians paid more for their electricity too, which makes up around 18.5% of final energy consumption in the residential sector. This is particularly significant in the light of increased electricity consumption for cooling: in 2022, Italy registered the highest cooling degree days since 2004, and energy use for cooling in the residential sector increased by around 148% compared to 2021.

Increased energy prices mean higher household energy bills. Even though the final energy consumption in the residential sector reduced by 4.6% in 2022, energy expenditure per household in Italy increased by 33.4% in that year compared to the average observed in 2015-2019 (Figure 28 (a)). As a result, energy expenditure as a proportion of total housing

[50] https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231026-1

costs increased from 23.2% on average during 2015-2019 to 34.5% in 2022, as shown in Figure 28 (b)[51]. Overall, insufficient progress in building decarbonisation puts increased pressure on households' budgets.

Figure 28: Energy expenditure in households (b) Share of energy expenditure in total housing costs [Based on ODYSSEE]



DECARBONISATION OF THE BUILDING STOCK: A COMPREHENSIVE PROCESS

The decarbonisation of the building stock is a broad, complex process determined by the composition of the building stock, building users, variations in climatic conditions, renewable energy supply and supporting infrastructure. CO_2 emissions will decrease if efficiency measures to reduce final energy consumption are deployed together with the decarbonisation of buildings energy supply and investments tightly linked to measurable energy and emissions savings.

The decarbonisation of the building stock has enormous potential to unlock multiple social benefits. As presented in the previous section, the slow progress of decarbonisation has repercussions on people. These effects go beyond energy bills. The transformation of the building stock towards climate neutrality represents a significant opportunity to tackle diverse social challenges, such as energy poverty, health and well-being. For instance, the proportion of people in Italy unable to keep their homes warm enough decreased from 17% in 2015 to a low of 8.1% in 2021, although it slightly increased to 8.8% in 2022.[52] This highlights both the progress made and the need for sustained efforts to address energy poverty. Similarly, indoor air quality has improved significantly: the proportion of the population living in dwellings with leaking roofs or damp walls and floors dropped from 24.1% in 2015 to 13.2% in 2018 before rising again to 19.6% in 2020,[53] indicating uneven progress. Outdoor pollution rates also showed a downward trend, dropping from 17.6% in 2015 to 11.7% in 2018 before

[51] The data source for the two indicators is the ODYSSEE database
[52] Based on EUROSTAT
[53] Based on EUROSTAT

increasing to 15.4% in 2020.[54] While outdoor pollution is often attributed to transport and intensive agriculture, emissions from buildings also play a significant role, particularly through heating systems that rely on fossil fuels and contribute to particulate matter and greenhouse gas emissions. These indicators highlight the critical role of building renovation and decarbonisation in improving living conditions and addressing energy poverty, health and overall well-being. However, the data also underscores the need for sustained progress to ensure these social benefits are fully realised.

A comprehensive and health-oriented approach to building design and renovation has been long overdue. The recently published Healthy Buildings Barometer framework[55] is the first to consider all the health-related dimensions in the construction and renovation of buildings. The Healthy Buildings Barometer includes five dimensions to achieve healthy and sustainable buildings: 1) Improving mental and physical health, 2) Designed for human needs, 3) Sustainably built and managed, 4) Resilient and adaptive, and 5) Empowering people. Aligning building decarbonisation action with these kinds of integrated and comprehensive approaches can maximise benefits for individuals and society.

[54] Based on EUROSTAT
[55] https://www.velux.com/what-we-do/healthy-buildings-focus/healthy-homes-barometer

MAIN FINDINGS AND RECOMMENDATIONS

While this report compares observed progress against the targets set in the Italian NECPs and LTS, the ambition and timing of some of these targets should be strengthened to avoid irreversible environmental and social impacts. Although a detailed evaluation of the alignment between the national targets and policies is beyond the scope of this report, a comprehensive approach considering the different aspects of the decarbonisation of the building stock is crucial to ensure that the actions and resources deployed deliver environmental, economic and social benefits.

Only one of the main four indicators – investment in renovation – is on track with the reference path. The final energy consumption and the share of renewable energy are far off track from their targets. While the CO_2 emissions indicator is almost on track, the goals set in Italy leave the major portion of the targets to be achieved after 2030 (see Translating climate neutrality by 2050 into a goal for each indicator).

An effective transition towards a zero-emission and resilient building stock will only occur if actions are aligned and rolled out in a well-timed way. Financial programmes such as the Ecobonus and Superbonus should be coupled with energy and emissions savings requirements to ensure these investments are effectively contributing to the decarbonisation of the building stock. Similarly, the roll-out of renewable energy systems should be closely linked to energy efficiency measures to unlock the full potential of renewables. Investments should be channelled towards vulnerable populations and the worst-performing buildings to have the greatest positive impact on energy and emissions savings and on society.

The following sections present diverse recommendations to strengthen and make the progress of the decarbonisation of the building stock in Italy more effective. These are presented in the context of the new EPBD recast, which will guide the decarbonisation of buildings in the EU and Italy in the upcoming years. The EPBD brings diverse opportunities to tackle the decarbonisation of the building sector in a more comprehensive and structured way, promoting clear targets and a framework for the progressive renovation of buildings, the phase-out of fossil fuel technologies, social and additional benefits, and financial and technical support.

CO_2 EMISSIONS FROM ENERGY USE IN BUILDINGS FOR HOUSEHOLDS AND SERVICES

STATUS: ALMOST ON TRACK

Actions to reduce emissions need to consider the full decarbonisation path until 2050. A clear roadmap for the phase-out of fossil fuels from the building energy supply, earlier reduction of emissions to avoid environmental impacts and comprehensive policies are crucial.

EPBD opportunities to reduce CO_2 emissions

Diverse provisions introduced in EPBD Articles 7, 9 and 11 bring opportunities to speed up the reduction of CO_2 emissions. Articles 7 and 11 introduce the concept of zero-emission buildings to become the standard for new buildings. Italy should adopt the zero-emission building (ZEB) standard for new buildings early in the transposition process to ensure it is communicated effectively to stakeholders. This will enable smooth compliance for buildings constructed as of 2028/2030, allowing them to meet standards with ease. To maximise impact, ZEB standards should be extended to existing buildings being renovated. This approach will broaden CO_2 emissions reductions beyond new builds. These considerations are of special relevance for Italy since the majority of emissions reductions are planned for the second part of the decarbonisation period (2030-2050).

OPPORTUNITIES BROUGHT BY THE EPBD RECAST

- Articles 7 and 11 introduce the concept of zero-emission buildings to become the standard for new buildings.
- Under provisions in the Article 9 for the renovation of the building stock, Member States have the possibility to use indicators related to operational greenhouse gas emissions in $kgCO_2eq/(m^2y)$
- The national roadmaps under Article 7(5) require setting limit values for the total cumulative life-cycle global warming potential of new buildings, aiming to progessively reduce the environmental impact of buildings.

RECOMMENDATIONS DURING IMPLEMENTATION

- Italy should adopt the ZEB standards for new buildings early in the transposition process to ensure it is communicated effectively to stakeholders for smooth compliance. To maximise impact, these standards should be extended to existing buildings being renovated when appropriate.
- This option should be leveraged to ensure that renovation activities are explicitily linked to reducing emissions and achieving national climate targets.
- Italy should establish clear guidelines for measuring, disclosing and limiting the life-cycle global warming potential of new buildings. Italy should take inspiration from proven approaches of frontrunner countries and base its guidelines on the EU methodological framework as much as possible to ensure rapid uptake and consistent impact reduction

FINAL ENERGY CONSUMPTION FOR HOUSEHOLDS AND SERVICES

STATUS: FAR OFF TRACK

Actions to accelerate the reduction of the final energy consumption should prioritise buildings with the highest potential for energy savings. Dedicated actions are required for the service sector, where final energy consumption is higher than in 2015.

EPBD opportunities to reduce final energy consumption

EPBD Articles 7, 9 and 11 bring opportunities to accelerate the reduction of the final energy consumption of the building stock. Italy should ensure robust minimum energy performance standards (MEPS) for the non-residential sector since its final energy consumption is still higher than the levels in 2015. Italy should also ensure that the trajectory for the progressive renovation of residential buildings prioritises the worst-performing buildings and vulnerable groups to ensure that available resources target renovations with greatest climate and social benefits.

OPPORTUNITIES BROUGHT BY THE EPBD RECAST

- Provisions in article 9(1) require a MEPS scheme for non-residential buildings.
- The trajectory for the progressive renovation of the residential building stock in Article 9(2) is based on an average primary energy use metric.
- Under provisions in Article 9(2), Member States must achieve at least 55% of the decrease of the average primary energy use of the residential building stock through the renovation of the 43% worst-performing buildings.

RECOMMENDATIONS DURING IMPLEMENTATION

- The implications of exempting certain buildings from the MEPS obligation should be considered carefully. Neglecting a large portion of the building stock would jeopardise the energy savings potential of this provision.
- Besides switching the building energy supply from fossil fuel to renewable options, Italy should deploy the right renovation mechanisms to ensure that energy efficiency measures are prioritised to avoid cases where renewable energy systems are installed in inefficient buildings.
- The renovation of the worst-performing buildings has critical social repercussions, since very often these buildings are occupied by vulnerable groups and people in energy poverty. Italy should aim to achieve more than 55% of savings through these renovations

ENERGY PERFORMANCE CERTIFICATES AND THE EPBD

EPCs are a key tool to understand the energy performance of buildings. The EPBD recast includes provisions to enhance the role of EPCs in the decarbonisation of the building stock. Articles 19, 20 and other provisions seek to transform national EPC frameworks. EPCs must be issued for new buildings, major renovations, sales, rentals and contract renewals. EPCs' role in renovations is strengthened, and they will need to provide information on renovation measures, one-stop shops, and guidance for implementing recommendations. Building owners with an EPC below class C will be encouraged to visit one-stop shops for renovation advice. This structured approach can support Italy's decarbonisation efforts by increasing energy performance assessments, providing insights into the building stock's condition, and offering technical and financial guidance to owners of buildings where renovations are needed the most.

RENEWABLE ENERGY SHARE

STATUS: FAR OFF TRACK

To accelerate the deployment of renewables requires a clear roadmap for the phase-out of fossil fuels and no financial support for fossil-fuel-based technologies. Adopting the principle of energy efficiency first is also vital for accelerating the growth of renewables in the energy mix.[55]

EPBD opportunities to increase renewable energy for buildings

The EPBD recast brings opportunities to increase the use of renewable energies for buildings in diverse ways in Articles 9, 10, 13, 17 and Annex II. These are especially relevant for Italy due to its high dependency on gas. Italy needs a clear roadmap for the phase-out of fossil fuels, starting from removing subsidies for the installation of gas boilers from the budget law.[57] According to the EPBD, Member States should strive to phase out stand-alone boilers powered by fossil fuels and not provide financial incentives for the installation of stand-alone boilers powered by fossil fuels from 2025 on. When deploying renewable technologies for heating, it is important to consider that biomass already dominates this sector, and the development and support of other technologies should be prioritised.

OPPORTUNITIES BROUGHT BY THE EPBD RECAST

- In article 9(1), average primary energy use is the indicator used to express the requirement on the trajectory for the progressive renovation of the residential building stock. For non-residential buildings, primary energy use is an option for the MEPS scheme as well.
- Article 10 requires Member States to ensure the deployment of suitable solar energy installations.
- Member States shall describe the policies to achieve the phase-out of fossil fuels by 2040, with "a view to a complete phasing out of fossil fuel boilers by 2040".

RECOMMENDATIONS DURING IMPLEMENTATION

- In both cases, Italy should consider using complementary indicators, besides primary energy use, to monitor the non-renewable and renewable share of the building energy supply, especially for heating and cooling which need a boost to bridge the gap towards climate neutrality.
- Given that the growth of renewables for heating and cooling must be six times faster than untill now to achieve the target by 2030, Italy should provide technical and financial support for other renewable technologies. This should prioritise renewables other than biofuel technologies, which currently dominate renewable space heating.
- Italy should make full use of the possibility given by the EPBD to not allow the installation of new fossil fuel heating systems, whether in new buildings or as replacements in existing buildings, by setting requirements on heat generators based on either emissions or the type of fuel used.

[56] https://www.bpie.eu/wp-content/uploads/2022/05/BPIE_Briefing-EU-Energy-Savings-Plan_Final_HQ.pdf
[57] The Italian budget law was still under discussion at the time this work was completed (5 December 2024). The law must be approved by 31 December 2024.

CUMULATIVE INVESTMENT IN RENOVATION

By 2022, the cumulative investments in renovation were more than double the target for that year. However, these investments have not yet visibly translated into significant final energy consumption or CO_2 emissions savings.

ON TRACK?

Italy needs to ensure its investments in renovation are effective. Investments should be well-targeted towards vulnerable populations and buildings with a high potential for energy savings. Investments should also support resilience measures to increase buildings' adaptability to more intense and frequent weather events. A robust monitoring structure is imperative.

EPBD opportunities to make the investment in renovation more effective

EPBD Article 17 introduces the main provisions for the financing framework to support the decarbonisation of the building stock. Italy should promote specific financial support for deep renovations, monitor social impacts and prioritise accessible funding for vulnerable groups to drive equitable progress toward zero-emission buildings.

Prioritising deep renovation is particularly relevant in Italy since, while the investment target is based on deep renovation rates, the observed investments include all types of renovation. Linking financial and technical support mechanisms to minimum energy and CO_2 emissions requirements and monitoring their performance is essential. Italy should avoid directing resources to support fossil fuel-based technologies such as gas boilers in the new Italian budget law. These resources should instead be targeted to more structural improvements of the building stock.

The EPBD also requires that buildings undergoing major renovation consider the issues of indoor environmental quality, adaptation to climate change, fire safety, risks related to intense seismic activity, the removal of hazardous substances including asbestos, and accessibility for people with disabilities. Italy should ensure that investments follow a comprehensive approach, tackling all these elements through multi-purpose renovations.

OPPORTUNITIES BROUGHT BY THE EPBD RECAST

- The EPBD highlights the role of deep renovation and staged deep renovation by requiring Member States to incentivise these through specific financial mechanisms.
- Member States must implement financial mechanisms that remove barriers such as upfront costs and split incentives, ensuring that information about funding and financial tools is available and easily accessible. Member States must pay special attention to financial support for vulnerable households and people affected by energy poverty.
- Article 9(4e) requires the monitoring of social impacts of fincanial tools.

RECOMMENDATIONS DURING IMPLEMENTATION

- Italy should align the financial mechanisms to the execution of deep renovation requirements (e.g. MEPS, trajectory) to incentivise renovation projects to go beyond minimum requirements, avoid lock-in effects and make best use of the financial recourses available.
- Italy should ensure that available and new financial resources are fairly distributed. This is crucial to achieve the objective of zero-emission building while ensuring benefits reach all communities.
- Even though this is outlined in the context of MEPS, Italy should monitor social impacts and other benefits in a broader range of activities (e.g. the renovation of the worst-performing buildings as part of the trajectory for the residential sector). This can enable the inegration of these benefits into improved renovation and funding policies. It can also be a starting point to understand better how to address energy poverty issues, improve the health of the building stock and its users, and harness the full potential of the investments in renovation.

SOCIAL ASPECTS

In addition to provisions directly related to the indicators, the EPBD brings other opportunities to address multiple social aspects linked to the decarbonisation of the building stock. According to the NECP, in 2022, 2,587,981 households were unable to keep their home adequately warm. Italy set the objective[58] to reduce this number by 1% annually from 2022 until 2030. The EPBD recast can support the achievement of this and other social targets, as summarised below.

Energy poverty and social impacts

- The EPBD recast requires Italy and all Member States to create an enabling framework to provide financial support and technical assistance, especially to vulnerable households, people affected by energy poverty, and people living in social housing, in the context of MEPS, if applied to the residential sector (Art. 9).
- Social impacts of financial tools must be monitored in the context of MEPS (Art. 9).
- The EPBD focuses on the renovation of the worst-performing buildings, which are often occupied by people in energy poverty (Art. 9).
- Key indicators related to energy poverty must be included in the national building renovation plans (Annex II).

Access to technical and financial support

- Barriers related to upfront costs of renovations must be assessed and addressed (Art. 17).
- Information about available funding and financial tools must be made available to the public in an easily accessible and transparent manner, which could facilitate vulnerable groups' access to information and tools (Art. 17).
- Specific safeguards should be implemented to protect citizens, particularly tenants, such as imposing caps on excessive rent increases or providing rent support (Art. 17).
- EPCs and renovation passports must be affordable for all, especially vulnerable households (Art. 12, Art. 19).

Health, resilience and indoor quality

- The EPBD recommends considering environmental and health externalities in the cost-optimality methodology and including information about wider benefits related to health and comfort, indoor environmental quality, and the improved adaptive capacity of the building to climate change in renovation passports (Annexes VII, VIII).
- In new buildings and buildings undergoing major renovations, the issues of optimal indoor environmental quality, adaptation to climate change, fire safety, risks related to intense seismic activity, and accessibility for people with disabilities should be addressed (Recital 45, Art. 7).

[58] The NECP indicates that with the adoption of a national definition of energy poverty and the appropriate multidimensional monitoring indicators, this objective may be updated.

CONCLUSIONS

FROM THE ABOVE ANALYSIS, WE CAN ANSWER THE QUESTIONS THAT TRIGGERED THE ITALIAN BUILDINGS CLIMATE TRACKER:

How has the decarbonisation of the building stock in Italy evolved since 2015?

Despite the progress made since 2015, Italy remains off track in achieving its decarbonisation targets. In 2015, Italy required 1.8 points of annual progress in decarbonisation to align with the reference path to climate neutrality. From 2022 onwards, this requirement has increased to 2.5 points to be on track by 2030. This underscores the need for accelerated measures and stronger policy implementation to align with Italy's climate neutrality goals and highlights the urgency of intensifying efforts to decarbonise Italy's building stock.

Is the current trajectory of the Italian building sector aligned with the 2050 climate neutrality goals?

While decarbonisation scenarios at global and EU levels require early actions, the goals set in Italy leave the major portion of the targets to be achieved after 2030. At the EU level, CO_2 emissions from the building sector are expected to be reduced by around 60% in the 2015-2030 period.[59] In contrast, Italy aims to reduce these emissions by only 31% by 2030, leaving more than two-thirds of the reductions to happen in the later period 2030-2050. As illustrated in Figure 12, well-timed action based on ambitious targets is essential to avoid the release of extra CO_2 emissions and their irreversible environmental impacts.

What level of improvement is required between the latest data and 2050 to achieve these climate targets?

When considering the progress of the four indicators, four main improvements are required:

1. Timely action to avoid the release of extra CO_2 before 2030 and greater future mitigation and adaptation risks and related costs.
2. A faster deployment of renewable energy in buildings for heating and cooling by breaking the dependence on natural gas, and an increased share of renewables in electricity. This would also improve energy security and reduce imports of fossil fuels.
3. Investments for renovation directed towards the worst-performing buildings to achieve the required energy savings and emissions reductions where they are most needed, and reap the benefits connected with renovation, including health, comfort and energy poverty alleviation.
4. A timely transposition and effective implementation of the EPBD to set the right conditions for a faster and more effective decarbonisation of the building stock by 2050.

[59] Based on the MIX scenario from the impact assessment accompanying the Communication 'Stepping up Europe's 2030 climate ambition'

ANNEXES

ANNEX I – INDICATORS IN NORMALISED VALUES

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 (level in 2015) to 100 (final goal in 2050). See the EU BCT first edition. Ten points on the normalised scale means that the indicator has achieved 10% of the improvement that it should achieve during 2015-2050.

Table 6: ITA BCT's indicators status assessment

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

Figure 29: CO_2 emissions from energy use in buildings for households and services 2015-2022, normalised

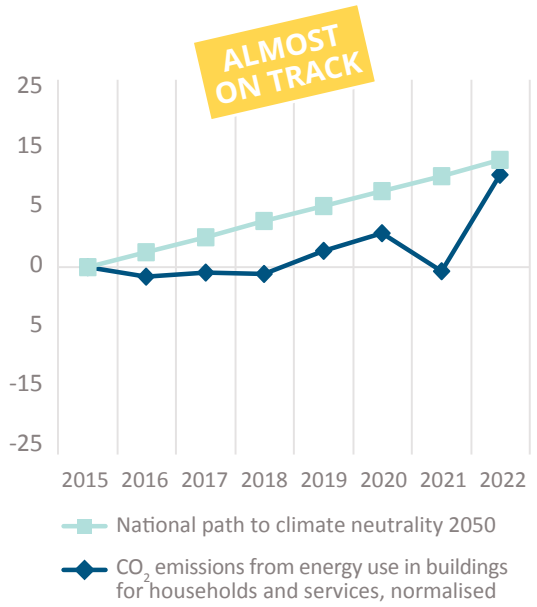


Figure 30: CO_2 emissions from energy use in households 2015-2022, normalised

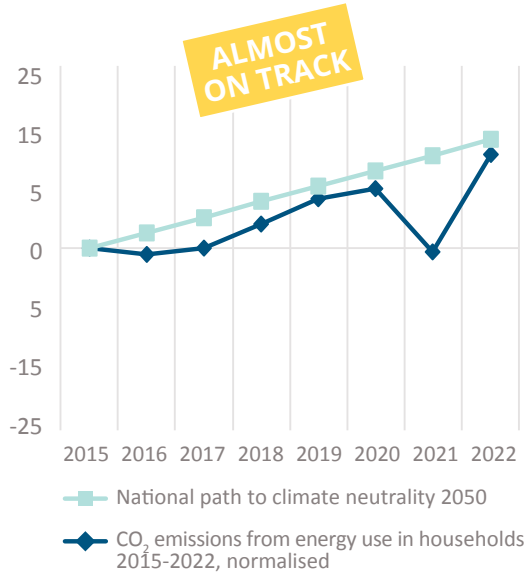


Figure 31: CO_2 emissions from energy use in service-sector buildings 2015-2022, normalised

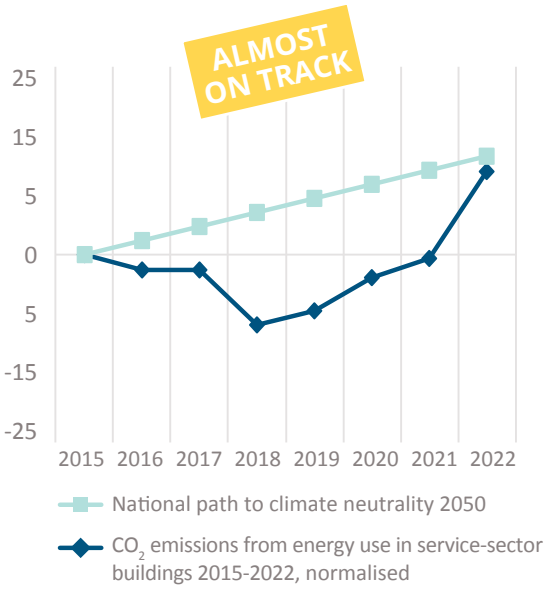


Figure 32: Final energy consumption in households and services 2015-2022, normalised

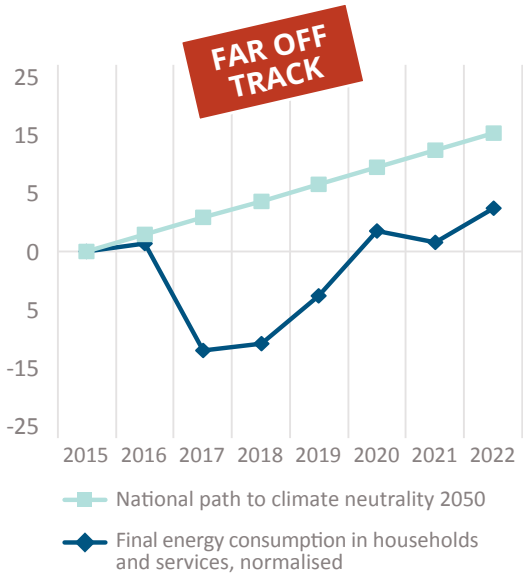


Figure 33: Final energy consumption in households 2015-2022, normalised

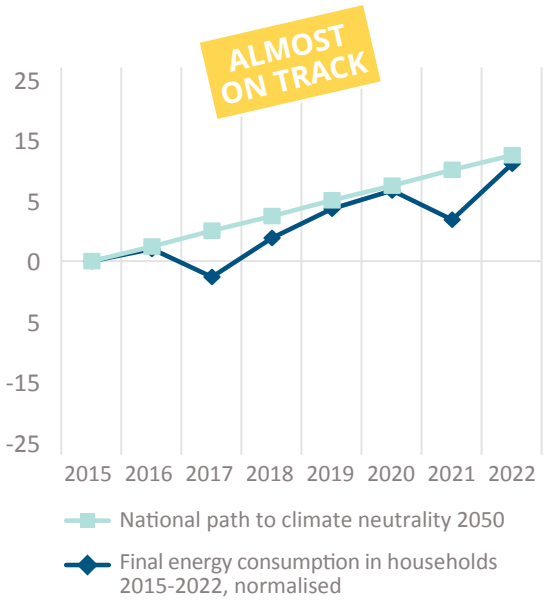


Figure 34: Final energy consumption in service-sector buildings 2015-2022, normalised

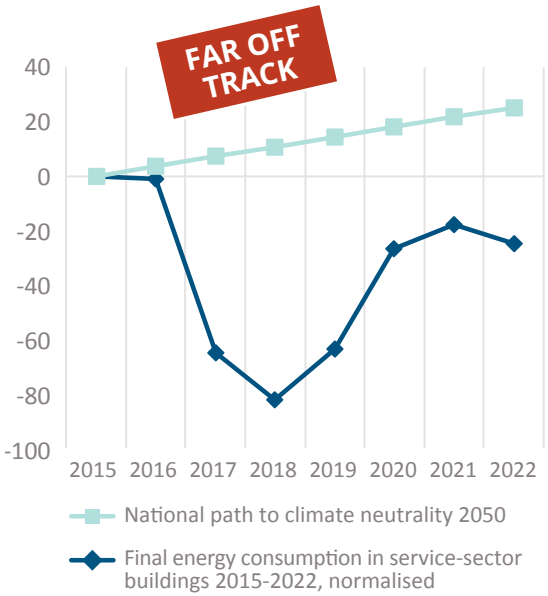


Figure 35: Renewable energy share 2015-2022, normalised

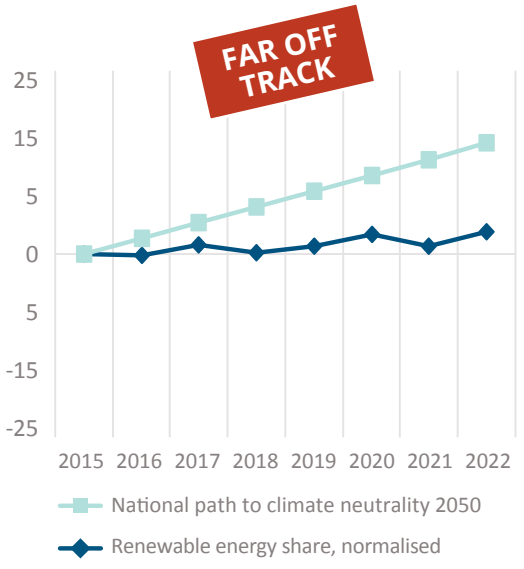


Figure 36: Share of energy from renewable sources for heating and cooling 2015-2022, normalised

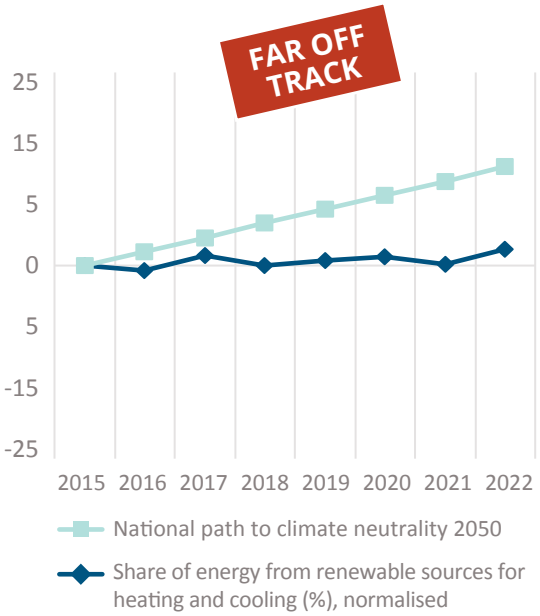


Figure 37: Share of energy from renewable sources in gross electricity consumption 2015-2022, normalised

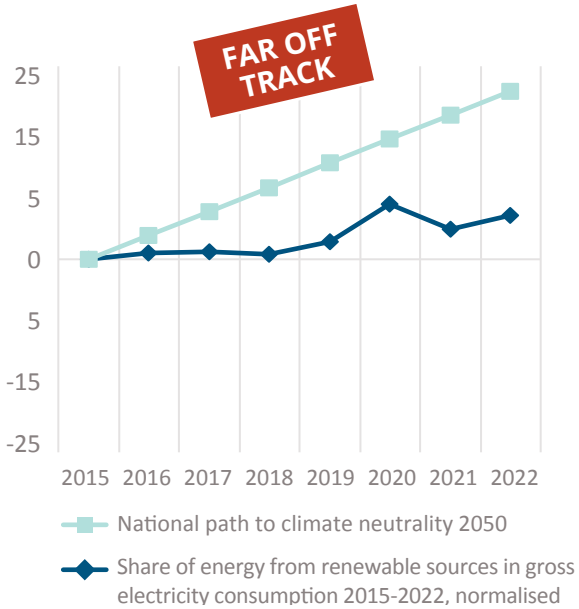
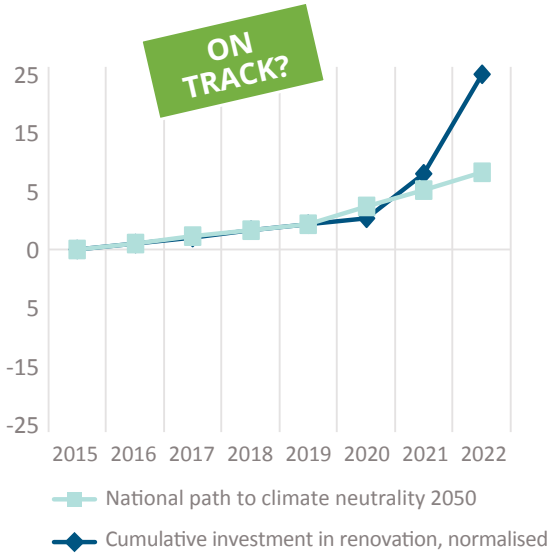


Figure 38: Cumulative investment in renovation 2015-2022, normalised



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