UN environment programme

Building fast. Falling short.

As climate risks rise and cities grow, we must rethink how we build to create better lives for all.

Global Alliance for Buildings and Construction

Global Status Report for
Buildings and Construction 2025–2026

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Global Status Report for Buildings and Construction 2025–2026

Photo: Unsplash

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The report was designed by 89up

The report was edited by Chloé Farand

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Dr. Essam Elnagar, Buildings Performance Institute Europe (BPIE)
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Li Fen, Chief Engineer, Shenzhen Institute of Building Research Co., Ltd.
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Mina Hasman, Commonwealth Association for Architects | SOM
Prof. Shan Hu, Tsinghua University
Dr. Silke Krawietz, SETA Network / SETA Design
Dr. York Ostermeyer, Stichting CUES / University College London (UCL)
Dr. Carolina Owen, World Green Building Council (WorldGBC)
Dr. Alicia Regodon Puyalto, United Nations Office for Project Services (UNOPS)
Julie Robles, Global Green Growth Institute
Prof. Da Yan, Tsinghua University
Dr. Derek Sarfo-Yiadom, Environmental Protection Authority, Ghana

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Abbreviations

BECs	Building Energy Codes
EMDE	Emerging Market and Developing Economies
EPBD	Energy Performance of Buildings Directive
ICBC	Intergovernmental Council for Buildings and Climate
IEA	International Energy Agency
IDB	Inter-American Development Bank
IPCC	Intergovernmental Panel on Climate Change
GlobalABC	Global Alliance for Buildings and Construction
GBCT	Global Buildings Climate Tracker
GSRBC	Global Status Report for Buildings and Construction
GHG	greenhouse gas
MEPS	Minimum Energy Performance Standards
NAP	National Adaptation Plan
NDCs	Nationally Determined Contributions
NZE	Net-Zero Emissions
UAE	United Arab Emirates
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services
WorldGBC	World Green Building Council
ZEB	Zero-emissions building

Foreword

Buildings shape how we live, work, and grow. They are where opportunity is built and where climate action becomes tangible in daily life.

The sector generates over a tenth of global GDP and employs nearly one in ten people worldwide. It also carries a significant environmental footprint accounting for more than a third of global CO_2 emissions and almost half of global material use. These realities make buildings one of the most consequential arenas for climate action, not only for mitigation, but for resilience, equity, and well-being. Encouragingly, the direction of travel is clear.

Over the past decade, global building floor area has expanded rapidly, while energy demand and emissions have grown more slowly. Energy efficiency, cleaner power, and better design have delivered tangible progress. These gains show that the sector can grow while reducing its climate impact and that policies, markets, and technology can align.

Yet progress remains uneven.

New construction continues to outpace decarbonisation, while renovation of existing buildings is far too slow. Fossil fuels still dominate heating, cooling and cooking in many countries. As this report shows, the gap between current trajectories and the Paris Agreement goals persists—not because solutions are missing, but because they are not yet deployed at the speed and scale required. UNEP's role is to make this progress visible, credible, and scalable. Through the Global Status Report for Buildings and Construction and the work of the Global Alliance for Buildings and Construction, UNEP is showing what must be done and mainstreaming what is already working.

This is where a shift in perspective matters.

Rather than viewing buildings solely as a problem to be fixed, this report presents them as a platform for delivery: a way to meet housing needs, reduce energy costs, strengthen resilience to climate extremes, and support inclusive economic growth, simultaneously.

Well-designed, energy-efficient housing cuts emissions while protecting households from volatile energy prices and extreme heat. Climate-resilient buildings reduce risks from floods, storms, and heatwaves. For low-income families, better housing delivers long-term affordability, health benefits, and energy security. Housing and climate action are not competing priorities; when designed together, they reinforce each other.

The future of climate action will be built home by home, neighbourhood by neighbourhood, through today's choices on how we design, construct, and renovate the spaces we inhabit. This report shows that the foundations are already in place. The opportunity now is to scale them, and to make sustainable, affordable, and resilient buildings the global norm.

Martin Krause
Director, Climate Change Division

Political Statement

KENYA
Hon. Alice Wahome
Cabinet Secretary for Housing and Urban Development, Kenya

Kenya's rapid urbanisation demands housing and infrastructure solutions that are both resilient and inclusive. As outlined in Kenya's Decarbonization Roadmap and forthcoming Green Building Standards, climate-responsive planning combined with evidence-based decision-making is essential to safeguarding vulnerable communities from escalating risks such as heatwaves, flooding, and other climate-related hazards. The Global Status Report for Buildings and Construction supports this effort by providing the data and insights countries need to evaluate progress, identify gaps and advance the development of a sustainable, resilient and inclusive building and construction sector, ensuring access to affordable housing for all.

BRAZIL
Amb. Antônio da Costa e Silva
Chief International Adviser, Ministry of Cities, Brazil, Vice-chair of ICBC

Brazil underlines that strong data and continuous monitoring are key to turning climate ambition into real action in the built environment, and remains committed to this approach as pressures on the sector increase.

In its role as Vice-Chair of the Intergovernmental Council for Buildings and Climate (ICBC), Brazil supports the UNEP-hosted Global Alliance for Buildings and Construction (GlobalABC). The Global Status Report for Buildings and Construction provides a solid evidence base to track progress, identify gaps, and accelerate the transition to a zero-emission and resilient built environment.

Brazil is committed to applying these insights to expand access to sustainable and affordable housing, advance low-carbon solutions, and support inclusive and resilient development.

FRANCE
Mr. Yves-Laurent Sapoval
Ministerial delegate for Sustainable Cities and Urban Envoy, Ministry for Ecological Transition, France, Chair of the ICBC and Co-Chair of GlobalABC

France believes that climate action in the built environment is central to preserve and enhance people's well-being, sustainability, economic stability and security. As we observe climate risks continue to increase, mitigation, adaptation and resilience are every day more necessary.

We welcome a decade of progress and inclusive work since COP 21, making the sector more coordinated, data-driven, and ready for action. At this regard, we reiterate our support to the work of the United Nations Environmental Programme (UNEP).

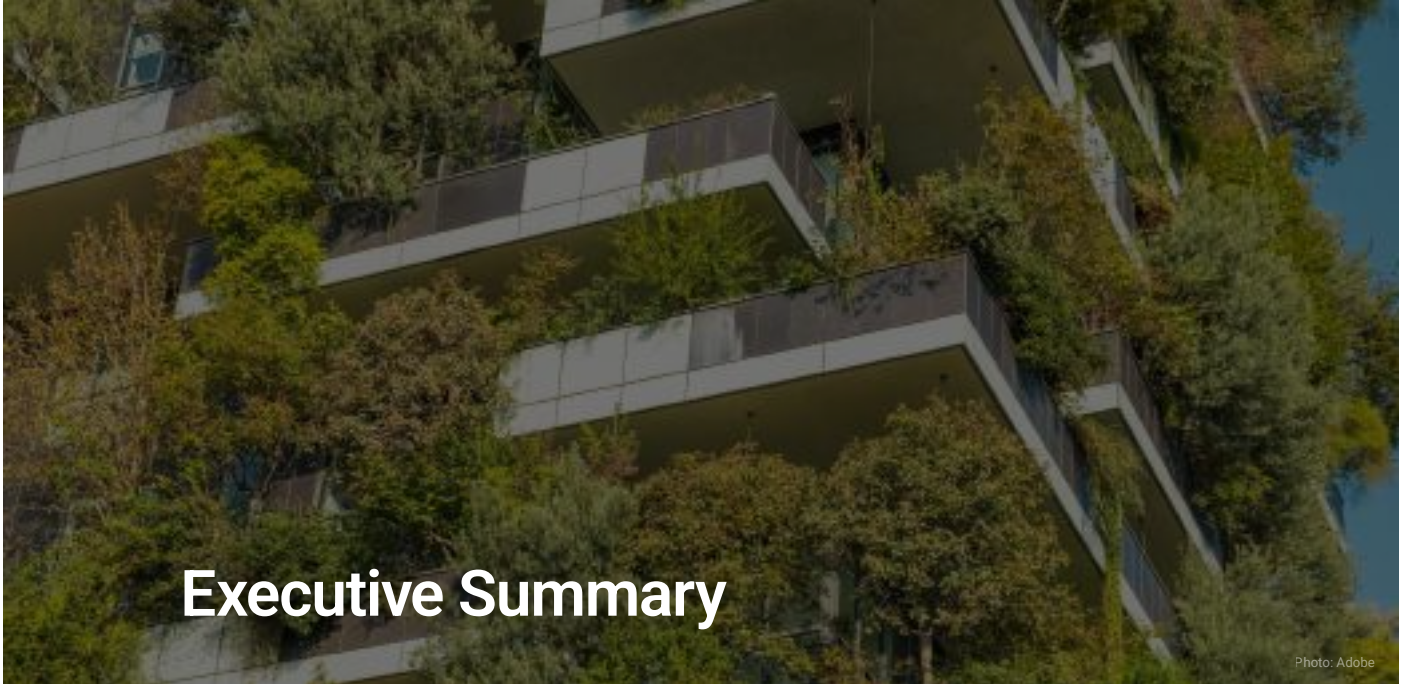
Thanks to the constant involvement of many, we now can rely on a strong statement supported by more than 60 governments, the Déclaration de Chaillot; an implementation body, the Intergovernmental Council for Buildings and Climate (ICBC); and an inclusive Global Alliance for Buildings and Construction gathering 400 key members and organization through the whole value chain willing to act together.

Yet, apart from active community engagement, to make our buildings and cities future-proof, resilient, and fair, we need strong data and effective reporting.

The Global Status Report for Buildings and Construction is a vital tool in this effort. It shows that while progress is possible, the sector remains off track, with rising emissions, continued reliance on fossil fuels, and the need for stronger policies and greater investment.

France supports stronger building codes implementation, faster renovation, the use of low-carbon materials and energy resources, and increased investment to drive change this decade.

Photo: Unsplash



Executive Summary

Photo: Adobe

The global buildings and construction sector provides essential infrastructure for human well-being and economic activity, is an economic powerhouse and at the same time a major contributor to climate change. Innovating and transforming today's practices in the sector can foster fair economic development, enhance safety and public health, advance social justice and cultural cohesion, and reduce waste and pollution.

The expansion of global floor area and construction activities worldwide is creating pressure on raw materials extraction and energy demand, which are driving emissions associated with material production and transport, as well as construction and operation of buildings. The life cycle of construction materials results in significant emissions, with cement, steel and aluminium accounting for a large share.

The need to retrofit the current building stock and to provide adequate new buildings provides an opportunity to lock in zero-emission and climate-resilient performance through planning and policies, codes, and investment, before inefficient and high-carbon construction becomes a liability.

This report takes stock of the progress the sector is making in reducing its climate impact across many indicators. While many positive developments can be documented, the benchmarking against the commitment made in the Paris Agreement a decade ago shows that the momentum is stalling. To measure decarbonisation progress in a simplified way, the Global Buildings Climate Tracker combines a range of indicators into one index. The index shows that the buildings and construction sector remains off track from the path to full decarbonisation by 2050. The observed stagnation is mainly due to the increase of buildings' operational emissions, a lack of policies for the phase-out of fossil fuels, and existing policies still supporting these fuels in different regions around the world.

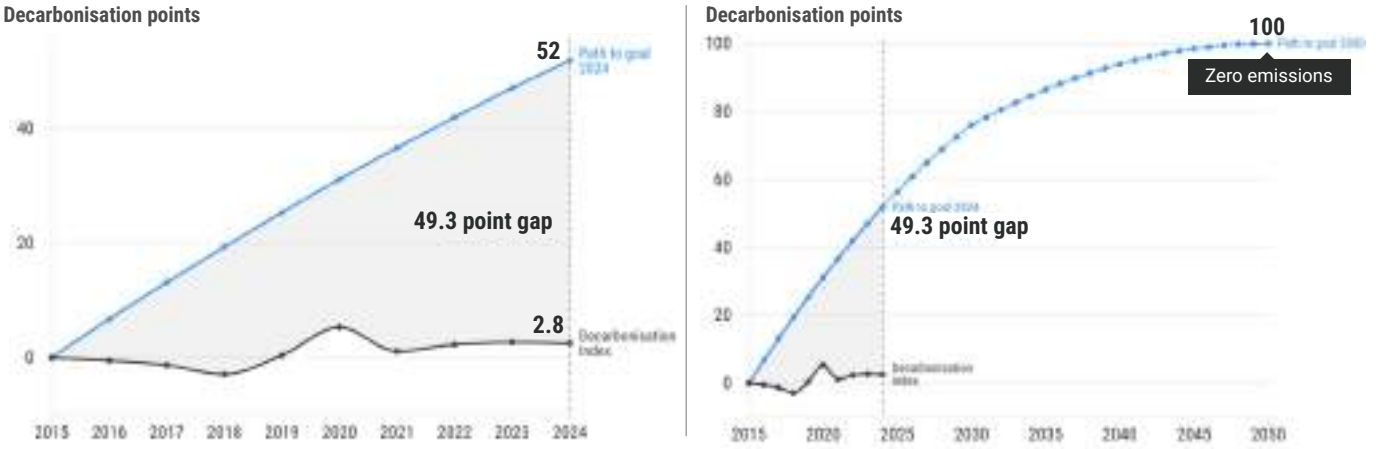


Figure ES 1. Global Buildings Climate Tracker reference path to goal and observations (Based on GSRBC authors internal analysis)

The sector is currently 3.5 $GtCO_2$ off the required trajectory and would require a 56 per cent decline in emissions from 2024 levels to get on track by 2030, following the International Energy Agency (IEA) Net Zero Emissions (NZE) scenario.

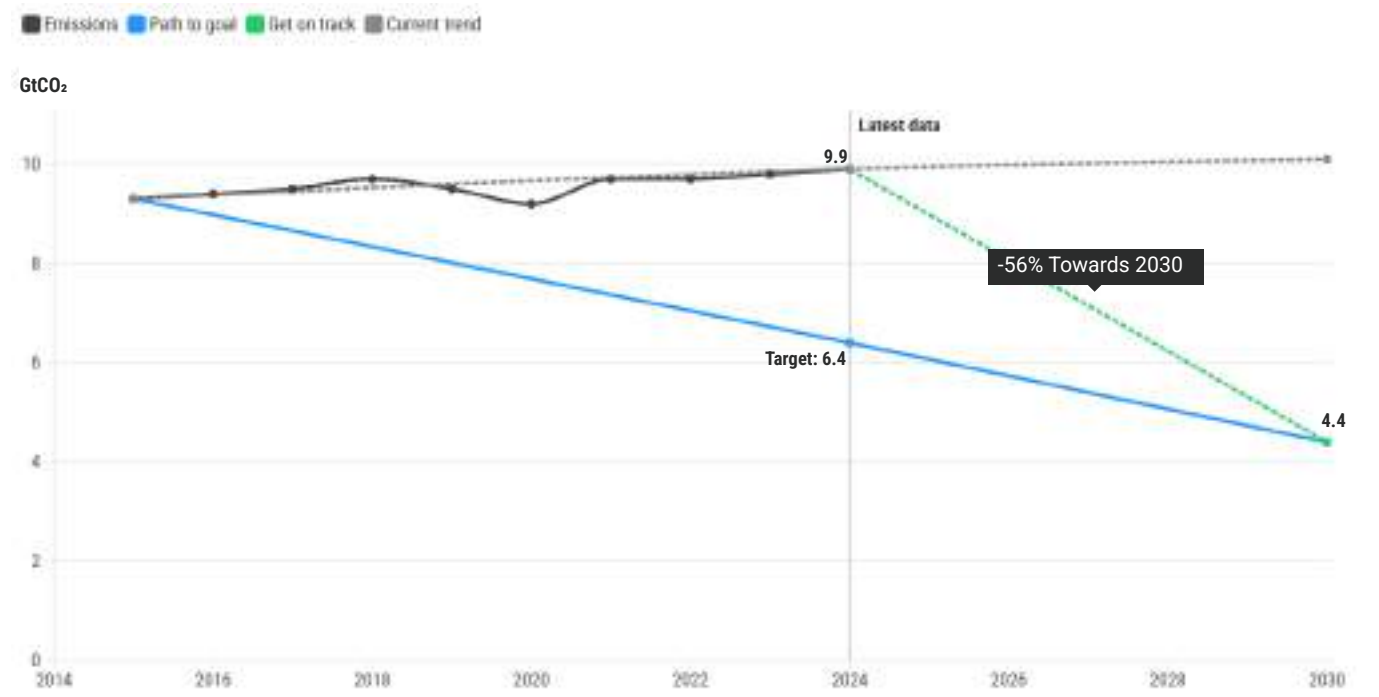


Figure ES 2. Buildings' operational emissions 2015-2024, path to goal, and path to get on track until 2030 (Based on (IEA 2025e) and GSRBC authors internal analysis)

In terms of embodied emissions, the IEA estimates that carbon emissions from cement, steel and aluminium used in buildings alone accounted for 9 per cent of global emissions in 2024. These emissions have not changed significantly through the years, remaining around 2.1 $GtCO_2$, showing the urgency to establish policies to address these emissions in the construction sector.

In 2024, global buildings' floor area increased by 1.7 per cent to reach 273 billion square metres. This growth is roughly equivalent to a land area five times the size of Nairobi, or two times Delhi, four times Berlin or New York, respectively, or three times Rio de Janeiro. Growth in Europe and China has recently slowed down but remains robust in India and Southeast Asia.

Much of this expansion is driven by the housing sector, which plays a central role in shaping the sector's climate impact. More than three-quarters of building floor area are for residential use and residential buildings account for 70 per cent of total energy demand. In 2024, the residential building stock floor area increased 3.4 billion square metres, while the non-residential building stock grew 1.3 billion square metres. This highlights the relevance of this segment in the transformation of the buildings and construction sector.

In addition to climate change, housing affordability is a major and increasing global challenge. To ensure that actions that address one crisis do not aggravate the other and hinder progress in both, governments should consider housing affordability and the housing sector's role in tackling climate change together.

Buildings' operational emissions increased by 1 per cent to 9.9 $GtCO_2$ in 2024, following the trend in the past decade. Between 2015 and 2024, global buildings' operational emissions rose by 6.5 per cent and energy demand increased by an estimated 11 per cent, while global floor area grew by 20 per cent. Governments should leverage these existing improvements to accelerate progress across all indicators and beyond.

INCREASED 1.7% IN 2024

273bn m²

global buildings' floor area

equivalent to...

4x Berlin **2x Delhi**

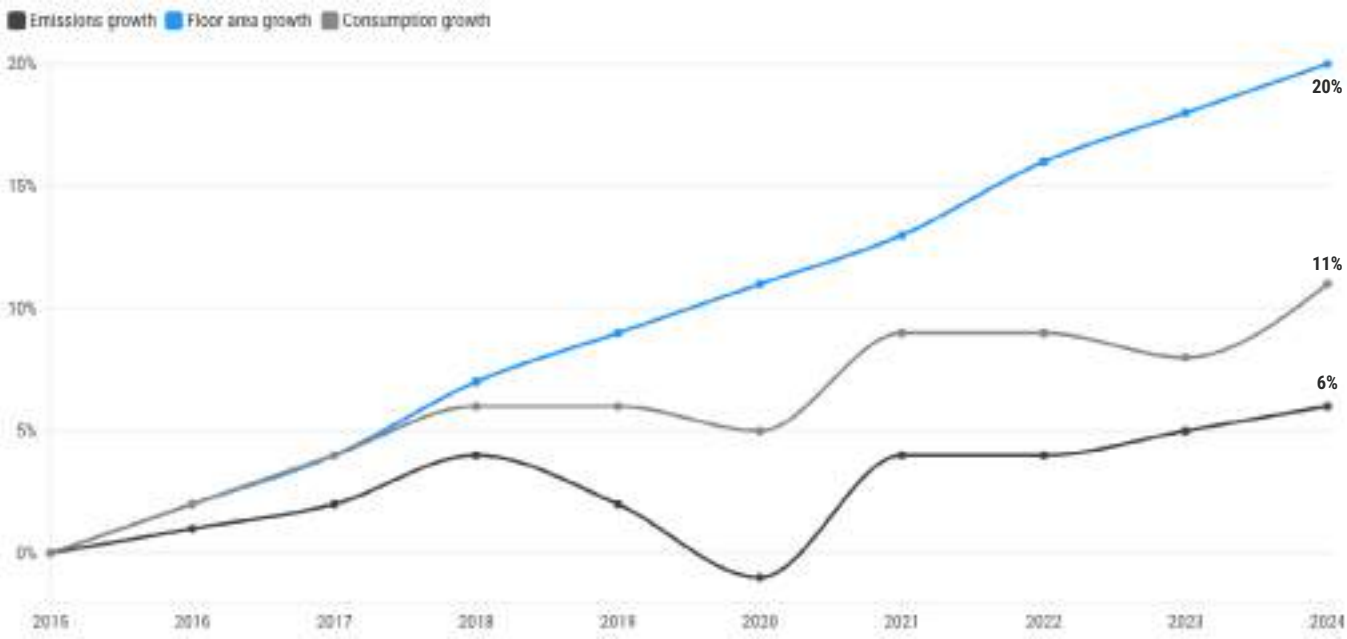


Figure ES 3. Percentage growth of operational emissions, floor area, and energy consumption of the global buildings stock in reference to 2015 (Based on (IEA 2025g), (IEA 2025e) and GSRBC authors internal analysis)

The declining carbon intensity of electricity and heat, driven by the rapid expansion of renewables and reduced coal use in power generation, alongside modest improvements in buildings' energy intensity, has led to the decoupling of emission and energy demand growth. As a result, operational emissions from buildings have increased more slowly than energy demand. Without improvements in energy efficiency, the increase in energy demand would have been twice as large.

These positive developments in energy efficiency can be seen in the decrease of energy consumption per square meter which decreased by 8.5 per cent since 2015.

The share of renewables in buildings' energy supply has risen by 4.7 percentage points since 2015 – only around a quarter of the increase needed over the period to stay on track to achieve net-zero emissions by 2050. Particularly, the contribution of on-site renewable generation to buildings' energy supply has remained relatively static, hovering at approximately 5 per cent throughout the period from 2015 to 2024, in many cases due to high initial costs and regulatory and policy hurdles.

Energy supplied to operate buildings accounts for a substantial share of global energy-related carbon emissions. Demand for fossil fuels in buildings has remained stable despite continued growth in buildings' final energy demand. While this can be considered a positive development, the limited phaseout of fossil fuels in buildings has hindered the reduction of direct operational emissions. The expansion of renewables and electricity demand has increased, covering part of the new demand.

Countries require a clear policy framework to transform the buildings and construction sector towards a zero-emission, efficient, resilient, and socially just sector. Developing comprehensive strategies in Nationally Determined Contributions (NDCs)[1] required under the Paris Agreement represents a key opportunity to guide this transformation. By 2024, 20 countries had submitted an NDC with an extensive strategy for cutting the sector's emissions, demonstrating that it is possible to integrate sector-specific pathways into national climate planning. But as of January 2026, under the new NDC 3.0 round launched in 2025, no country has yet published extensive strategies for the sector, despite calls for more detailed pledges.[2]

Building energy codes are a crucial mechanism to ensure that buildings are sustainable and future-proof. Global building energy codes coverage is increasing despite regional disparities. As of mid-2025, building energy codes covered approximately 60 per cent of new construction worldwide, with widespread adoption in high-income countries, and low adoption in emerging economies. Recent updates in codes around the world have aimed at applying minimum efficiency requirements to more building segments, strengthening these requirements for certain building categories, inclusion of whole-life carbon concepts, and in a few cases passive cooling concepts. However, none of the mandatory existing codes is aligned with zero-emission principles.


Photo: Unsplash

Voluntary instruments such as green building certifications can mobilise the industry to drive greater sustainability in buildings. The uptake of green building certification schemes has grown steadily since 2015, due to local tailoring, financial incentives and awareness campaigns in the construction industry. Overall, between 2015 and 2024 the total number of green building certifications has almost tripled worldwide.

A clear direction of travel is critical to put the buildings and construction sector on track. Roadmaps are an effective tool to decarbonise and future-proof the buildings sector. Multiple countries such as Bangladesh, Jordan, Ghana and Kenya have recently developed roadmaps for the buildings and construction sector, with other examples at the sub-national level in five cities in Indonesia, and the Indian state of Odisha.

Rapidly decarbonising and future-proofing the global building stock requires substantial and sustained investment. Global investment in building energy efficiency has increased steadily over the past decade, reaching around USD 275 billion in 2024 – a 38 per cent increase compared to 2015 levels and a 3 per cent increase on 2023. Governments have deployed green loans, retrofitting programmes and climate bonds to support investment.

However, energy efficiency investment needs to reach an additional USD 3.6 trillion cumulatively by 2030 to align investment levels to what is needed under a 2050 net-zero pathway. Governments should provide long-term regulatory certainty to boost investment.

Amid increasing climate risks, it is crucial to ensure that new and existing buildings are future-proof, resilient and adaptable. This requires resilience and adaptation measures to be implemented across individual structures and at the urban scale to protect building users and citizens. Governments should collect and monitor data on hazard exposure, structural vulnerability and adaptation capacity to identify communities, buildings and other infrastructure that face existing and future climate risks. Adequate adaptation solutions mitigating these risks should be a political priority.

To accelerate the transition of the buildings and construction sector to a zero-emission, efficient, resilient and socially just sector, decision-makers require robust and timely evidence to assess progress and design effective strategies. Acceptance of policies and programmes needs an engaged community of stakeholders so that collective action is embedded in people's lived realities. Policymakers should focus on the following areas:

Reversing the trend of growing emissions requires governments to adopt plans for the phase-out of fossil-fuel heating and cooking, scale deep retrofitting and leverage public procurement to demand low-carbon solutions for buildings energy supply.

Photo: Unsplash

These policies need to deliver results which can be traced with quantitative observations. The energy intensity of the global building stock needs to fall by 25 per cent by 2030 compared to current levels to stay on track with the IEA's NZE scenario. Governments should update building energy codes to include energy efficiency and sufficiency principles[3], set minimum performance standards for existing buildings, and promote passive heating and cooling designs and retrofits to reduce energy needs.

The share of renewables in buildings' power supply needs to increase from 17.3 per cent to 46 per cent by 2030 from 2024 levels. To speed up the adoption of on-site renewables, governments should consider renewable heat and electricity in buildings as a technology deployment challenge, not solely as a power-sector issue.

The role of the buildings and construction sector in the overall strategy to address climate change needs to be systematically recognised and made actionable. Governments need to develop extensive building strategies within their NDC, including actions and targets for building energy codes and energy supply, efficiency of appliances, green building certifications, material supply chain and circularity, urban planning, and finance.

At least all G20 countries and 75 other countries should have zero-emissions aligned building codes by 2030. Governments should urgently upgrade building codes with requirements toward zero-emissions standards and enforcement mechanisms, especially in high-growth areas such as Africa. This should be paired with strengthened capacity building and knowledge transfer of low-carbon construction practices.

Governments should use green certification schemes to amplify their decarbonisation policies, by aligning schemes to the national context and integrating them into building codes as well as procurement and social housing requirements to accelerate the transformation of the market.

Photo: Unsplash

1 Introduction

Photo: Adobe

The Global Status Report for Buildings and Construction (GSRBC), published by the UN Environment Programme (UNEP) and the Global Alliance for Buildings and Construction (GlobalABC), provides an annual global snapshot of progress to decarbonise and make the buildings and construction sector more resilient. It assesses the state of policies, finance, technologies, and other solutions to determine whether the sector is on track to reach the goals of the Paris Agreement.

1.1 The relevance of the buildings and construction sector

In recent years, geopolitical conflicts, energy crises, the Covid-19 pandemic, and intensifying extreme weather events have compounded economic, environmental and social pressures, increasing living costs, resource scarcity, community displacement, and infrastructure strain.

The buildings and construction sector is central to these challenges: it consumes vast natural resources and employs a significant global workforce but also provides essential services and shapes the organisation of society. Buildings are the primary venues for living, working, learning, and leisure and directly interact with the energy, transport and health sectors.

Through targeted policies, the buildings sector can foster inclusive development, curb waste and pollution, improve resource efficiency and reduce pressure on natural ecosystems, including through more sustainable material use and land management, strengthen climate resilience, enhance carbon sequestration via bio-based materials, bolster health and safety, and promote equity. Its importance will intensify, with approximately 50 per cent of 2050's building stock yet to be constructed. (United Nations Environment Programme [UNEP] 2026)

1.2
The Global Status Report for Buildings and Construction

This is the tenth edition of the GSRBC, which marks the tenth anniversary of the 2015 Paris Agreement. The report aims to inform decision and policymakers and to catalyse greater climate action across the wider buildings and construction community.

An overview of this edition is illustrated in Figure 4.

2

Latest data on global construction trends presented in **Section 2** indicate an expanding building stock;

3

Section 3 discusses the emissions of the buildings and construction sector. Significant carbon emissions arise from building material extraction and production as well as from construction, retrofitting and buildings' operational energy use, highlighting the sector's major contribution to the climate crisis.

4 5

Sections 4 and **5** present further details on buildings' energy demand and the use of renewables in buildings' energy supply;

6 7 8

Sections 6, 7, and **8** discuss policies, building energy codes, and certification as mechanisms to guide and transform the sector into a zero-emission, efficient, resilient, and socially just sector;

9

Section 9 presents the trends on investments in buildings energy efficiency and beyond;

10

Escalating climate risks demand resilience improvements for new and existing buildings, **Section 10** discusses the latest concepts on resilience and adaptation and introduces a proposed indicator framework to monitor this issue in the sector;

11

Section 11 summarises the latest updates in roadmaps and highlights their role to turn strategic ambitions into practical implementation frameworks;

12

A series of priority actions for the sector is synthesised in **Section 12**.

Moreover, this report includes key upgrades to previous GSRBC editions as part of an ongoing initiative to enhance and increase the monitoring and understanding of the buildings and construction sector worldwide (see Section 13).

The expansion of the GSRBC aims to build on the perspective illustrated in Figure 4 with greater regional coverage and thematic depth. This will provide key actors with the relevant information to adjust and accelerate efforts to transform the buildings and construction sector into a zero-emission, efficient, resilient, and socially just sector.

Report Overview

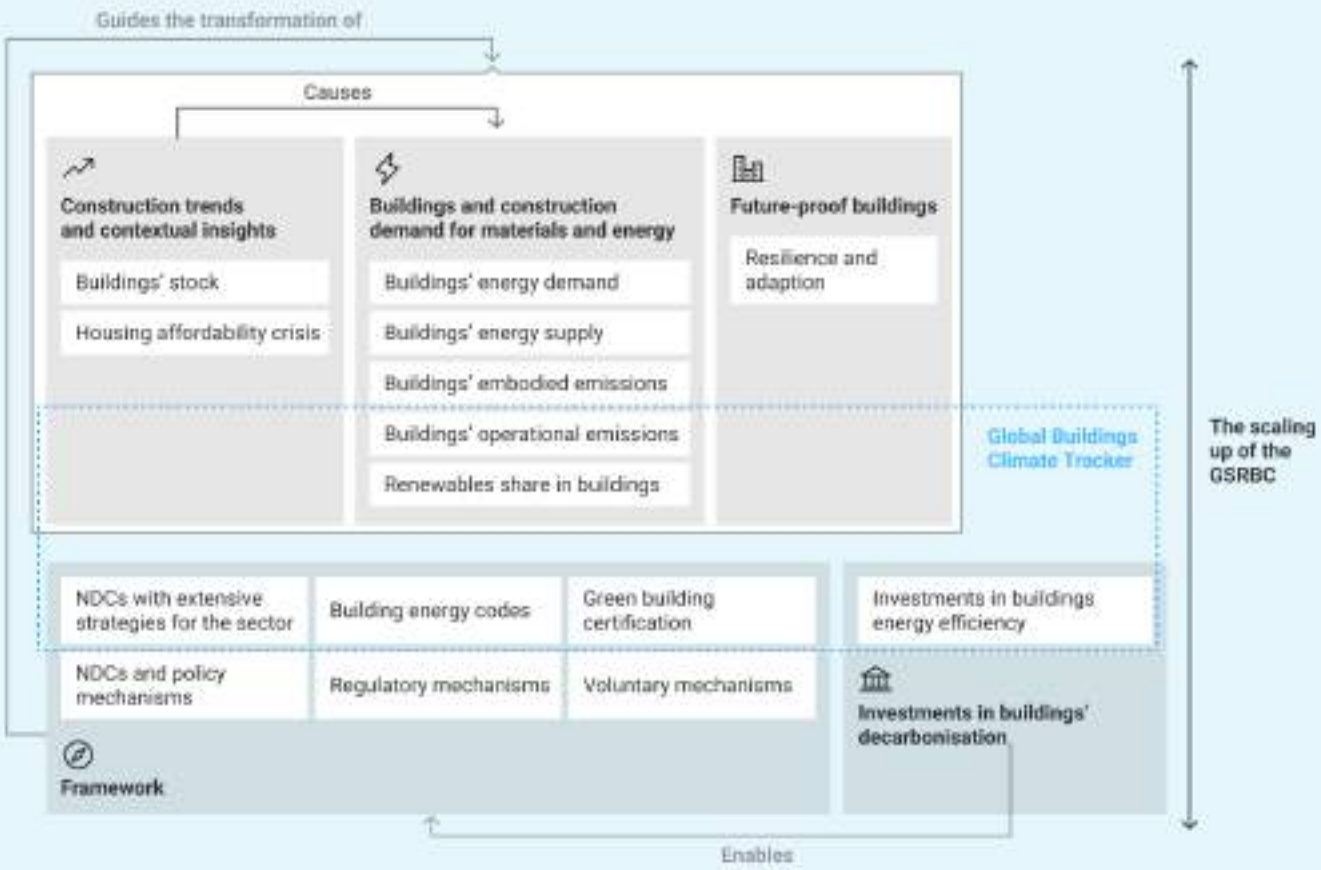


Figure 4. Overview of the report (Based on GSRBC authors internal analysis)

1.3
Monitoring the buildings and construction sector

Since its introduction in the GSRBC's 2020 edition, the Global Buildings Climate Tracker (GBCT) has monitored progress towards decarbonising the sector through seven key indicators, against a 2050 net-zero emissions pathway.

This edition presents observations for 2015–2024, with extensions to 2025 where data permits.

Using a seven-part composite index, the tracker provides a snapshot of decarbonisation efforts in the buildings sector since 2015, the year the Paris Agreement was adopted. It evaluates progress against a reference scenario in which the buildings sector is fully decarbonised by 2050, with intermediate milestones in 2030.

The seven indicators part of the composite index of the Global Buildings Climate Tracker correspond to:

INDICATOR 3

Buildings' operational emissions

$GtCO_2$/year

(see Section 3.2)

INDICATOR 4

Buildings' energy intensity

kWh/m^2

(see Section 4)

INDICATOR 5

Renewable share in buildings' final energy demand

per cent

(see Section 5)

INDICATOR 6

Nationally Determined Contributions (NDCS) with extensive buildings plans

per cent, aggregated

(see Section 6)

INDICATOR 7

Building codes that are aligned with zero-emissions buildings (ZEB)

per cent, aggregated

(see Section 7)

INDICATOR 8

Green building certifications

cumulative growth

(see Section 8)

INDICATOR 9

Cumulative energy efficiency investment in buildings

USD billion

(see Section 9)

Note that while the tracker focuses on these seven indicators, the full GSRBC report presents a more comprehensive analysis of the sector as a whole (see Section 1.2), including additional trends linked to the seven indicators but also to other topics such as buildings and construction market, the growing housing affordability crisis, embodied emissions, resilience and adaptation, and roadmaps and diverse policy instruments.

The seven indicators are normalised to translate them to a common scale by dividing the observations by the total range between their value at the starting point in 2015 and their goal value in 2050. Once the indicators are normalised, the CO_2 emissions indicator is used as a multiplier while the other six indicators are aggregated using a weighted sum. All the results are combined to create a reference path that moves from 0 decarbonisation points in 2015 to 100 decarbonisation points in 2050, representing a zero-emissions buildings and construction sector. The lower path shows actual progress since 2015. The findings, which cover the 2015-2024 period, are presented throughout this report.

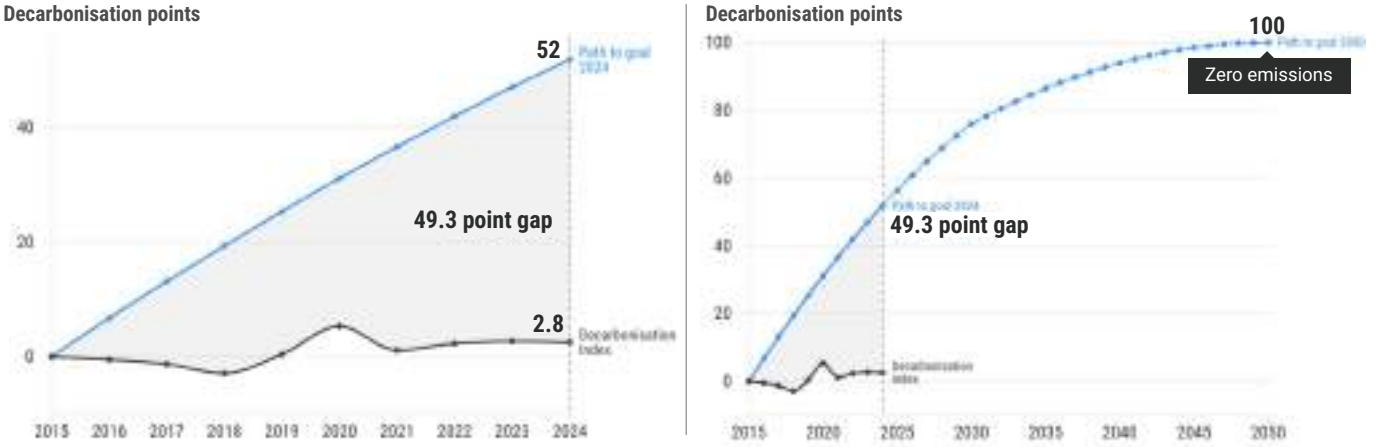


Figure 5. Global Buildings Climate Tracker reference path to goal and observations (Based on GSRBC authors internal analysis)

The tracker shows the sector remains far off track to achieve net-zero emissions objectives by 2030 in new buildings and by 2050 for the full building stock, with a decarbonisation gap exceeding 49 points in 2024.

Sector-wide decarbonisation has plateaued since the Covid-19 pandemic made the year 2020 an outlier. It advanced to 3 points by 2023 but dropped to 2.8 points in 2024. This stagnation stems primarily from rising operational emissions in buildings, which is driven by expanding floor area, sluggish retrofitting and persistent fossil fuel policy support.

Most of the individual indicators show a widening gap to achieve the 2030 and 2050 targets (see Figure 6). A more detailed analysis of each indicator and complementary trends is presented in **Sections 3 to 9**, including key recommendations to realign the sector with net-zero pathways.

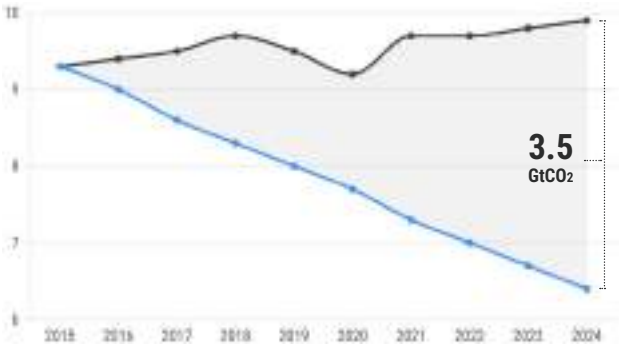
Page Key

Measured indicator

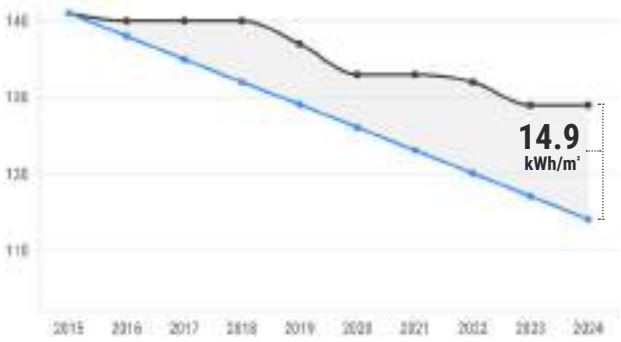
Path to 2030 and 2050 goal

Gap between indicator and goal

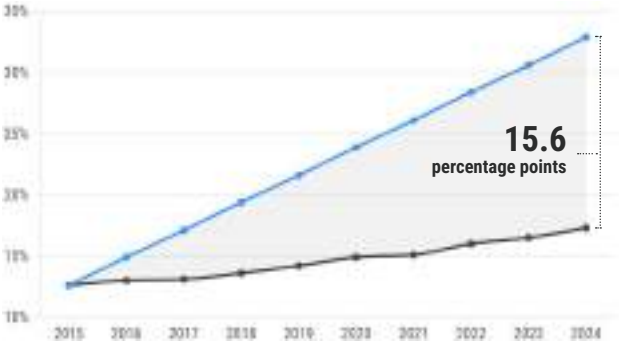
Emissions



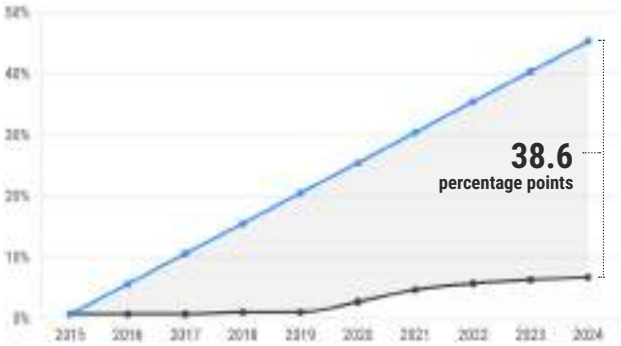
Energy intensity



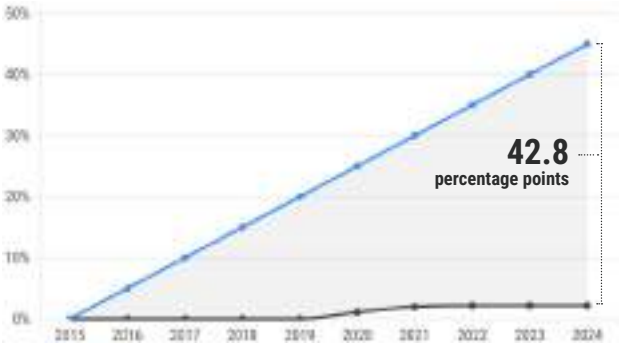
Renewable share



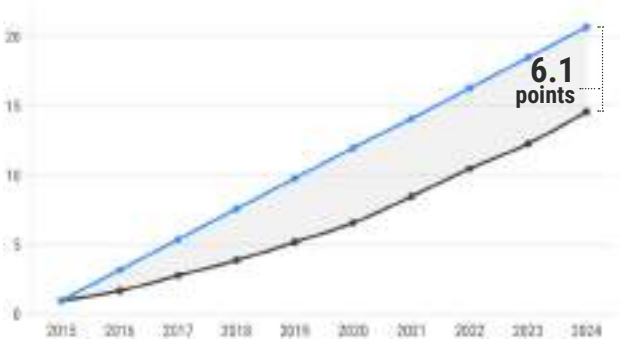
Aggregated NDCs considering buildings extensively



Aggregated ZEB-aligned codes



Cumulative growth in green building certification



Cumulative investment in energy efficiency in buildings

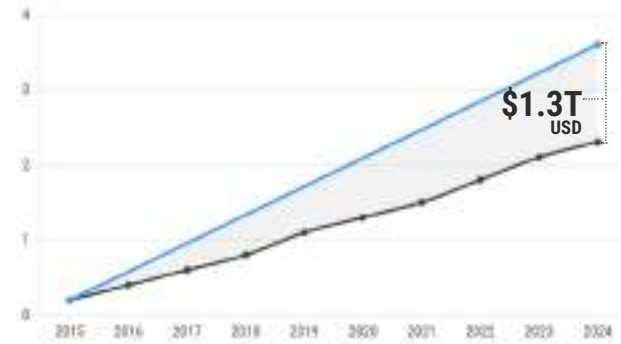


Figure 6. Growing gap between indicators and their paths towards 2030 and 2050 goals (Based on GSRBC authors internal analysis and sources indicated in detailed figures in chapters 3 to 9)

1.4
The progress observed between 2015 and 2024

Overall, despite the stagnation observed in the decarbonisation of the sector and the policy and regulatory panorama, other efforts and actions taken until now have shown progress in multiple aspects. There have been some positive shifts:

8.5%

Energy intensity has dropped by 8.5 per cent

4.7pts

Renewable share has increased by 4.7-points

Photo: Adobe

13.6pts

Green certification growth has increased by 13.6 points

$2.3T

Cumulative investments in energy efficiency have reached USD 2.3 trillion

Moreover, between 2015 and 2024, global buildings' operational emissions rose by 6.5 per cent and energy demand increased by an estimated 11 per cent, while global floor area grew by 20 per cent (see Figure 7).

The relative decoupling between operational emissions and energy demand has been driven by the growing share of renewables in electricity and heat generation and reduced coal use, alongside modest improvements in buildings' energy intensity (see all the details in **Section 3.2**). Similarly, the slight decoupling between the energy demand and global floor area is a result of efficiency measures. Without improvements in energy efficiency, the energy demand increase would have been twice as large (see all the details in **Section 4**). Governments should leverage these existing improvements to accelerate progress across all indicators and beyond.

The following sections present more detailed trends and developments linked to all the indicators and beyond, explaining the overall status of the buildings and construction sector worldwide. Each section includes key takeaways, multiple insights based on the data available, a set of recommendations, and examples of where progress is being observed.

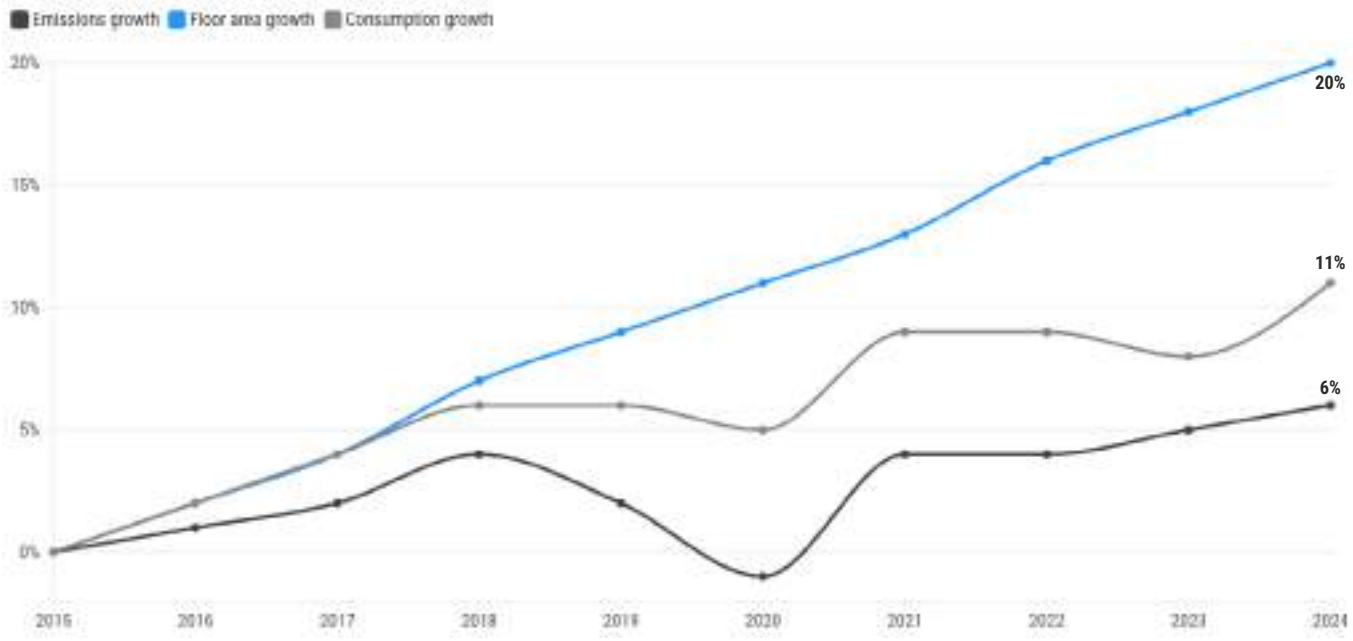
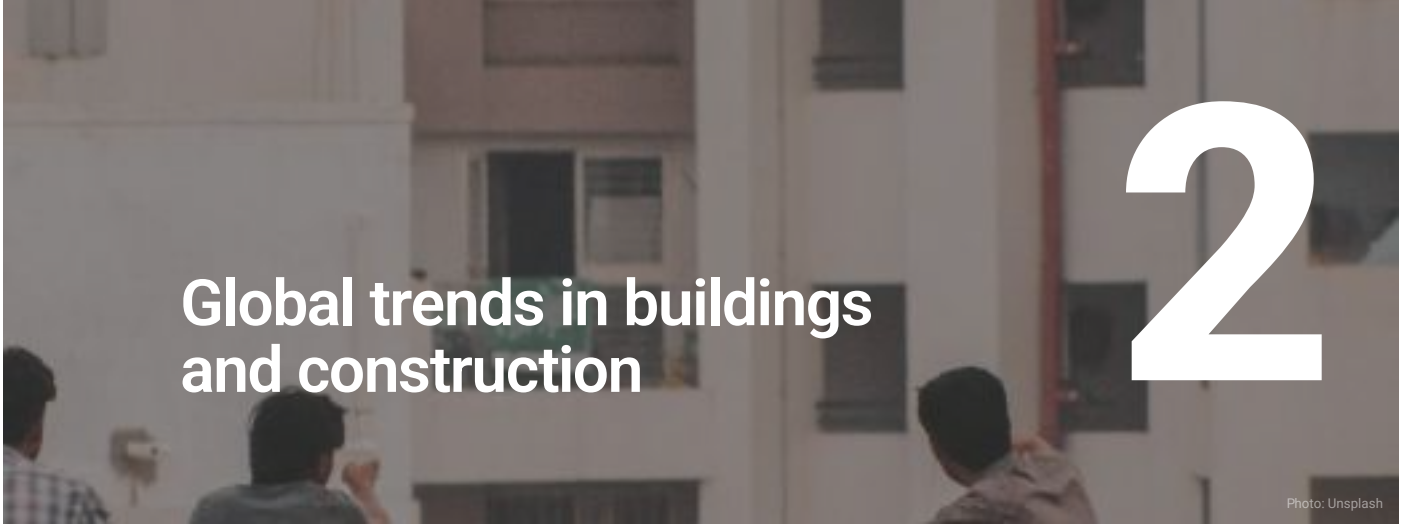


Figure 7. Percentage growth of operational emissions, floor area, and energy consumption of the global buildings stock in reference to 2015 (Based on (IEA 2025g), (IEA 2025e) and GSRBC authors internal analysis)

Photo: Unsplash



2 Global trends in buildings and construction

Photo: Unsplash

This section provides an introductory overview of trends in global buildings' floor area and market developments.

KEY TAKEAWAYS:

The building stock continues to grow, albeit with considerable regional differences. In 2024, global buildings' floor area increased by 1.7 per cent to reach 273 billion square metres – roughly equivalent to a land area five times the size of Nairobi, or two times Delhi, four times Berlin and New York, respectively, or three times Rio de Janeiro. Growth in Europe and China has recently slowed down but remains robust in India and Southeast Asia.

INCREASED 1.7%

273 Billion m²

Total global floorspace reached in 2024.

The economic health of the construction industry is improving. Global construction cost inflation – an indicator of construction activity – eased sharply after a 2022 peak. Residential construction inflation has declined significantly and is projected to stabilise around 4 per cent through 2025 and 2026. The easing reflects the gradual resolution of pandemic-induced supply chain constraints and improved material availability.

STABILISING

4%

Residential construction inflation from 2025-2026

The expansion of global floor area and construction activities worldwide is creating higher pressures on raw materials extraction and energy demand, which are driving emissions associated with material production and transport as well as construction and the operation of buildings. This is a major driver of the climate crisis.

The housing sector has a key role to play in reducing the climate impacts of buildings. More than three-quarters of building floor area is for residential use and residential buildings account for 70 per cent of total energy demand.

In addition to climate change, housing affordability is a major and increasing global challenge. To ensure that actions that address one crisis don't aggravate the other and hinder progress in both, governments should consider housing affordability and the housing sector's role in tackling climate change together.

2.1
An expanding global buildings and construction sector

In 2024, global floorspace reached 273 billion square metres – a 1.7 per cent increase from 2023 (see Figure 8 and 9). Looking ahead, a rising construction market is projected to increase from USD 11.39 trillion in 2024 to USD 16.11 trillion by 2030, driven by rising urbanisation, population ageing, digital transformation, and the energy transition (Deloitte 2025).

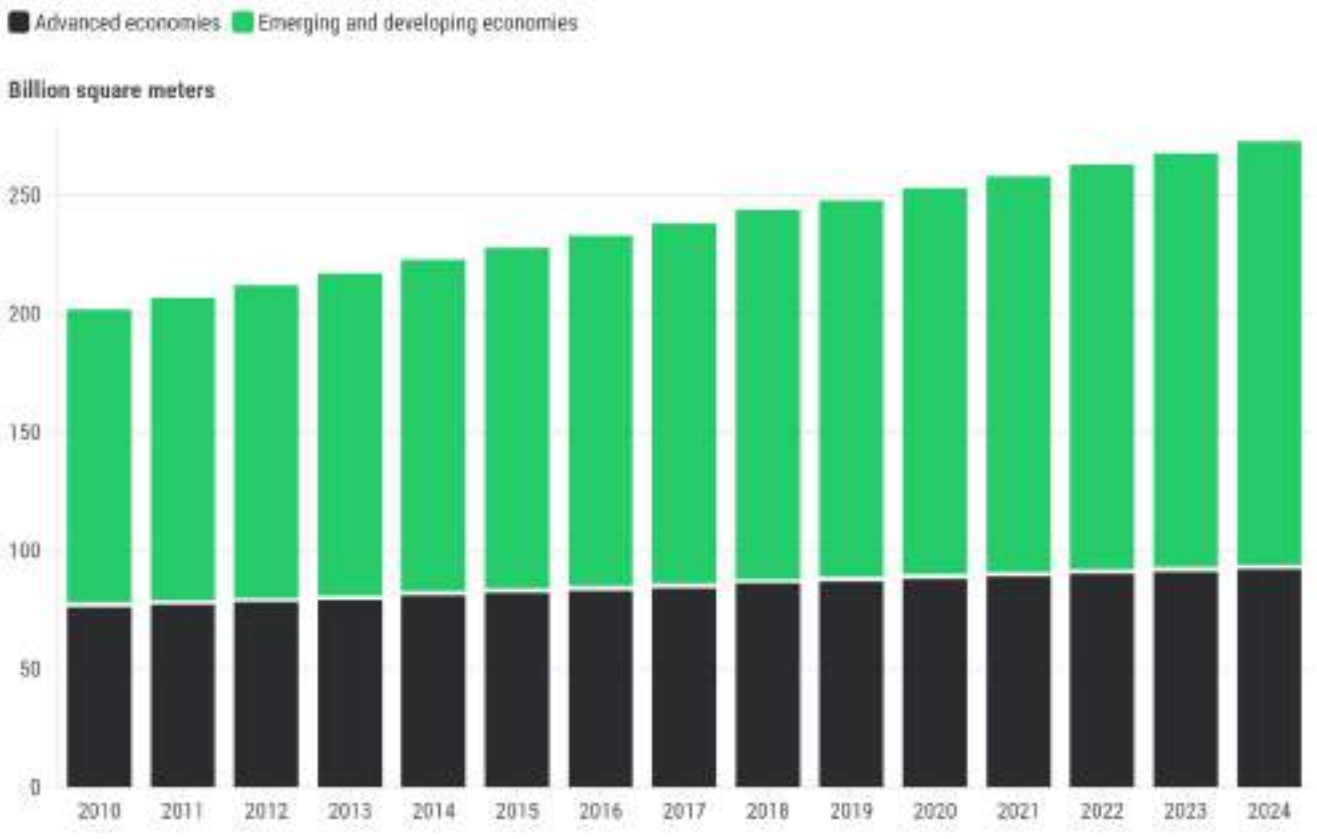


Figure 8. Global floorspace by economy type 2015 to 2024 (IEA 2025g)

The pace and nature of construction activity varied considerably across regions. Due to uneven data availability, regional trends are captured using different proxies, such as new floorspace additions, investment levels, and broader market dynamics. Taken together, these three provide a composite view of construction activity, where floorspace expansion serves as a proxy for underlying demand, investment levels reflect the mobilisation of capital in response to that demand, and broader market conditions influence both.

Floorspace additions

- In China, new construction fell from 7.3 billion square metres in 2024 to 6.6 billion square metres in 2025 (China, National Bureau of Statistics 2025).
- In Southeast Asia, the construction sector recorded robust growth in 2025, with an estimated 1.6 billion square metres of new floorspace added (Asian Insiders 2025).
- Construction demand in Singapore is projected to grow by around 6.5 per cent in 2025 (Singapore, Building and Construction Authority 2025b).

Photo: Unsplash


Photo: Unsplash

Investment and market valuation trends

- In the European Union, investment in residential construction fell after two years of post-COVID recovery (European Construction Industry Federation 2025).
- In the United States, construction spending rose from USD 2,023 billion in 2023 to USD 2,154 billion in 2024, with rapid growth in the public sector (United States, Census Bureau 2025).
- In India, construction grew from 2024 to 2025 with an annual rate of 11 per cent, reaching a valuation of around USD 210 billion, driven by strong public and private investment (Research and Markets 2025a).

Broader market dynamics

- Mexico experienced continued economic pressure on construction following global trade disruptions (Research and Markets 2025b), but the construction market in Latin America is expected to grow in the coming years (Data Insights Market 2026).
- The construction sector grew in the Middle East, mostly driven by large-scale projects (Nextmsc 2025; Turner and Townsend 2025).


Photo: Unsplash

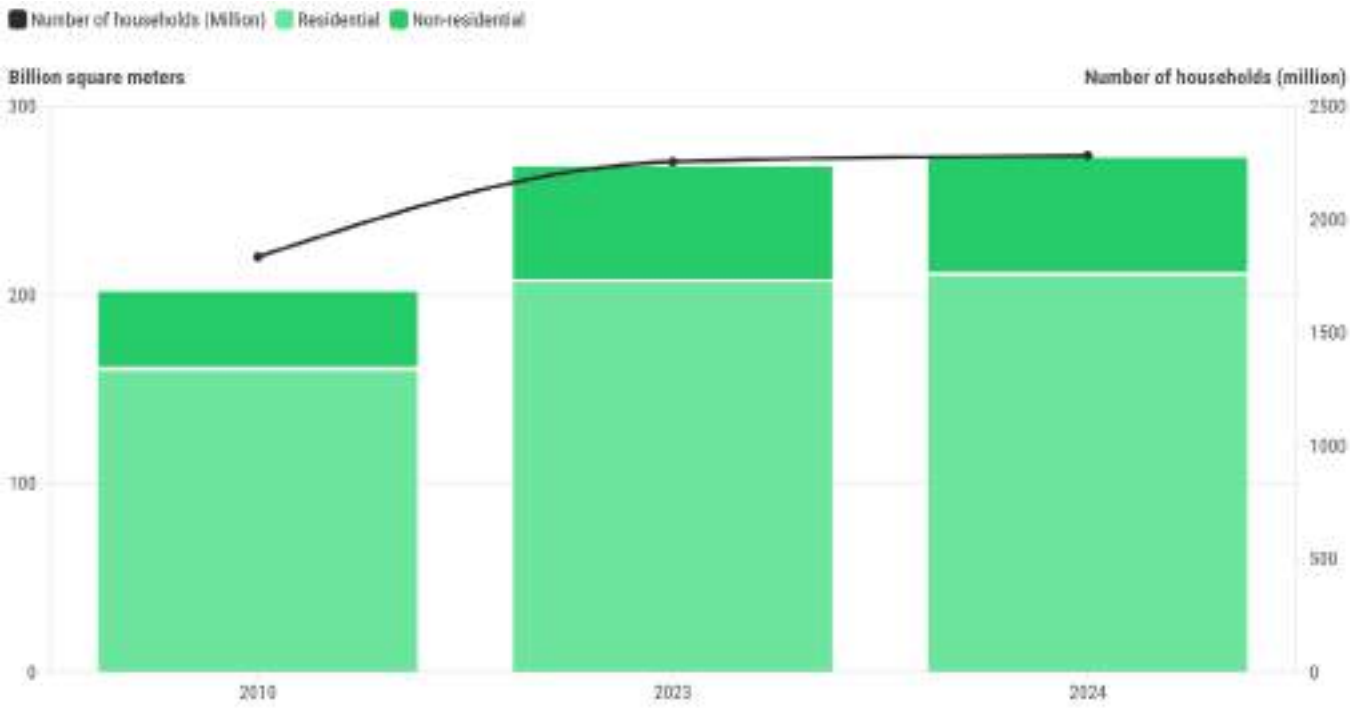


Figure 9. Global floorspace between residential and non-residential buildings (Adapted from IEA 2025g)

Despite regional differences in construction activity, residential buildings dominate the global building stock with 77 per cent, while the rest remains non-residential. In 2024, the residential building stock floor area increased 3.4 billion square metres, while the non-residential building stock grew 1.3 billion square metres. The total number of household units increased globally by 1.2 per cent in 2024.

77%
of global building stock is residential

3.4 billion m²
amount residential building stock floor area increased in 2024

1.3 billion m²
amount non-residential building stock floor area increased in 2024

1.2%
global increase in household units 2024

However, widespread estimates on new and retrofitted buildings are lacking. This limits our understanding of what buildings are being constructed globally and, critically, their quality and capacity to address and withstand climate change. Governments should establish the infrastructure to collect and aggregate data to better understand the growth of new floor area, retrofitting rates, the repurposing of buildings, and vacancy levels.

2.2
The construction market and cost inflation

The buildings and construction sector represents around 11-13 per cent of global GDP (UNEP 2026). As construction activity expands, cost pressures influence both the pace and type of new development, with inflation trends shaping investment decisions worldwide.


Photo: Unsplash

After peaking in 2022, global construction cost inflation eased sharply, reflecting the gradual resolution of pandemic-related supply chain constraints.[4] Residential construction inflation, for example, fell from 15.7 per cent in 2022 to 4.1 per cent in 2024 and is projected to stabilise around 3.9 to 4.0 per cent through 2025 and 2026 (Turner and Townsend 2025).

However, regional patterns remain uneven. For example, Europe and the United Kingdom recorded some of the lowest inflation rates in 2024, averaging 2.9 and 3.0 per cent, respectively, while North America registered 3.6 per cent. The Asia Pacific region averaged 3.4 per cent, with labour shortages driving 5 to 6 per cent inflation rates in Japan and India, compared with subdued conditions in China, Viet Nam, Singapore and South Korea (Turner and Townsend 2025).

Other markets experienced significantly elevated construction inflation due to macroeconomic instability and currency volatility. In Buenos Aires, material prices and labour costs rose sharply by 26 per cent and 116 per cent respectively, though they are projected to decline in 2025 (Turner and Townsend 2025). In Lagos, headline construction inflation is forecast to average 30.5 per cent year on year in 2025 (Turner and Townsend 2025). In the Middle East, construction inflation is anticipated to range between 4.0 and 7.0 per cent in 2025, with Riyadh, Abu Dhabi and Dubai forecasting 5.0 per cent increases driven by sustained project demand and skilled labour shortages (Turner and Townsend 2025).

Residential construction inflation is projected to stabilise around

3.9 - 4%

through 2025 and 2026

Construction costs directly influence the prices of new buildings. Across regions, residential property price trends have begun to reflect these dynamics. Following a post-pandemic dip, residential property price inflation has regained momentum in some parts of the world (see Figure 10). In the European Union, for example, house prices rebounded 5.5 per cent year-on-year in the third quarter of 2025 following interest rate reductions (Biehl et al. 2025).

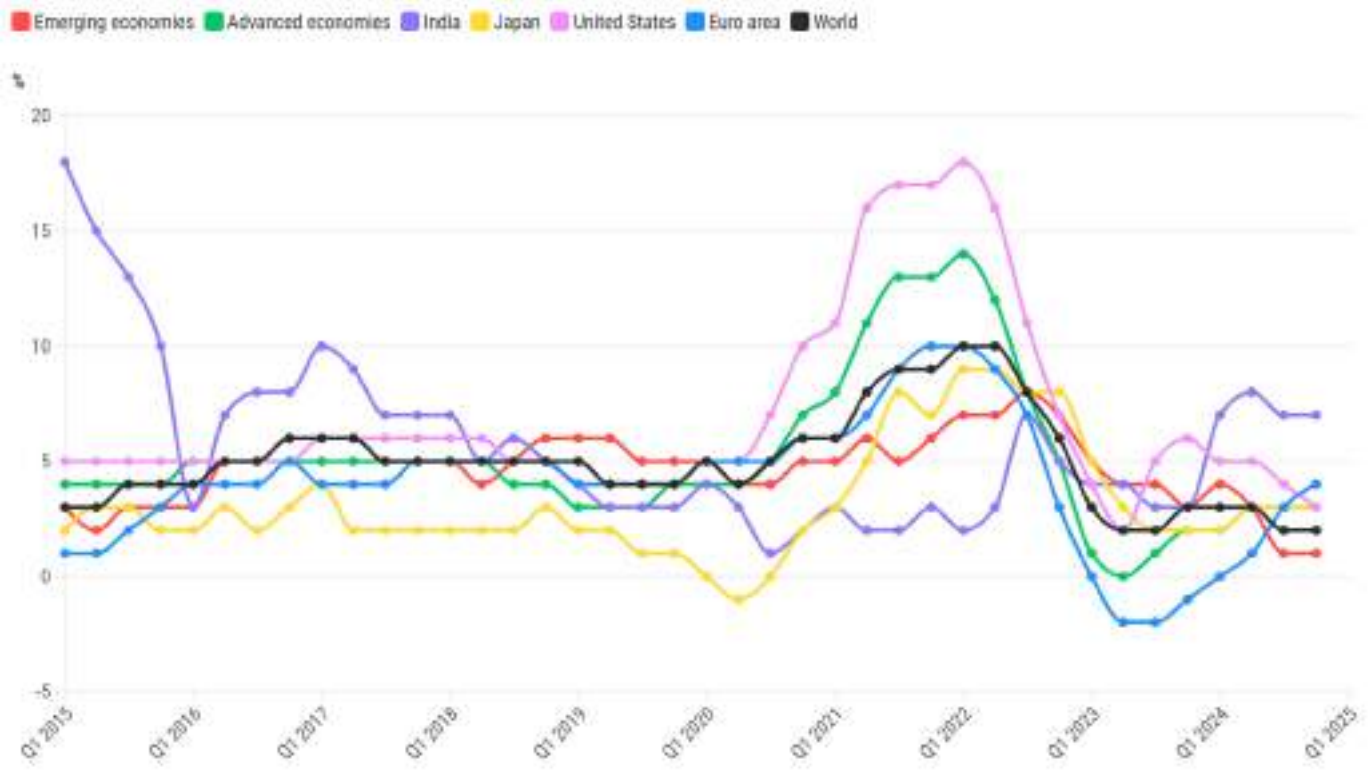


Figure 10. Residential property price inflation in key global markets Q1-2015 to Q4-2024 (Bank for International Settlements 2025)

2.3
The buildings and construction sector and the growing housing affordability crisis

This expansion of floor area and new construction activities are putting more pressure on raw materials extraction, energy demand and the emissions associated with material supply chains and the operation of buildings (see **Sections 3, 4, and 5**).

This expansion of floor area and new construction activities are putting increasing pressure on raw materials extraction, energy demand and the emissions associated with material supply chains and the operation of buildings (see Sections 3, 4, and 5). Given that the housing sector represents more than three-quarters of building floor area and accounts for 70 per cent of total buildings' energy demand, it plays a central role in driving these pressures and therefore has a key role to play in reducing the climate impacts of the buildings and construction sector.

At the same time, a growing affordability crisis is compromising access to adequate housing for millions of people worldwide. In many regions, particularly in rapidly urbanising economies, informal housing remains widespread, with around 1 billion people living in informal settlements globally, adding complexity to both affordability and climate resilience challenges (UN-Habitat 2022).

Addressing this crisis requires taking into account both the housing sector's contribution to climate change and rising temperatures' impacts on housing access and affordability. Such synergies are crucial to transform buildings and construction into a zero-emission, efficient, resilient, and socially just sector. For more details see Box 1.

The housing sector accounts for

77%+

total buildings' floor area

70%

total buildings' energy demand

Photo: Unsplash

BOX 1

A deep dive into the housing affordability crisis

Housing affordability is a major global challenge affecting a diversity of people – including those in homelessness, temporary housing and informal and migration settlements – as well as public provisions for social housing and market-driven development of housing for low- and middle-income households. Within this continuum, women are over-represented among low-income renters, single-parent households, elderly populations, and informal settlement residents, and face additional barriers such as pay gaps and limited access to finance, which further constrain their ability to access adequate housing (UN-Habitat 2025).

The recent Belém Call for Action reiterated that climate change exacerbates the housing crisis in multiple ways, such as increasing extreme weather risks to vulnerable dwellings, raising construction and material costs through resource scarcity, amplifying energy demands for cooling and heating in inadequate structures, displacing communities via floods and heatwaves, and widening affordability gaps for low-income households and compounding existing inequalities.

A whole host of transformative policy solutions are needed to address the main causes and drivers of this crisis, including addressing land access and land rights, urbanisation, the financialization of the housing market and inadequate zoning and land distribution policies among others.

Viewing the housing affordability crisis together with the climate crisis provides an opportunity to harness synergies and address both challenges simultaneously. A detailed deep dive and a selection of case studies to be published as a complementary deep dive to this edition of the GSRBC will show how::

- **Scaling solutions** that support low-income households' access to adequate housing have a large-scale impact on climate protection;
- **Improved infrastructure planning** at the urban or neighbourhood level can support climate resilience;
- **Affordable housing** can rely on nature-based solutions, new or traditional materials, circular economy practices and conversions of existing buildings to avoid exposure to economic and other external cris that can hike prices and disrupt supply chains;
- **New business models** that better value social and environmental benefits may help to tackle the structural drivers of unaffordable housing.

To guide policymaking, it is critical to measure and track progress in all its dimensions.

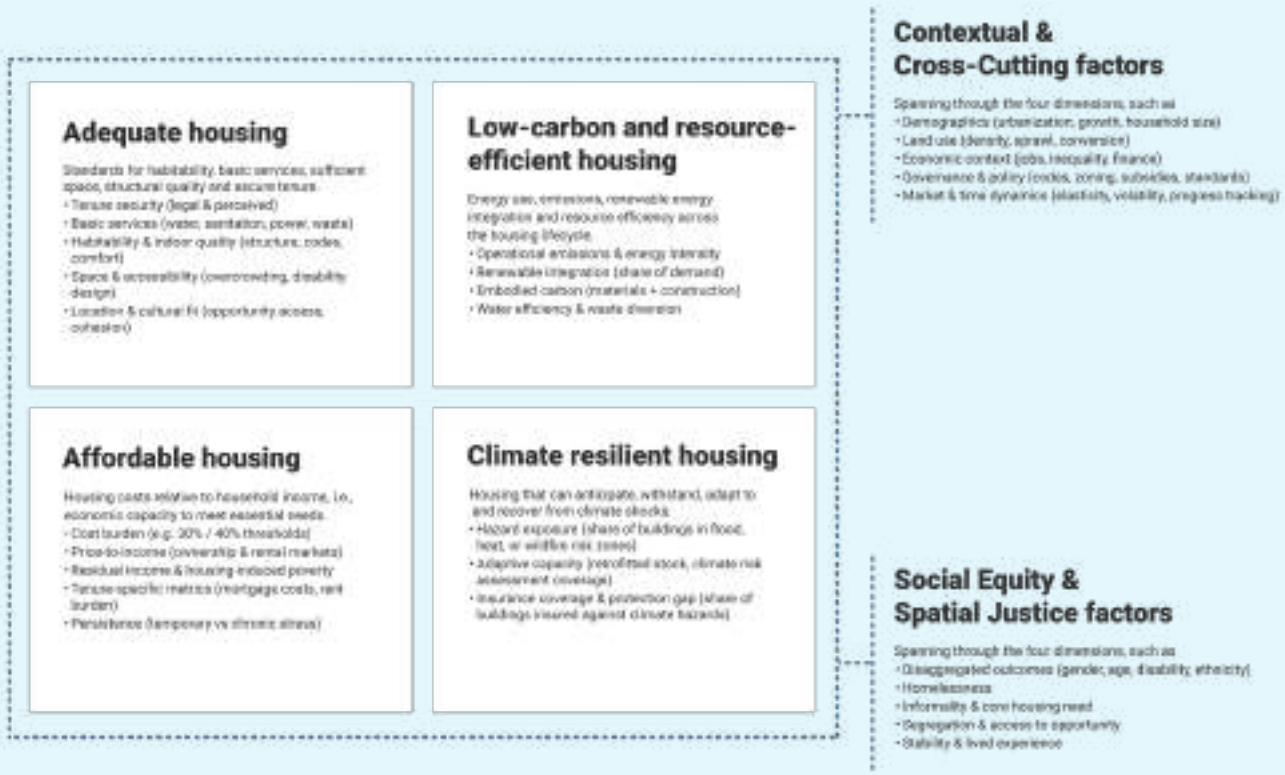


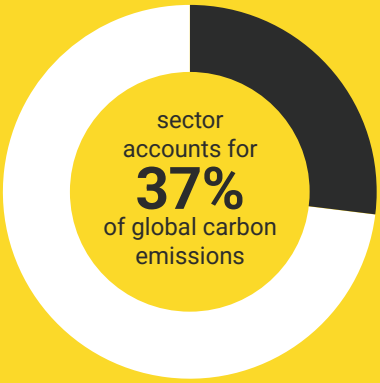
Figure 11. Framework for organising measurement around interconnected thematic elements related to housing affordability, adequacy and sustainability (Based on GSRBC authors internal analysis)

3 Buildings and construction sector carbon emissions

Photo: Unsplash

The buildings and construction sector accounts for around 37 per cent of global carbon emissions (UNEP 2023), driven by growing demand for new building materials and energy link to some of the trends discussed in **Section 2**.

This section examines how these trends translate into substantial embodied and operational emissions, underscoring the sector's outsized climate footprint and the urgent need for decarbonisation.



KEY TAKEAWAYS:

The buildings and construction sector has the largest material footprint of any sector, driving nearly 50 per cent of global material extraction. The life cycle of these materials results in significant emissions, with cement, steel and aluminium accounting for a large share. Governments must reduce buildings' embodied emissions by adopting emissions requirements.

Globally, carbon emissions from cement, steel and aluminium used in buildings alone accounted for 9 per cent of global emissions in 2024. These emissions have not changed significantly through the years, remaining around 2.1 $GtCO_2$, showing the urgency to establish policies to address these emissions in the construction sector.

Global operational emissions from buildings have increased more slowly than energy demand, with trends that may differ at a regional or national level. Between 2015 and 2024, operational emissions rose by 6.5 per cent while energy demand increased by an estimated 11 per cent. This relative decoupling has been driven by the growing share of renewables in electricity and heat generation and reduced coal use, alongside modest improvements in buildings' energy intensity.

Operational emissions are still rising when they need to fall significantly to meet global climate goals, however. Operational emissions grew by 6.5 per cent from 2015 to 2024, whereas they needed to fall by 31.6 per cent over the same period to align with a 2050 net-zero pathway. To reverse this trend, governments must adopt plans to phase-out fossil-fuel heating and cooking, scale deep retrofitting and leverage public procurement to demand low-carbon energy solutions across the supply chain.

To align with a net-zero pathway by 2050, operational emissions need to more than halve by 2030

3.1
New buildings and their embodied carbon emissions

The UNEP circularity platform shows that the buildings and construction sector is responsible for nearly 50 per cent of global material extraction, making it the highest material footprint of any sector globally (UNEP 2026).

Cement, clinker, bricks, clay, steel, aluminium, copper, and similar metals account for 55 per cent of material-related emissions (Li et al. 2025).

Embodied carbon emissions from buildings, which arise across the life cycle of materials – from extraction and production to transport, construction and use as well as decommissioning and disposal – are a major source of global greenhouse gas (GHG) emissions.

The IEA estimates that carbon emissions from cement, steel and aluminium used in buildings alone accounted for about 2.1 $GtCO_2$, 9 per cent of global emissions in 2024 (IEA 2025). While the Intergovernmental Panel on Climate Change (IPCC) estimates that GHG embodied emissions of steel and cement are around 2.2 $GtCO_2e$ (IPCC 2023). These figures are not intended to be compared directly, but are presented to illustrate differences between available estimates. One of the limitations of existing estimates often relates to the lack of available data from different material industries. While more data may be available from the cement, steel and aluminium sectors, data from other industrial activities, uncertainties on material flows and emissions intensities, pose a barrier to more complete estimations of embodied emissions of the global building stock.

Based on the IEA estimations, carbon embodied emissions from cement, steel and aluminium represent around 18 per cent of total building sector emissions, despite excluding other materials and life-cycle stages. If other materials (e.g. glass, gypsum, wood) and life-cycle stages were included, the share might be higher. Figure 12 shows that the embodied emissions from cement, steel and aluminium used in buildings have remained unchanged since 2015, showing the urgency to establish policies to address these emissions in the construction sector. Following existing standards such as ISO 21930/EN15978 combined with national databases covering materials' embodied emissions can help improve estimations (see Section 3.3).

Cement and steel are the dominant drivers of embodied emissions in newly constructed buildings. Steel production shows wide variation in carbon intensity. Global average emissions are about 1.85-2.0 tonnes CO_2 per tonne of steel, whereas electric arc furnaces using recycled scrap emit around 1.1 tonnes CO_2 per tonne – approximately 55 per cent less than conventional basic oxygen furnaces (OECD 2025).

Transforming the construction value chain through measures such as increasing the use of low-carbon materials and material reuse/recycling, reducing resource intensity, adequate sizing of spaces, optimised design, and including these principles in procurement is therefore essential to curb whole-life emissions in both new builds and retrofitting of existing buildings. Overall, building materials are set to dominate climate change, UNEP, GlobalABC, and Yale (UNEP 2023) recommend to prioritise three urgent pathways for the decarbonisation:

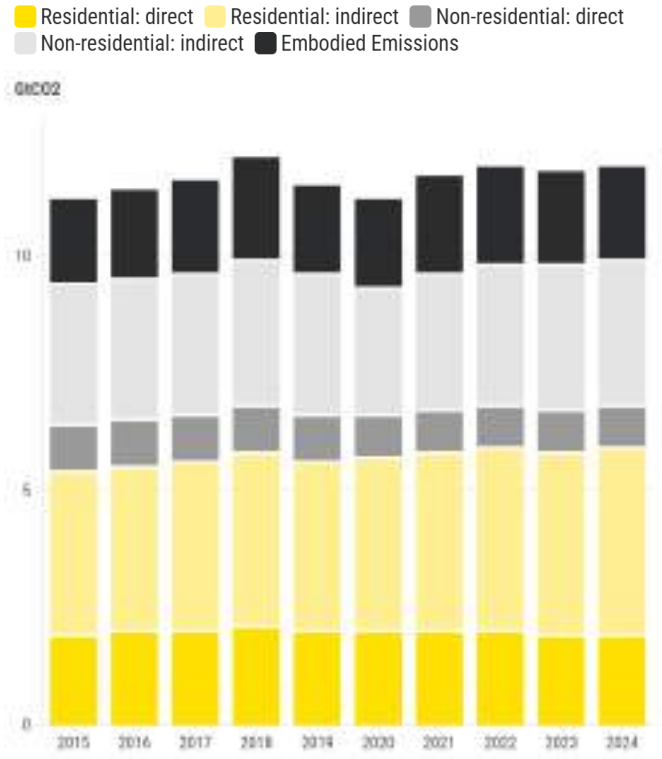


Figure 12. Global buildings-related carbon emissions 2015-2024, embodied emissions from cement, steel and aluminium used in buildings(Based on (IEA 2025g))

Avoid, Shift, and Improve:

Avoid the extraction and production of raw materials by galvanising a circular economy, which requires building with less materials through better data-driven design, while reusing buildings and recycled materials wherever feasible.

Shift to regenerative material practices wherever possible by using ethically-produced low carbon earth- and bio-based building materials (such as sustainably sourced bricks, timber, bamboo, agricultural and forest detritus) whenever possible.

Improve methods to radically decarbonise conventional materials such as concrete, steel and aluminium, and only use these non-renewable, carbon-intensive, extractive materials when absolutely necessary.

Despite the importance of embodied carbon, operational emissions remain the largest and best-tracked component of buildings' life cycle impacts and are analysed in subsequent sections.

BOX 2

Revising the global estimate of embodied emissions

While estimations of operational carbon emissions in buildings are common and consistently reported across the global building stock, that is not the case for embodied emissions.

The lack of consistency is partly be due to the larger and more complicated scope of embodied emissions, which comprise material extraction through to demolition, reuse and recovery (see Figure 13), and many thousands of types of materials being used for buildings construction. A recent review of embodied carbon studies shows that there is a broad range of stages covered, though most focus on the production stage (A1-A3) and underscores the lack of completeness and granularity of existing reporting and that estimates are impacted by differences in methods and scope (Lavagna et al. 2025).

For example, lifetime embodied emissions intensity of recently constructed European buildings can range from 310 $kgCO_2e/m^2$ for Northern European buildings to 700 $kgCO_2e/m^2$ for buildings in Eastern Europe, when considering stages A1-A4, B4-B5, and C (OneClickLCA 2021). While in the United States and Canada, recently constructed buildings have emissions intensities between 343–628 $kgCO_2e/m^2$ when considering life-cycle stages A1-A4, B4-B5, C2-C4 (Benke et al. 2025), though numbers globally vary widely.

Worldwide, the embodied carbon intensity of some buildings can be up to 5 times the median value of around 325 $kgCO_2e/m^2$, when considering the embodied carbon production only stages A1-A3 (Röck et al. 2024).

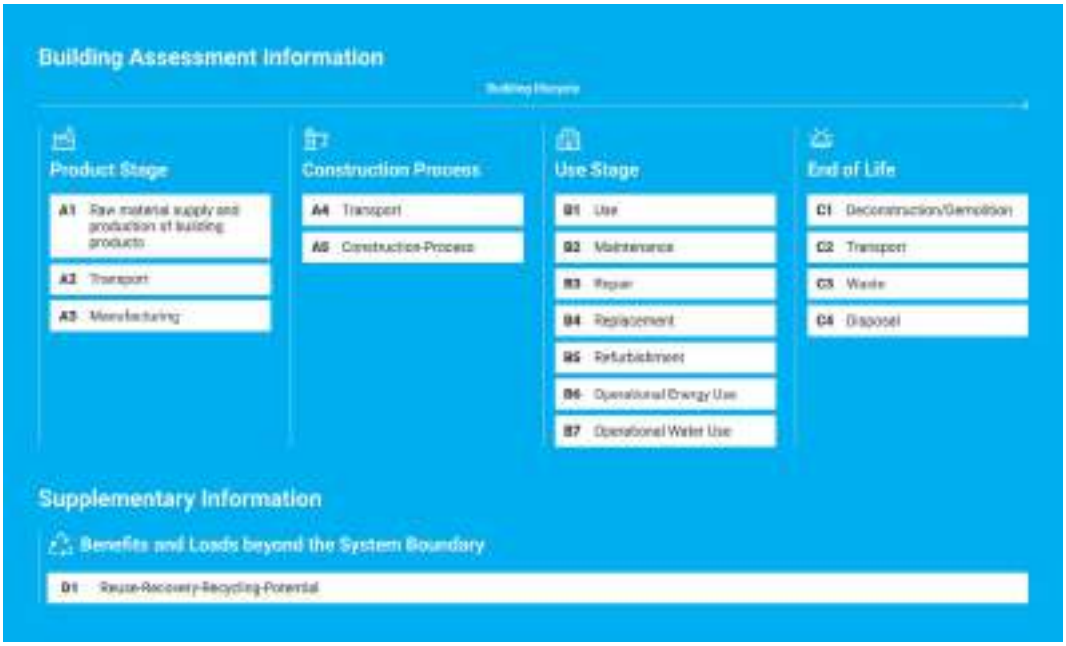


Figure 13. Whole life cycle stages of a building according to the EN 15978 standard (Based on (British Standards Institution 2011))

General challenges for estimating the global building stock's embodied emissions include:

- The lack of data on the number, characteristics and typologies of new or retrofitted buildings;
- Uncertainties in allocating emissions across life cycle stages;
- The lack of data on all the materials used in buildings, with most estimates only focusing on a limited set of materials, e.g. cement, steel and aluminium;
- The scarcity of national or regional emissions inventories, often requiring proxies to represent construction practices.

Addressing these challenges will require further improvement in data collection and estimation using consistent methods. Examples include the ISO 21930 for Environmental Product Declarations for construction products and services. EN 15978 Sustainability of construction works that defines the environmental performance of new and existing buildings over their entire life cycle.

A new analysis, which combines global buildings' footprint using GIS data, construction typologies and archetypes, and material emissions inventories, will provide updated global emissions values as part of a project supporting the GSRBC and funded by the UK government. This analysis will be published as a complementary deep dive to this edition of the GSRBC.

BOX 3

Examples of where buildings' embodied emissions are being addressed through regulation

In 2025, Denmark's requirement for maximum embodied carbon in new buildings was tightened to an average of 7.1 kg CO_2e/m²/year (EEA 2025a), and it will continue to decrease over time (Buro Happold 2025).


Photo: Unsplash


Photo: Unsplash

Similarly, in France, maximum operational and embodied emissions of newly constructed single-family homes and multi-unit buildings were lowered in 2025 to an average of 530 and 650 kg CO_2/m² respectively over the entire lifetime of the building (France, Ministère de la Transition écologique et de la Cohésion des territoires 2020) – similar levels to those of Denmark.[5]

In the European Union, an act passed in 2025 mandates future buildings to disclose their life cycle global warming potential (European Commission 2025), encouraging the use of environmental product declarations, which provide standardised and independently verified data on the climate impacts of building materials throughout their life cycle.


Photo: Unsplash


Photo: Unsplash

3.2
Operational emissions from existing buildings

The operational emissions of buildings have increased by 6.5 per cent since 2015, reaching 9.9 $GtCO_2$ in 2024 and accounting for around 26 per cent of global energy-related CO_2 emissions (IEA 2025). To stay on track for achieving net-zero emissions by 2050, operational emissions should have reduced by 31.6 per cent over that period.

INCREASED 6.5% SINCE 2015

9.9 $GtCO_2$

operational emissions of buildings in 2024

31.6%

amount operational emissions should have reduced to achieve net-zero emissions by 2050

Indicator

To monitor the decarbonisation of the global building stock, the GSRBC tracks the carbon emissions (in CO_2) from the production of direct (produced on the building site) and indirect energy (e.g. from electricity and heat produced off-site), for the energy supply of the global building stock. This is known as the buildings' operational emissions indicator.

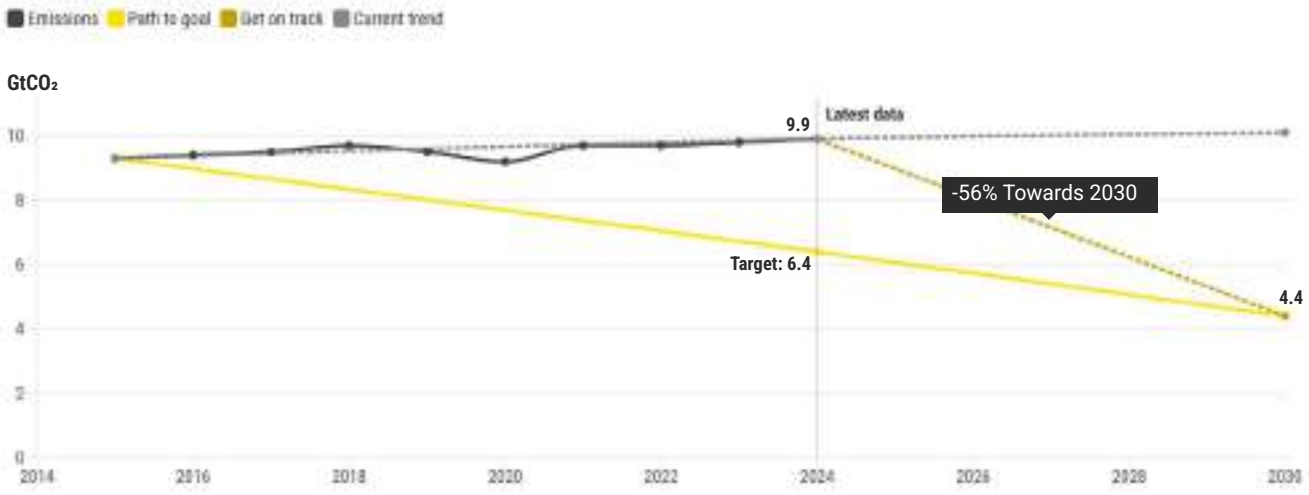


Figure 14. Buildings' operational emissions 2015-2024, path to goal, and path to get on track until 2030 (Based on (IEA 2025e) and GSRBC authors internal analysis)

Change observed from 2023 to 2024:

Buildings' operational emissions increased by 1 per cent in 2024.

Change observed from 2015 to 2024:

Buildings' operational emissions have increased by 6.5 per cent since 2015, reaching 9.9 $GtCO_2$ in 2024. To stay on track to achieve net-zero emissions by 2050, emissions should have instead reduced by 31.6 per cent.

Towards 2030:

To align the sector with a 2050 net-zero pathway, buildings' operational emissions must decline to 4.4 $GtCO_2$ by 2030 – a 56 per cent reduction from 2024 levels.

In 2024, direct emissions from the production of energy, electricity and heat in buildings globally declined by just 0.4 per cent, indicating continued reliance on fossil fuels, particularly natural gas and oil (see Figure 15). At the same time, indirect emissions - such as those from electricity and heat produced off-site - increased by 2 per cent in 2024.

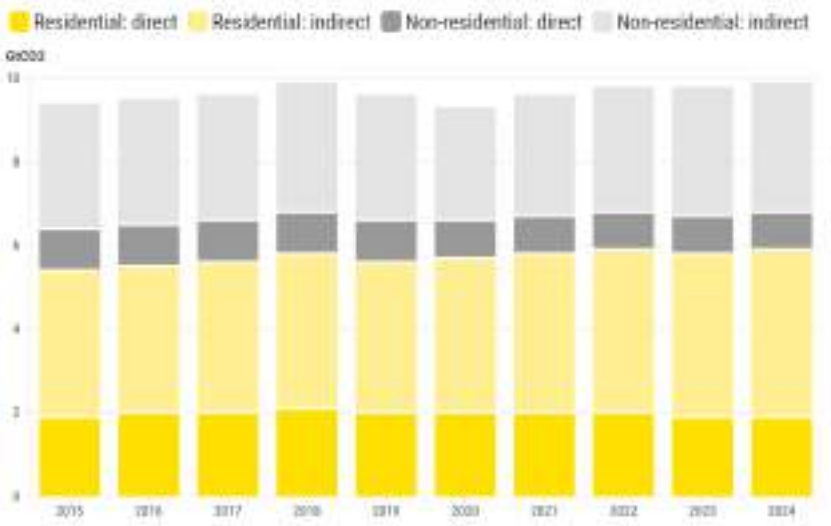


Figure 15. Global buildings-related carbon emissions 2015-2024 by emission source (Based on (IEA 2025g))

↘ DECREASED IN 2024

0.4%

decline in **direct emissions** from buildings

↗ INCREASED IN 2024

2%

increase in **indirect emissions** from buildings

Operational emissions have grown more slowly than buildings' overall energy demand between 2015 and 2024, however (IEA 2025). This relative decoupling reflects the electrification of space heating, water heating and cooking as well as the declining carbon intensity of electricity and heat, driven by the rapid expansion of renewables and reduced coal use in power generation (see **Sections 4 and 5** for further details on end-uses and other energy trends).

The IEA highlights that without faster deployment of high-efficiency electric technologies, stronger clean-power expansion and policies targeting fossil fuel phase-out in buildings, operational emissions are unlikely to fall at the pace required to align with climate targets (see further details on fuel use and electrification trends in **Sections 4 and 5**).

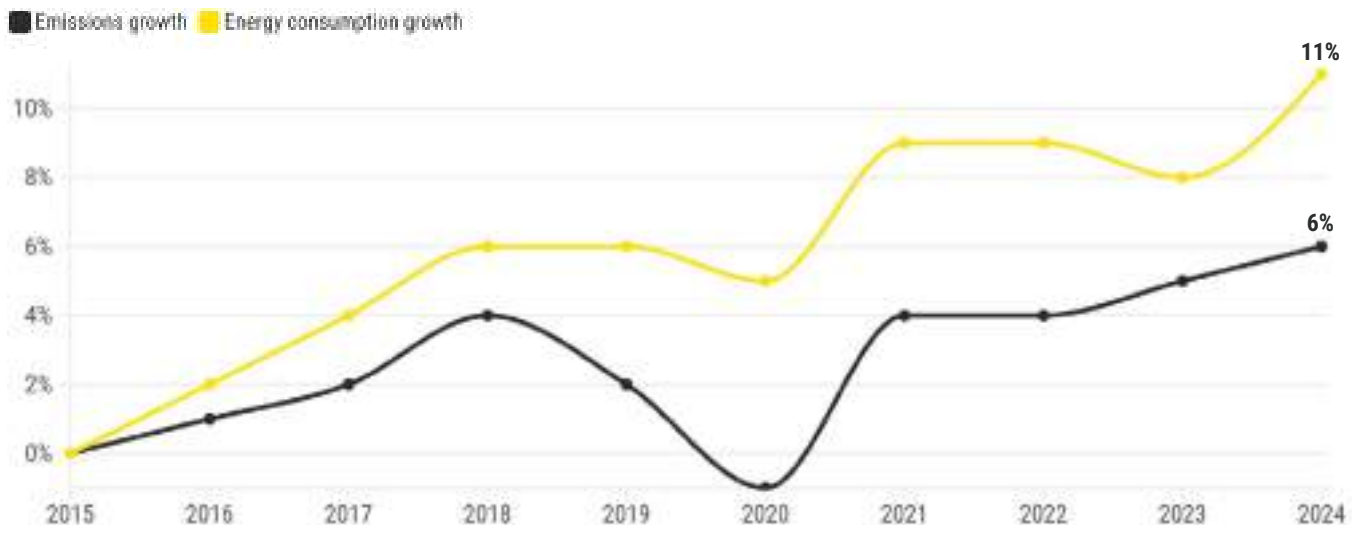


Figure 16. Percentage growth of operational emissions and energy consumption of the global buildings stock in reference to 2015 (Based on (IEA 2025e), (IEA 2025g) and GSRBC authors internal analysis)

3.3
Towards 2030: reducing buildings' operational emissions

Considering that buildings' operational emissions reached 9.9 $GtCO_2$ in 2024, 3.5 $GtCO_2$ higher than the needed value for that year, and that the gap between these emissions and the path to decarbonisation by 2050 keeps increasing, additional policies are needed to reduce these emissions faster and more effectively.

What can governments do now to stop the rising trend of emissions from buildings, both operational and embodied?

RECOMMENDATION

Establish or update the framework for buildings emissions from buildings

1. Develop a strategy for deploying emissions requirements for existing and new buildings,[6] including defining clear principles for how to measure, disclose and limit life cycle emissions.

2. Such principles need to be coupled with national databases covering materials' embodied emissions and buildings' energy performance. Data about building typologies, age distribution, renovation cycles, materials intensities and emission factors are crucial starting points to enable a better characterisation of the building stock and construction activities.

3. Establish clear national measurements and disclosure frameworks, including harmonised definitions, to report on near-zero, zero-emissions and resilient buildings, based on existing regional and international definitions.[7]


Photo: Unsplash

4. Integrate behavioural change, energy efficiency and sufficiency principles, electrification and renewable energy targets into building policies.[8]

5. Develop explicit, time-bound plans to phase out fossil fuels from buildings' energy supply, limiting their use in new buildings.

RECOMMENDATION

Accelerate decarbonisation actions

1. Mandate near-zero and zero-emissions performance for new buildings and accelerate deep retrofits of existing buildings, prioritising the most carbon-intensive and energy-intensive segments of the stock.

2. Use public procurement to require high-energy performance and low-carbon energy supply in publicly-funded buildings and programmes.

3. Accelerate the decarbonisation of electricity systems and the electrification of heating and cooking.

4. Measures to reduce energy demand and decarbonise the building energy supply are crucial in the efforts to reduce on these topics please see **Sections 4.2 and 5.2**.

BOX 4

Examples of where buildings' operational emissions are reducing

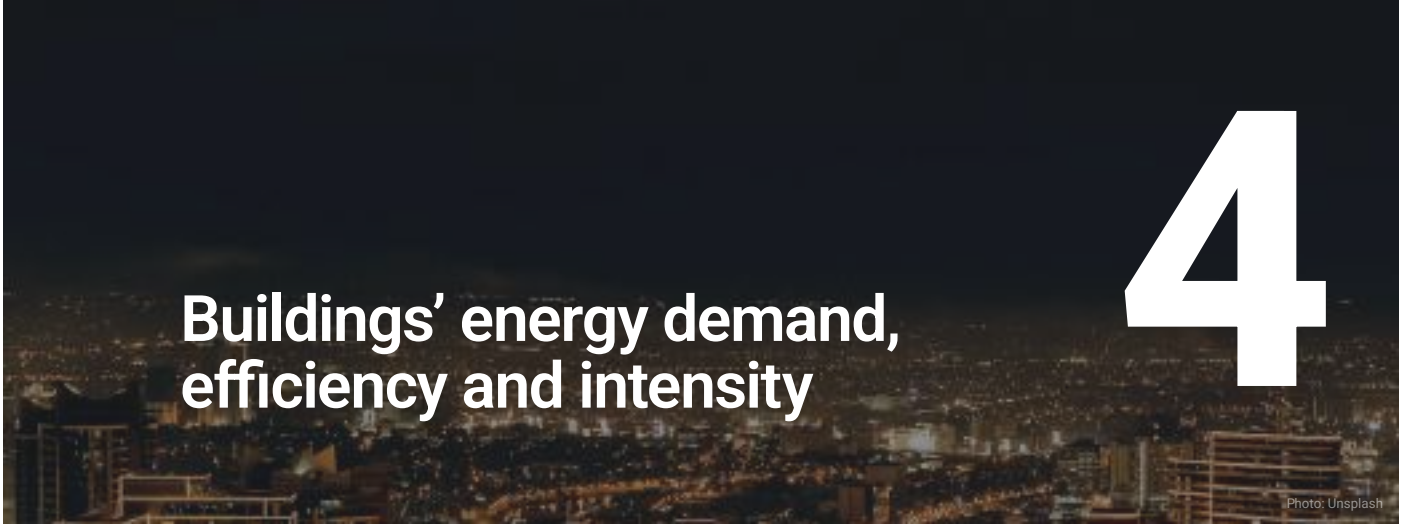
Progress in reducing emissions from the buildings sector varies across regions, with European member states showing the largest reported cuts. Between 2005 and 2023, **Sweden, Denmark, Greece, Slovenia and Finland** achieved emissions reductions ranging from 57 to 72 per cent (EEA 2025b). Sweden and Denmark are projected to deliver reductions exceeding 80 per cent by 2030 relative to 2005 levels under additional policy measures (EEA 2025b).

In the **United Kingdom**, GHG emissions from the buildings sector reduced 25 per cent between 1990 and 2024. Over this period, emissions from residential and public buildings decreased by 32 and 44 per cent respectively, while emissions from commercial buildings increased by 7 per cent (Climate Change Committee 2025). Although progress has varied in recent years, the Warm Homes Plan aims to invest GBP 13.2 billion through 2030 (United Kingdom, Department for Energy Security and Net Zero 2026).

Germany's residential sector emissions declined by around 1.6 per cent in 2024 (Wehnemann et al. 2025), largely due to weather effects. The same year, retrofitting rates fell to 0.7 per cent amid policy uncertainty, well below the 2 per cent annual rate required to meet 2030 targets (Bundesverband energieeffiziente Gebäudehülle e.V. 2025). Heat pump sales reached around 284,000 in 2025, 40 per cent lower than 2023 levels (Sören Amelang 2026).

Canada's buildings sector recorded a 1.2 per cent emissions decline in 2024 (Sawyer and Stiebert 2025), substantially slower than the 6.4 per cent reduction achieved in 2023. The slower rate was attributed to colder weather in 2024 relative to 2023.

Overall, operational building carbon emissions are falling steadily where mitigation policy is stable and regulatory frameworks are robust, while in jurisdictions with policy uncertainty and where short-term drivers dominate, progress becomes volatile and insufficient to meet 2030 targets.



4 Buildings' energy demand, efficiency and intensity

Photo: Unsplash

The buildings and construction sector is one of the single largest consumers of energy globally. Building operations require large amounts of energy across a range of fuels and represent a significant share of global carbon emissions as previously described in **Section 3**.

Energy efficiency measures are needed to reduce buildings' energy demand and their operational carbon emissions. This section examines the trends shaping global buildings' energy demand and efficiency.

KEY TAKEAWAYS:

In 2024, the buildings and construction sector accounted for 28 per cent of global energy consumption, reinforcing its position as one of the world's largest energy users and marking a 2 per cent increase from 2023.

INCREASING

28%

of Global energy consumption in 2024 was used by buildings and construction sector

The total energy demand of buildings has not grown as fast as the expansion of the building stock. Between 2015 and 2024, global floor area grew by 20 per cent while buildings' final energy demand increased by around 11 per cent during the same period. Without improvements in energy efficiency, the increase in energy demand would have been twice as large.

However, in 2024, progress stalled, with building energy intensity remaining at 129 kWh/m², the expansion of new floor area, population growth, weather effects, and rising demand for energy services such as heating, cooling, appliances use and plug load are potentially offsetting improvements in efficiency gains, particularly in emerging economies experiencing rapid urbanisation and increasing living standards.

Overall, buildings' energy intensity has reduced by 8.5 per cent since 2015. This represents only around half of the reductions needed to stay on track to achieve net-zero emissions by 2050. To stay on track with a 2050 net-zero pathway, the energy intensity of the global building stock needs to fall by 25 per cent by 2030 compared to current levels.

To accelerate the reduction in energy intensity, governments should update building energy codes to include energy efficiency and sufficiency principles, set minimum performance standards for existing buildings, and promote passive heating and cooling designs and retrofits to reduce energy needs.

4.1
Buildings' energy intensity

Overall, the energy intensity of buildings has reduced by 8.5 per cent since 2015 – less than half the 19 per cent reduction needed to stay on track to achieve net-zero emissions by 2050. In 2024, the energy intensity of buildings remained stable, indicating a stagnation in efficiency gains, though factors such as weather are estimated to have had a small effect (IEA 2025e).

Indicator

Reducing energy intensity lowers operational energy demand and emissions and reduces energy costs and exposure to price shocks. To monitor the progress of improved energy efficiency in buildings, this indicator tracks the operational energy intensity of the global building stock in terms of energy demand per floor area, expressed in kWh/m².[9]

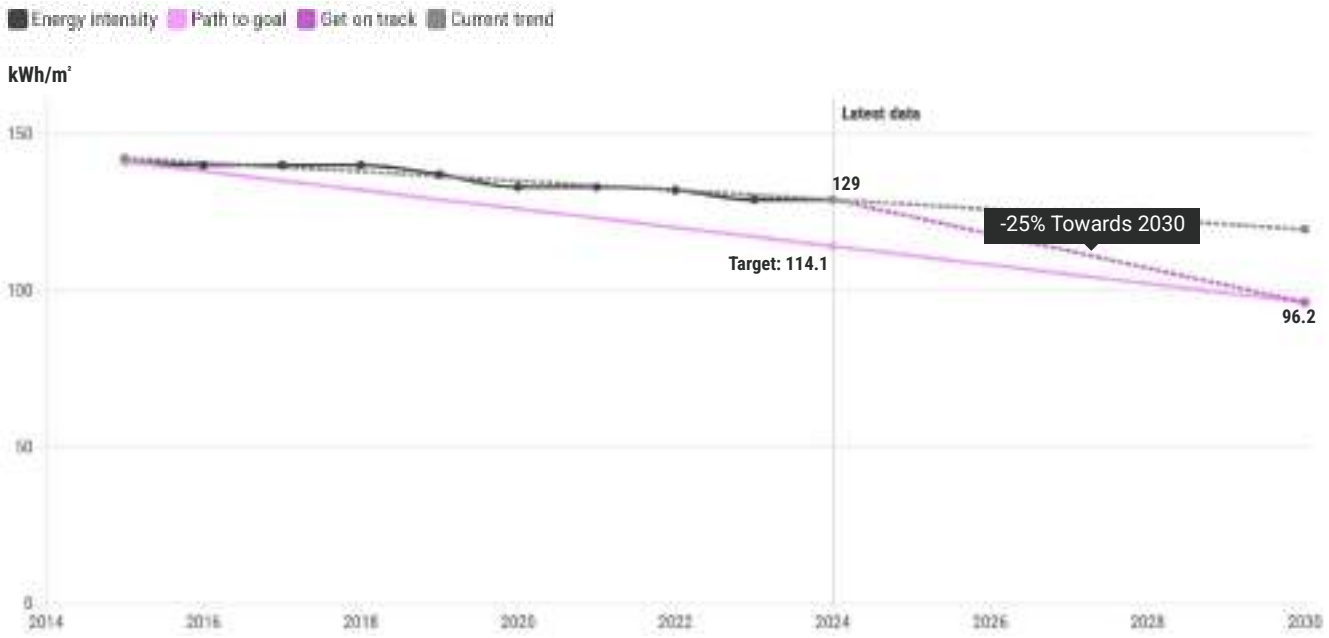


Figure 17. Buildings' energy intensity 2015-2024, path to goal, and path to get on track until 2030 (Based on (IEA 2025e) and GSRBC authors internal analysis)

Change observed from 2023 to 2024:

Buildings' energy intensity remained stable at 129 kWh/m² in 2024.

Change observed from 2015 to 2024:

Buildings' energy intensity has reduced by 8.5 per cent since 2015, around half of the 19 per cent reduction that was needed to stay on track to achieve net-zero emissions by 2050.

Towards 2030:

To align the sector with a 2050 net-zero pathway, the energy intensity of buildings needs to fall to 96.2 kWh/m² by 2030 – a 25 per cent reduction on 2024 levels.

Rapid growth in the global building stock continues to drive energy demand. Buildings energy demand increased by 2 per cent compared to 2023 (IEA 2025) driven by growth in floor area, consumer products demand, and some extreme weather effects. Residential buildings account for 70 per cent of total buildings energy demand, while commercial and public buildings comprise the remaining 30 per cent (IEA 2025).

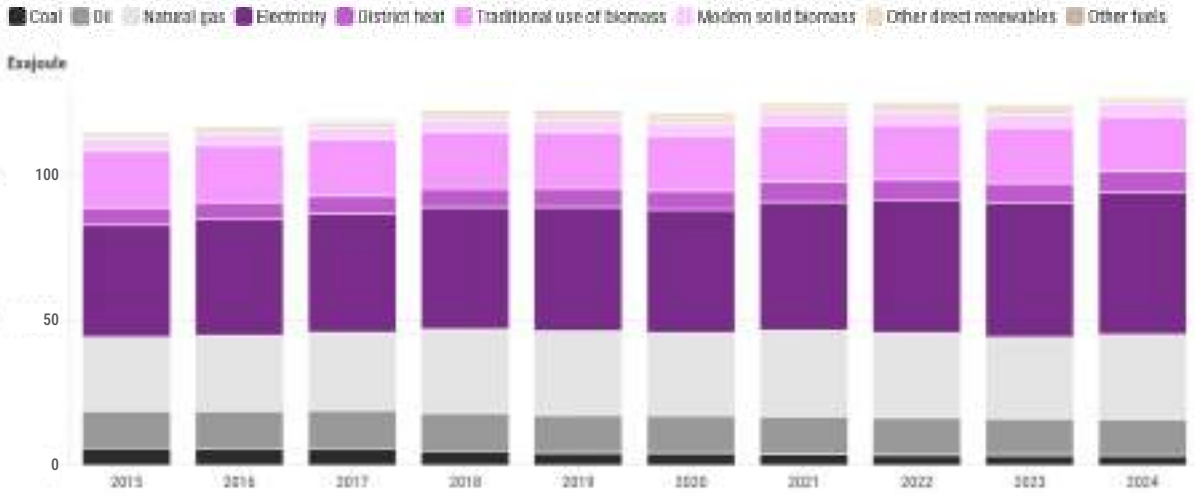


Figure 18. Energy consumption in buildings by fuel 2010–2024 (Based on (IEA 2025g))

Regional Insights

Despite rising energy demand from buildings globally, the regional picture is uneven. Between 2010 and 2024, the largest growth in building energy demand in absolute terms occurred in the Asia-Pacific region, driven by rapid urbanisation, expanding floor area and surging appliance ownership and cooling demand (IEA 2025).

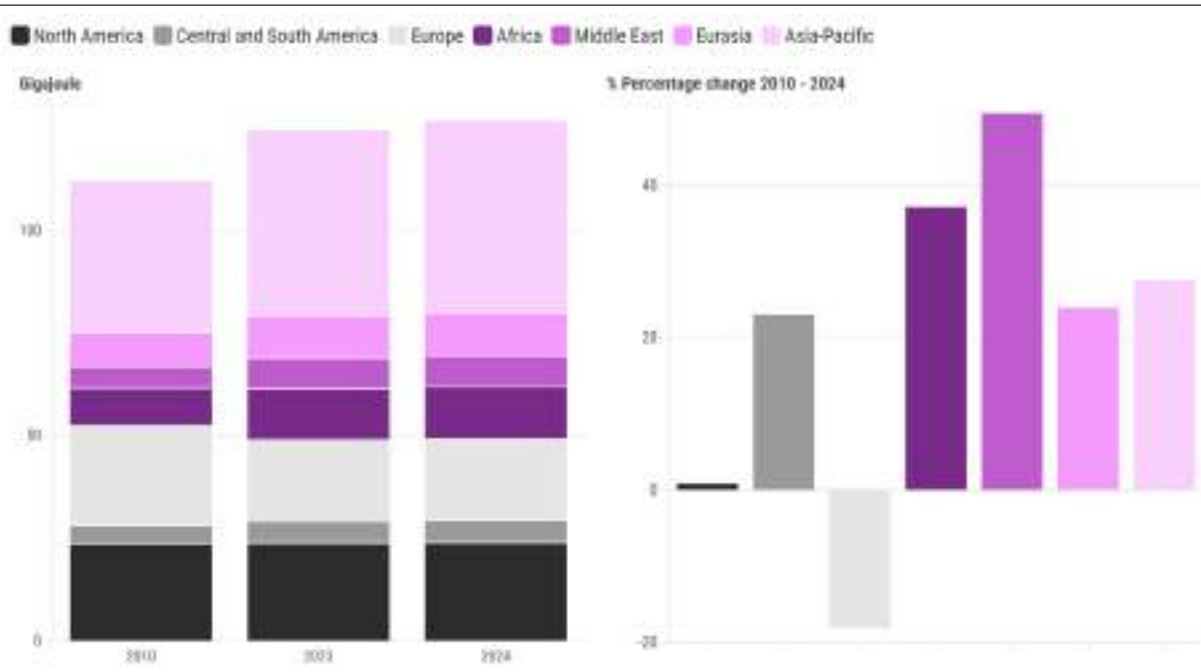


Figure 19. Buildings total final energy consumption by region, 2010 to 2024 (Based on (IEA 2025g))

Europe was the only region to record a reduction - 18 per cent decrease - over the same period, mainly due to stronger efficiency standards and slower floor-area growth. In relative terms, the **Middle East** saw the largest increase at 49 per cent.

49%

Increase in buildings energy consumption in the Middle East

China is the country with the largest building energy consumption, which grew by an additional 4 per cent between 2023 and 2024 (IEA 2025). The energy intensity of heating has more than halved in the country in the past 20 years as coal has been replaced with electrical systems (EMBER 2025). However, economic development has led to an increased use of household appliances and air conditioners, driving growing energy consumption in residential buildings (Tsinghua University 2025).

In **North America**, building energy consumption has remained broadly stable, increasing by 1 per cent between 2010 and 2024. This reflects an older building stock, comparatively weaker regulatory frameworks and fewer financial incentives for comprehensive retrofits compared to Europe.

Demand in **Sub-Saharan Africa** rose by 37 per cent over the same period, with growth slowing down to 1 per cent between 2023 and 2024 (IEA 2025). The increase reflects expanding energy access rather than declining efficiency. The region accounts for about 10 per cent of global building energy demand despite being home to roughly 20 per cent of the world's population. Much of the growth reflects expanding energy access rather than declining efficiency: electricity access increased from 39 per cent in 2015 to 53 per cent in 2023. Around 600 million people on the continent still lacked access to electricity in 2024, mainly in rural areas and in highly populated countries such as Nigeria, the Democratic Republic of Congo, and Ethiopia (IEA 2025b).

The residential sector

As described in Section 2.3, the residential sector plays a key role within the efforts to decarbonise the buildings and construction sector. In residential buildings, space heating is the largest single driver of total building energy demand (see Figure 20) and accounts for 46 per cent of buildings' energy use when combined with water heating (IEA 2025g).

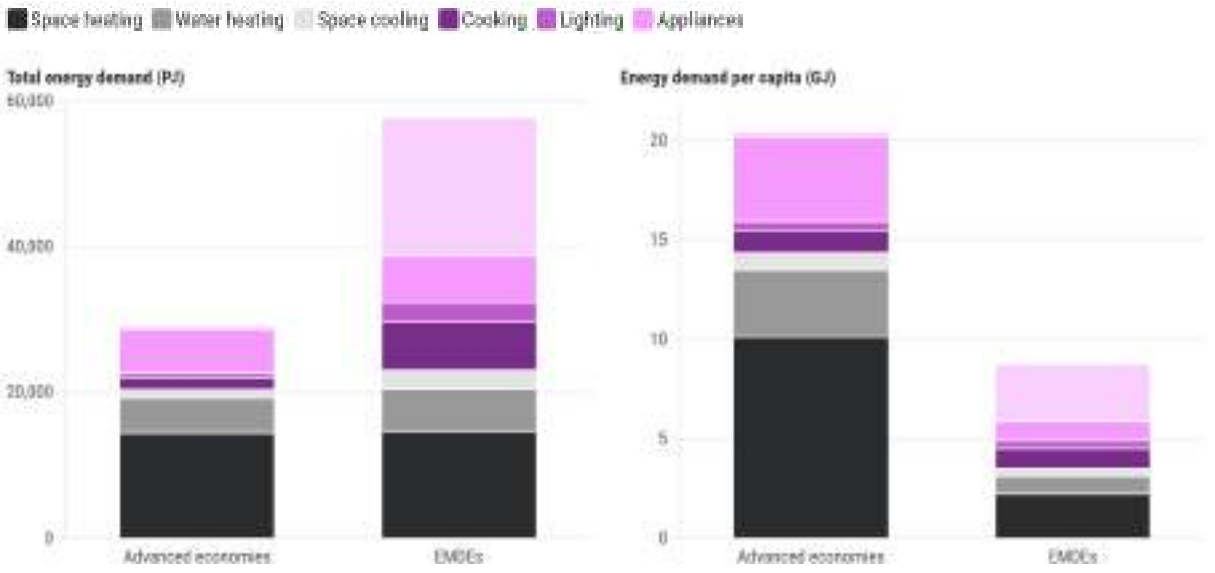


Figure 20. Total and per capita energy demand by end use service demand in the residential sector in 2024 for advanced and emerging and developing economies (EMDE) (Based on (IEA 2025a))

The traditional use of biomass for cooking accounts for approximately 22 per cent of energy demand, with virtually all of it - 96 per cent - coming from emerging and developing economies, underscoring persistent disparities in access to affordable clean fuels. In regions heavily reliant on traditional biomass, women and girls bear the primary responsibility for cooking and collecting fuel, exposing them to health risks from indoor air pollution and limiting time for education and economic opportunities (Clean Cooking Alliance 2023). Transitioning to clean cooking and efficient buildings is therefore both a climate and gender equality priority.

Cooling represents 4 per cent of total energy use in buildings in advanced and emerging economies and since 2015 has grown by 70 per cent (UNEP 2025a). This increase was driven by rising global temperatures, population growth in tropical regions, increasing household incomes, and the intensification of heat island effects through urbanisation (IEA 2025a). However, demand for cooling technology is still unequal, with the lowest income deciles having less than 20 per cent access to cooling equipment in Southeast Asia and less than 1 per cent in Sub-Saharan Africa. Addressing the growing cooling demand depends on appropriate policy adoption. The UNEP Cooling Watch Report suggests that, by 2050, the adoption of more efficient cooling technologies and stronger regulations (e.g. minimum energy performance standards) and managed growth through passive design measures and retrofits could drive emissions from cooling 64 per cent below business-as-usual levels, and to near-zero with rapid decarbonisation of the power sector (UNEP 2025a). The Cooling Watch 2025 report outlines four steps to unlocking cooling efficiency improvements, which are:

4%

Cooling represents 4 per cent of total energy use in buildings in advanced and emerging economies

1. minimise cooling loads (e.g. through passive building design);
2. use low-energy cooling (e.g. through fans in place of air conditioning);
3. maximise the energy efficiency of new and existing equipment (e.g. through variable-speed compressors; improved control and maintenance);
4. implement a rapid phase-down of HFC refrigerants.

Photo: Unsplash

Prioritising passive cooling strategies such as external shading, natural ventilation and white roofs to reflect heat as well as low-energy cooling systems such as fans and evaporative coolers can help minimise electricity demand (UNEP's Global Cooling Watch) and expand access to cooling sustainably. To reduce the climate impact of cooling systems, equipment needs to be selected, operated and maintained adequately so it performs efficiently and the use of hydrofluorocarbons as refrigerants should be rapidly phased out and replaced with low global warming potential refrigerants, including natural refrigerants (UNEP 2025a; European Commission 2026).

Growing building floor area vs energy demand

Overall, between 2015 and 2024, the building energy demand did not grow as fast as the floor area of the global building stock. Global floor area increased by 20 per cent between 2015 and 2024, while energy demand rose by 11 per cent. This indicates that efficiency improvements have helped moderate energy demand growth.

However, in 2024, progress stalled, with building energy intensity remaining at 129 kWh/m², the expansion of new floor area, population growth and rising demand for energy services such as heating, cooling, appliance use and plug load are potentially offsetting improvements in efficiency gains, particularly in emerging economies experiencing rapid urbanisation and increasing living standards (IEA 2025a). As a result, despite efficiency gains, the buildings sector remains one of the largest energy consumers globally, accounting for 28 per cent of total energy use in 2024.

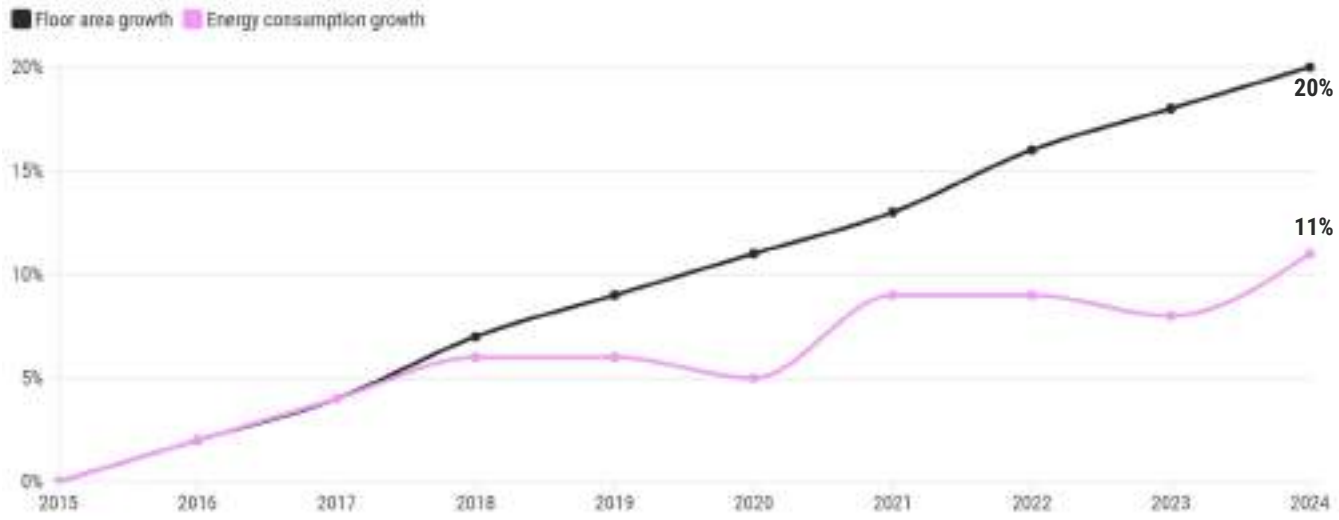


Figure 21. Percentage growth of floor area and energy consumption of the global buildings stock in reference to 2015 (Based on (IEA 2025e) and GSRBC authors internal analysis)

In addition to energy efficiency measures, sufficiency actions at the individual and building stock level are also crucial. Sufficiency is a set of policy measures and daily practices which avoid the demand for energy, materials, land, water, and other natural resources, while delivering well-being for all within planetary boundaries. Applying sufficiency principles to buildings requires i) optimising the use of buildings, ii) repurposing unused existing ones, iii) prioritising multi-family homes over single-family buildings and iv) adjusting the size of buildings to the evolving needs of households (Yamina Saheb 2021).

Moreover, addressing the reduction of energy and improvement of buildings' energy intensity should be coupled with efforts on the energy supply side such as electrification and the decarbonisation of the energy mix through the deployment of renewables energies. For a detailed analysis of the buildings energy supply and dedicated recommendations, see **Section 5.**

4.2
Towards 2030: faster reduction of buildings' energy

To align the sector with the 2050 net-zero pathway, the energy intensity of buildings needs to fall to 96.2 kWh/m² by 2030, equivalent to a 25 per cent reduction from 2024 levels.[10]

What can governments do now to overcome the recently observed stagnation in buildings' energy intensity?

RECOMMENDATION

Establish or update the regulatory framework

1. Update building energy codes to include energy efficiency and sufficiency principles and integrate similar principles in other regulations. These principles should be deployed both at the individual (e.g. adequate sizing of spaces, prioritisation of shared spaces where suitable) and building stock levels (e.g. adequate spatial planning, optimised land use, repurposing of existing stock). This can contribute to addressing the observed trend of growth in floor area and energy demand offsetting efficiency gains.

2. Adopt binding minimum energy performance standards for new and existing buildings. This should be backed by measures to scale deep retrofitting and the deployment of energy-efficient improvements, ensure effective implementation, and strengthen integration across the construction value-chain. Such measures should be locally tailored to balance operational energy efficiency, resource use, renewable integration, and embodied emissions.

RECOMMENDATION

Accelerate improvement actions

1. Introduce energy efficiency and sufficiency requirements for procurement and financial and technical support schemes, combined with requirements for electrification and the deployment of renewable energy where appropriate (For recommendations on the buildings' energy supply side, see **Section 5.2**).

2. Promote passive thermal comfort strategies to meet heating, cooling and ventilation demands with minimal energy, recognising the role of neighbourhood- and urban-scale measures (e.g. vegetation, shading and urban design) in reducing cooling demand.


Photo: Unsplash

3. Strengthen delivery capacity through workforce training and streamlined permitting to accelerate retrofitting and electrification before 2030.

BOX 5

Examples of where building energy intensity is reducing

Switzerland is among the countries that have achieved the largest improvements in building energy efficiency over the past two decades. Across both the residential and service sectors, energy intensity declined by around 2 per cent per year on average, driven mainly by improvements in space heating efficiency. A tax of 120 CHF per tonne of carbon on certain fossil fuels has helped to fund efficiency programmes, such as the Building Programme, which provides grants for retrofits and to replace inefficient heating systems (Switzerland, Federal Office for the Environment 2025). In addition, policies require minimum energy performance standards for new buildings, which cover the building envelope, the installation of renewable energy and the type of fuel used. This has been recently extended to include retrofitting obligations for some existing buildings (EnDK 2025).


Photo: Unsplash


Photo: Unsplash

Japan also significantly reduced its building energy use. Between 2000 and 2023, energy intensity fell by 27 per cent in the residential sector (IEA 2021; IEA 2025d). The country relied on energy standards with more stringent restrictions put on large buildings and financial incentives to improve energy performance (Japan, Ministry of Land, Infrastructure, Transport and Tourism 2016). In addition, the promotion of energy-efficient appliances and air conditioners seems to have played a major role in improving the sector's efficiency (Bank of Japan 2023).

5

Buildings' energy supply, renewable energy share and electrification

Photo: Unsplash

Energy supplied to operate buildings accounts for a substantial share of global energy-related carbon emissions, reflecting the sectors' heavy reliance on fossil fuels for heating, cooling and power. The rapid decarbonisation of buildings' energy supply through the scaled deployment of renewable-generated heat and electricity is critical to cut operational emissions in line with net-zero pathways. This section examines trends related to buildings' energy supply, with a focus on renewable energy.

KEY TAKEAWAYS:

Demand for fossil fuels in buildings has remained stable, despite continued growth in buildings' final energy demand. The expansion of renewables and electricity demand has increased covering part of the new demand. Nevertheless, while coal demand has reduced, reliance on oil and natural gas has increased.

INCREASING

4.7 percentage points

rise in share of renewables in buildings' energy supply since 2015

The share of renewables in buildings' energy supply has increased too slowly to stay aligned with climate goals. It has risen by 4.7 percentage points since 2015 – only around a quarter of the increase needed over the period to stay on track to achieve net-zero emissions by 2050. While the share of renewables in global electricity generation rose 9 per cent over the same time period, the contribution of on-site renewable generation to buildings' energy supply has remained relatively static, hovering at approximately 5 per cent throughout the period from 2015 to 2024.

The share of renewables in buildings' power supply needs to increase from 17 per cent to 46 per cent by 2030 from 2024 levels to put the sector in line with net-zero by 2050. To speed up the adoption of on-site renewables, governments should consider renewable heat and electricity in buildings as a technology deployment challenge, not solely as a power-sector issue.

2030 TARGET

46%

target share of renewables in buildings' power supply by 2030

5.1
Share of renewable energy in buildings

The share of renewables in buildings' energy supply increased– rising by 4.7 percentage points and reaching 17.3 per cent in 2024 – but not at the pace required. However, the increase represents only around a quarter of the 20 percentage points increase that was needed over the period to stay on track to achieve net-zero emissions by 2050.

Indicator

Renewable energy sources are among the cleanest and lowest-carbon forms of energy. The indicator measures the share of renewables in final energy demand in buildings using an estimate of the proportion of grid-supplied electricity generated from renewable sources.

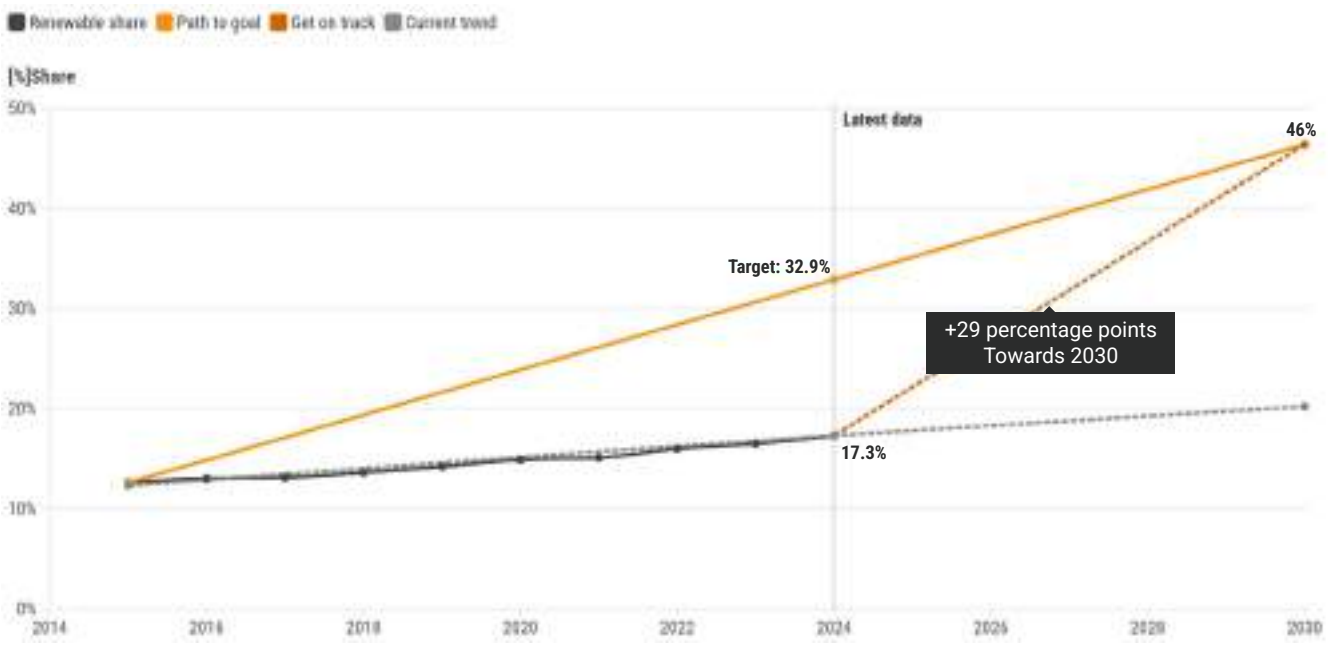


Figure 22. Renewable share 2015-2024, path to goal, and path to get on track until 2030 (Based on (IEA 2025c) and GSRBC authors internal analysis)

Change observed from 2023 to 2024:

The renewable share in buildings' final energy demand increased 0.9 percentage points in 2024.

Change observed from 2015 to 2024:

The renewable share in energy demand in buildings has increased by 4.7 percentage points since 2015, only around a quarter of the 20 percentage points rise that was needed to stay on track to achieve net-zero emissions by 2050.

Towards 2030:

To align the sector with a 2050 net-zero pathway, the share of renewables in buildings' energy demand must rise to 46 per cent by 2030 – a 29 percentage points increase from 2024 levels.

From 2015 to 2024, fossil fuel consumption, including oil, gas, and coal, as well as biomass, remained broadly stable. Over this period, rising natural gas use largely offset declines in other fossil fuels through fuel replacement. This shows the continued reliance on fossil fuels, especially in emerging market and developing economies, where natural gas is widely used in cooking and water heating, and policies aim to expand gas distribution networks (IEA 2025g).The demand of traditional fossil fuels for most building energy demand services highlights the challenge of addressing existing networks. For example, in 2025, 40 per cent of European residential demand was for gas use, though electricity system access is more widespread and offers an opportunity to support building electrification with infrastructure improvement and adoption of technologies such as heat pumps.


Photo: Unsplash

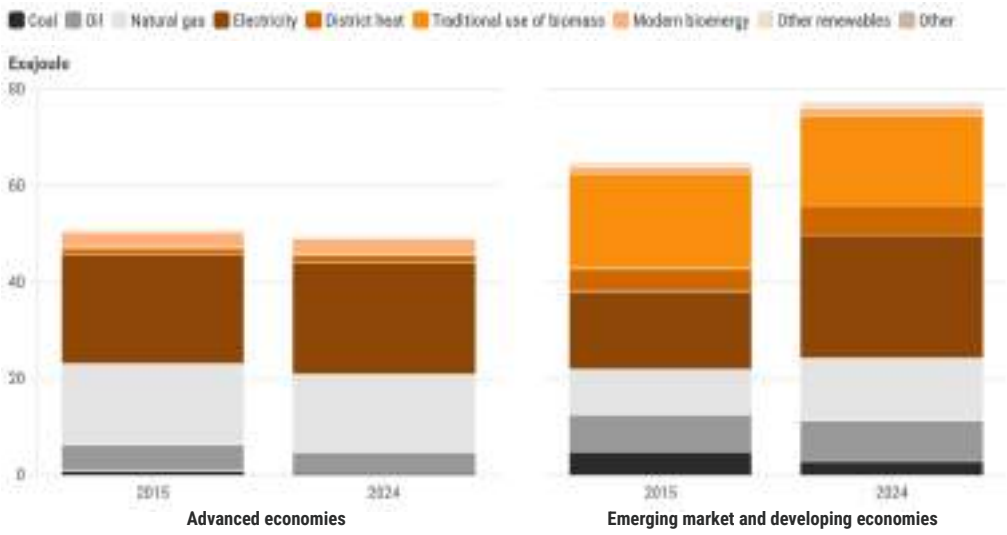


Figure 23. Building sector total final energy consumption in 2015 and 2024 in advanced and emerging and developing economies (IEA 2025g).

Electrification (based on electricity generated by renewable energies) is a key strategy to decarbonise building energy use. Electrifying buildings cuts carbon emissions when powered by low-carbon electricity and boosts efficiency, as electric technologies like heat pumps deliver 3–5 times more heat energy than the electricity they consume – far surpassing fossil-fuel boilers (United States, Department of Energy 2025).

Technologies such as heat pumps are being deployed to contribute to electrification. Global heat pump sales increased between 2019 and 2023, especially in Europe and China (Figure 24). Even though Europe recorded a 17 per cent fall in 2024 due to tightened or delayed incentive programmes, sales in many European countries went up 9 per cent in the first semester of 2025, compared to the same period in 2024 (European Heat Pump Association 2025). In the United States, the heat pump market continued to grow, with an increase of around 11 per cent in 2024 – the fourth consecutive year in which heat pump sales exceeded gas furnace sales (European Heat Pump Association 2025; IEA 2025c).

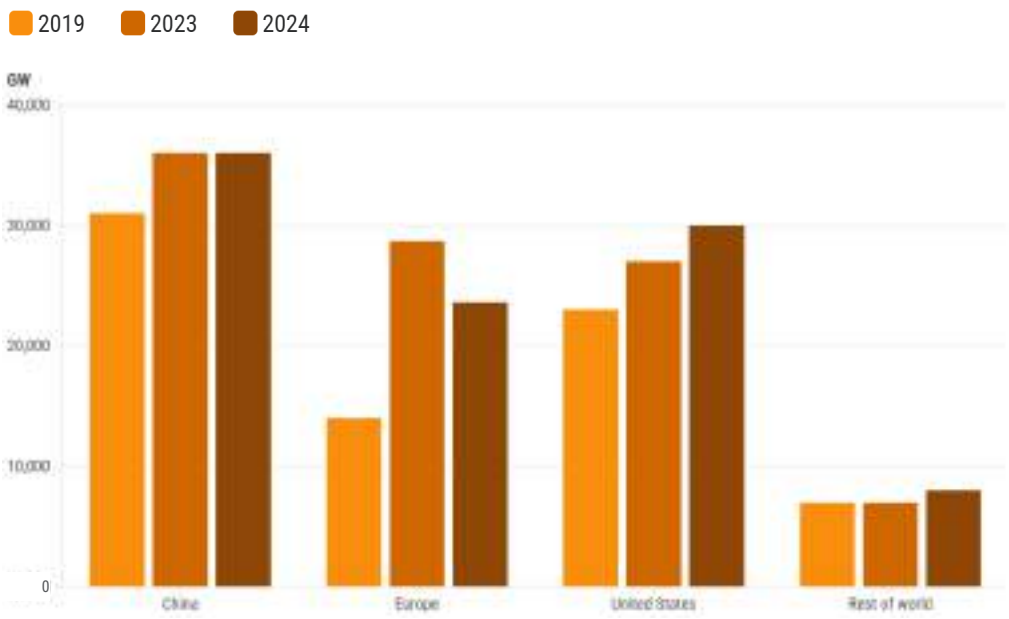


Figure 24. Global heat pump sales in 2019, 2023 and 2024 across the world (IEA 2025a)

Overall, electricity demand in buildings increased by around 26 per cent from 39 EJ in 2015 to 49 EJ in 2024. Differences in the share of electricity and traditional biomass in final energy consumption explain differences between advanced economies and emerging market and developing economies (EMDEs) (see Figure 23). Electricity accounted for about 33 per cent of buildings' final energy consumption in advanced economies, compared with about 23 per cent in EMDEs. Traditional biomass represents less than 1 per cent of consumption in advanced economies, compared with around 15 per cent in EMDEs.

Overall, the share of renewables in global electricity generation rose from 23 per cent to 32 per cent over the same time period. This expansion of renewables in electricity generation was responsible for most of the increase in the share of renewables in building's energy supply observed until 2024. In contrast, the share of energy supply generated by on-site renewables, which is mainly provided by solar on rooftops and balconies, stagnated at around 5 per cent. This is hindering the decarbonisation of energy use in buildings. Showing the urgency to consider renewable heat and electricity in buildings as a technology deployment issues, not solely as a power-sector challenge.

5.2
Towards 2030: increasing the share of renewables in buildings

The share of renewables in buildings' energy supply needs to increase from 17 per cent to 46 per cent by 2030 to align the sector to net-zero by 2050. This represents a 29 percentage points increase compared to 2024 levels.[11] Particularly, the stagnation of on-site renewables need to be tackled.

What can governments do now to increase the share of renewable energies in buildings' energy supply, particularly unlock the deployment of on-site renewables?

RECOMMENDATION

Develop or update clear paths for the deployment of renewables in buildings

1. Design roadmaps for the deployment of renewable energy, including clear targets and policies to phase out fossil fuels, and support the diffusion of clean technologies.
2. Deploy policies to boost the use of local renewable energy, promoting existing and emerging technologies that are appropriate for the local building stock and climate.

RECOMMENDATION

Accelerate deployment of on-site renewables and electrification

1. Couple electrification initiatives in new and existing buildings with clean and renewable electricity supply.

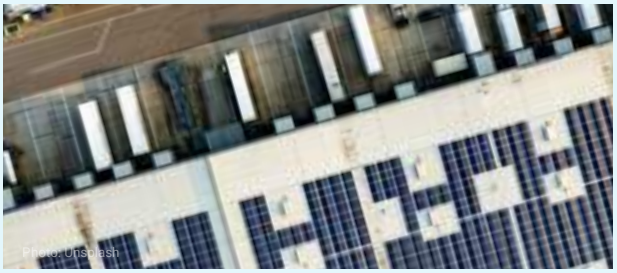


Photo: Unsplash

2. Develop regulatory frameworks to make communities more energy resilient through renewable deployment. This should be coupled with efficiency and sufficiency principles to unlock the full potential of on-site renewables systems.
3. Align space heating and cooling policies to optimise the deployment of efficient in-building technologies.

BOX 6

Examples of where renewables in buildings are growing

In regions with high solar power potential, rooftop solar installations are growing quickly and are becoming a major source of renewable energy in buildings. In **Australia**, more than 300,000 units with a total capacity of 3 GW were installed in 2024, with 115,000 more installed in the first half of 2025, continuing a sustained trend of high rooftop PV capacity additions in recent years (Australia Clean Energy Council 2025).

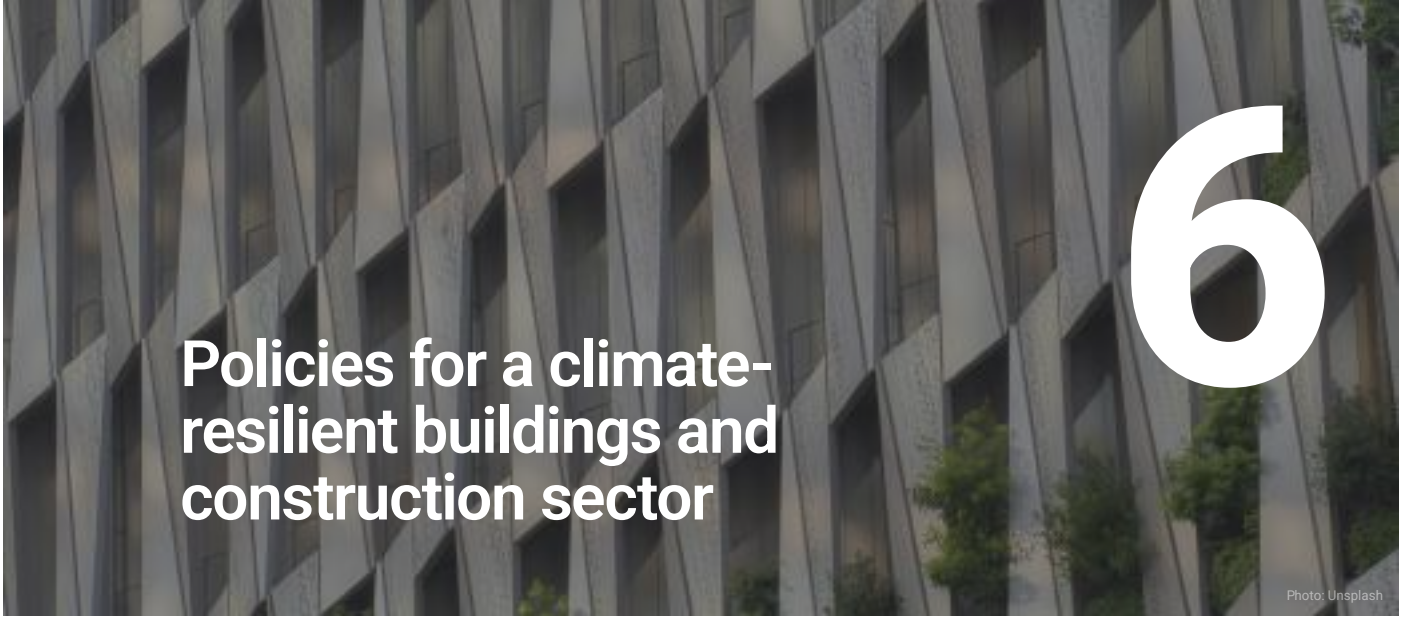
Photo: Unsplash

In **India**, 3.2 GW of additional capacity was installed in 2024 (Publicover 2025), followed by 4.9 GW (Economic Times Energy World 2025) in the first nine months of 2025, a sharp increase from 1.7 GW installed in 2023. This follows the PM Surya Ghar initiative, which provides households with subsidies and loans to install rooftop solar (India, Press Information Bureau 2025).

Photo: Unsplash

In **Pakistan**, between 2024 and 2025, net-metering capacity, where users consume their own electricity, went up from 2.4 GW to 6.1 GW (Jowett 2025). This is a result of tariff-free and cheap solar panel imports from China and progressive electricity pricing which incentivised high-consumption households to generate their own power (WRI 2025). In **Sri Lanka**, rooftop solar capacity saw an 82 per cent increase in installed capacity, from 930 MW in 2024 to 1.7 GW in 2025 (Jameel and Silva 2026).

In **Germany**, amid relatively high domestic electricity prices, balcony solar panels, which are easy to install and inexpensive, represented 430,000 new installations in 2025. In total, almost half of the installed solar capacity was on buildings (Bundesnetzagentur 2026).



6

Policies for a climate-resilient buildings and construction sector

Photo: Unsplash

Countries require a clear policy framework to tackle the diverse construction dynamics analysed in Section 2 and the rising emissions, the slow reduction of buildings' energy intensity, and the required increased of renewables is described in Sections 3, 4, and 5 to transform the buildings and construction sector towards a zero-emission, efficient, resilient, and socially just sector.

Developing comprehensive strategies in Nationally Determined Contributions (NDCs)[12] required under the Paris Agreement represents a key opportunity to guide this transformation. This section looks at the sector's sustainability policies, with a focus on NDCs.

KEY TAKEAWAYS:

Progress in establishing clear and stringent long-term policies to reduce the buildings and construction sector's climate impacts and improve its resilience remains uneven. By 2024, within NDC 2.0 submissions, 20 countries – none of them G20 members – had submitted an NDC 2.0 with an extensive strategy for cutting the sector's emissions, demonstrating that it is possible to integrate sector-specific pathways into national climate planning. But as of January 2026, using a new bar for measuring extensive, no country has yet published extensive strategies for the sector under the new NDC 3.0 round launched in 2025, despite calls for more detailed.[13]

20 countries

have submitted an NDC 2.0 with an extensive strategy for cutting the sector's emissions

No G20 country

has submitted an NDC 2.0 with an extensive strategy for cutting the sector's emissions

NDCs should include climate measures for building energy codes and energy supply, the efficiency of appliances, material supply chains and circularity, urban planning, and finance for the construction sector, alongside commitments to gender-responsive design, implementation and monitoring, including sex-disaggregated data, inclusive consultation processes, and safeguards to prevent disproportionate impacts on women and vulnerable groups.

All G20 countries and at least 75 additional countries should develop an NDC with an extensive building sector strategy by 2030,[14] with others doing so before 2050

6.1
NDCs with an extensive strategy for the buildings and construction sector

NDCs are a pillar of countries' climate policies and describe the actions governments are committed to take to achieve the goals of the Paris Agreement. Analysing NDCs enables the monitoring of national policy efforts to decarbonise buildings and construction.

Indicator

The indicator measures the number of NDCs that address the buildings sector in depth and presents a clear framework to increase the sector's contribution to national decarbonisation. The total is weighted to distinguish between G20 countries and other countries.

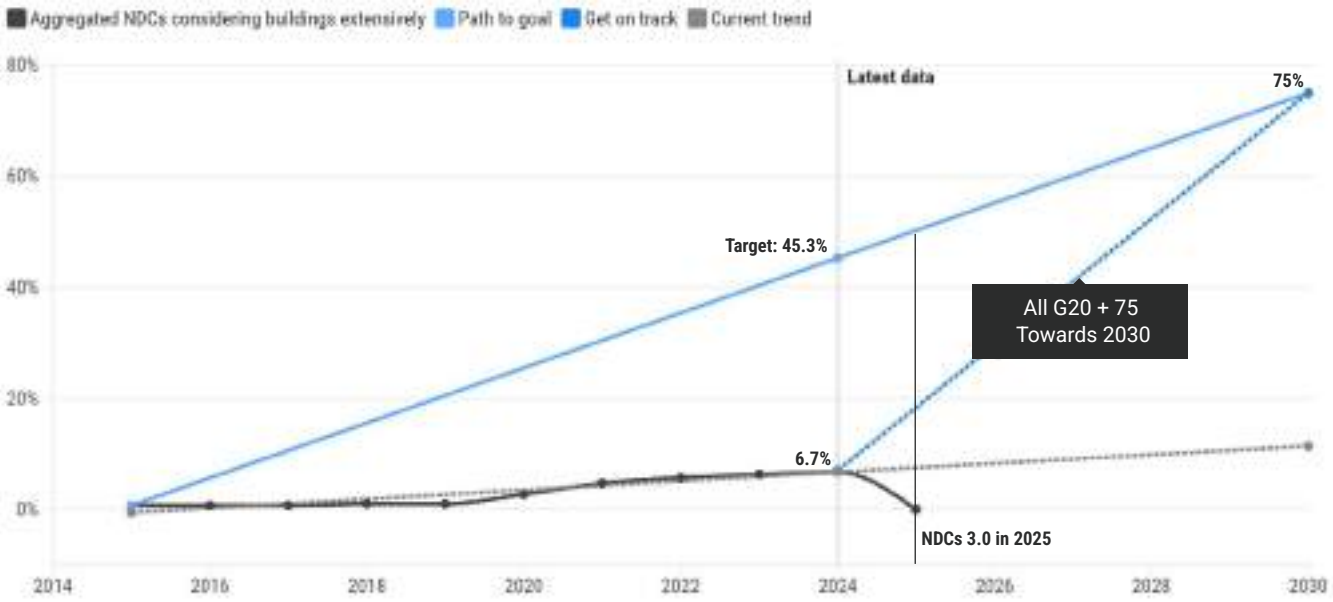


Figure 25. NDCs considering buildings extensively 2015-2024*, path to goal and path to get on track until 2030 (Based on GSRBC authors internal analysis)

**Note that only the results until 2024 are included in the calculations for the Global Buildings Climate Tracker to ensure the consistency with the time span for which the other six indicators are available.*

Change observed from 2023 to 2024:

Only one additional country submitted an NDC with an extensive strategy for the building sector between 2023 and 2024.

Change observed from 2015 to 2024:

Up to 2024, only 20 countries had submitted an NDC with an extensive strategy for the buildings sector, none of them from the G20 group.

Towards 2030:

To align the sector with a 2050 net-zero pathway, all G20 countries and at least 75 additional countries should develop an NDC with an extensive building sector strategy by 2030.

Since January 2025, countries are expected to communicate NDCs 3.0, setting out actions they will take to 2035. These NDCs should be informed by the first Global Stocktake[15], use agreed accounting approaches so targets can be compared and considered as standardised national plans, rather than a statement of intentions (United Nations Framework Convention on Climate Change [UNFCCC] 2026).[16]

For this report, mentions of buildings in NDCs are tracked and categorised. Those with the highest level of detail are labelled extensive, corresponding to a complete national plan for the sector. The second-highest grade describes NDCs as substantive if they mention considerations such as energy efficiency in buildings, improving energy codes or standards, or reference broader mitigation or adaptation actions in the built environment. The tracking of NDC 3.0 introduces a new analysis approach for measuring the extent of buildings-sector coverage, moving beyond the NDC 2.0 criteria, which focused only on the presence of individual action items related to building sustainability, to also consider whether a comprehensive sectoral plan for buildings and construction is included in the submission.

As of January 2026, 135 (from 108 countries + EU27) NDCs 3.0 have been submitted to the United Nations Framework Convention on Climate Change. Almost all NDCs mention actions for the buildings and construction sector and 16 of them include substantive details of climate actions for buildings. Alarmingly, under the revised NDC 3.0 analysis approach described in the previous paragraph, no country has an extensive national plan for the buildings and construction sector within its NDC, indicating that global ambition remains insufficient. Another analysis conducted by UN-Habitat notes that some NDCs 3.0 contain strong urban content, with 63 per cent mentioning the built environment (UN Habitat 2025). Several countries have included additional plans for the built environment in their Biennial Update Reports, National Adaptation Plans (NAPs) and other policy documents.

Alarmingly, under the revised NDC 3.0 analysis approach, **no country** has an extensive national plan for the buildings and construction sector within its NDC, indicating that global ambition remains insufficient

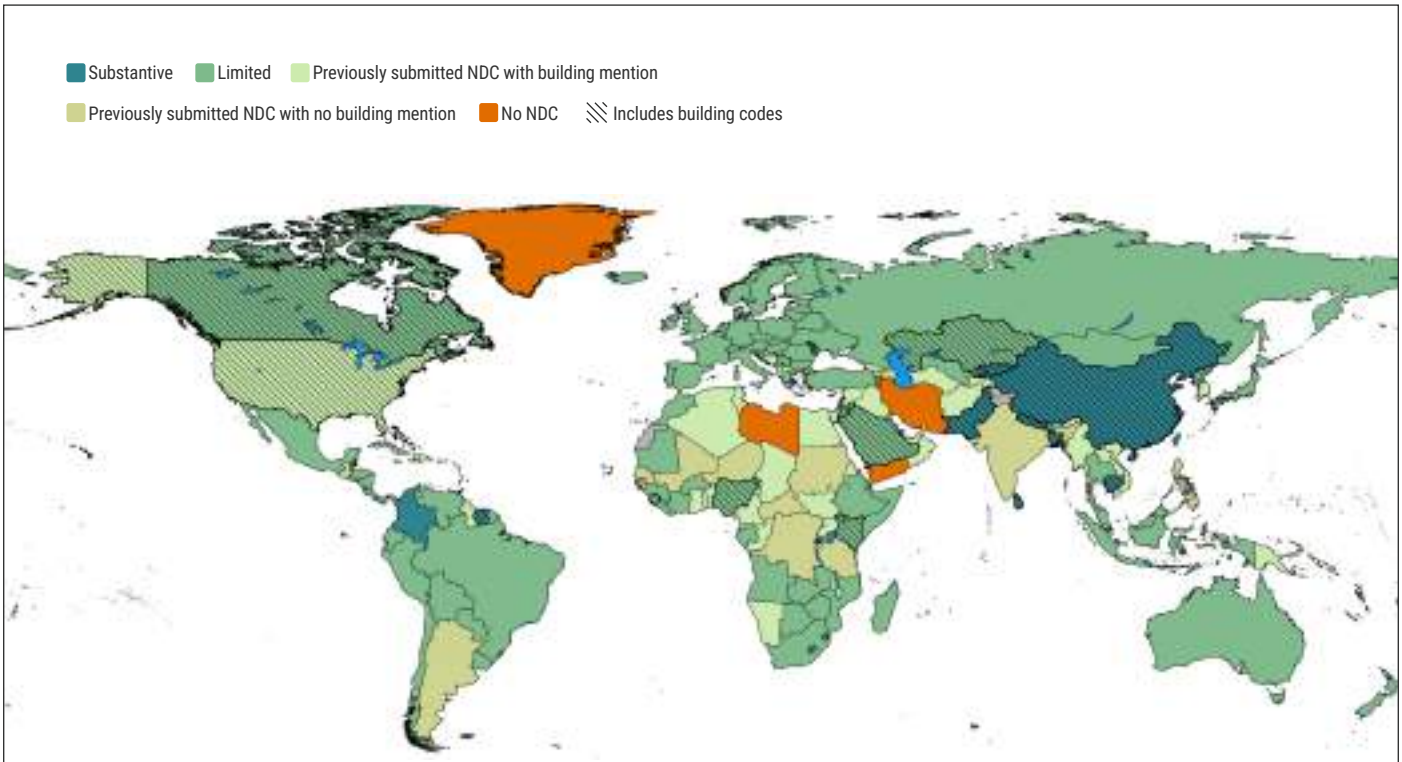


Figure 26. Parties to the Paris Agreement including mentions of buildings and construction climate actions under NDC 3.0. (Based on GSRBC authors internal analysis)

Notes: This map is without prejudice to the status of or the sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

For this edition of the GSRBC, countries gain an extensive engagement rating only if their NDCs include a complete, comprehensive and coherent national strategy for achieving a sustainable and resilient built environment.

Almost all NDCs mention actions or commitments in the buildings sector, although not always directly. For example, the Seychelles' NDC commits to actions in the air conditioning sector; Lesotho discusses "human settlements" in broad terms; while other countries such as Norway and New Zealand rely on commitments in other policy documents.

Others offer specific details on their plans for the built environment: Qatar and the Bahamas commit to expanding district cooling, while Canada, the Holy See, Iceland, and Kazakhstan describe district heating plans. Heat pumps, which help reduce gas consumption, are mentioned in several NDCs, including those of Canada, Uruguay and Monaco. Other parties such as Bangladesh, Cambodia, China and Nauru mention efforts to improve energy codes and building performance standards, and renewables (see **Section 7.1**).

6.2
Towards 2030: getting NDCs to include extensive strategies for the buildings and construction sector

The submission of NDCs 3.0 in 2025 was a crucial moment to integrate the buildings sector in national climate efforts halfway through the decade to deliver on the 2030 goals. However, no country submitted an NDC 3.0 with an extensive building strategy that year. All G20 countries and at least 75 additional countries should have an NDC in place with a well-developed and integrated buildings sector strategy by 2030 to align the sector with 2050 net-zero pathways.[17] [18]

What can governments do now to ensure that they leverage the potential of the buildings and construction sector in their overall climate change strategies?

RECOMMENDATION

Strengthen the role of the buildings and construction sector in NDCs

1. Develop extensive building strategies within their NDC, including actions and targets for building energy codes and energy supply, efficiency of appliances, green building certifications, material supply chain and circularity, urban planning, and finance. Particularly, WorldGBC's NDC Scorecard for Sustainable Buildings provides governments with a structured tool to assess how comprehensively buildings are reflected in their NDCs.

2. Design and implement comprehensive policy packages to address both mitigation and adaptation of buildings and construction in line with the Paris Agreement.

3. Establish clear monitoring and accountability mechanisms to track and report progress on strategies and commitments.


Photo: Unsplash

4. Integrate gender-responsive approaches into NDCs, including inclusive consultations, gender-disaggregated data collection, and safeguards to ensure that policies address the needs of women and other vulnerable groups.

BOX 7

Examples of NDCs with substantive coverage of the building sector

Cambodia

Cambodia's NDC explicitly lays out a series of measures to achieve both mitigation and adaptation goals within the built environment. It sets goals for energy management and Minimum Energy Performance Standards (MEPS) for components used to build energy service systems, such as electric motors used in heating, ventilation and air conditioning systems. It also introduces a building energy code policy framework and a green building certification system, with the goal of certifying 500 buildings by 2035 and reducing residential and commercial energy demand by 34 per cent and 25 per cent respectively. Adaptation measures include new urban green spaces to limit urban heat exposure by 2028, and the construction of 4,000 climate-resilient dwellings by 2035.


Photo: Unsplash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The Bahamas

The Bahamas frames its NDC as complementing previous submissions. Building codes are highlighted as a mitigation tool for new construction and retrofitting, as well as a mechanism for promoting climate resilience and nature-based solutions in development projects. These codes are scheduled to be revised to improve resilience and reduce energy consumption. Government buildings will be subject to lighting retrofit requirements. In addition, MEPS for air-conditioners are intended to support mitigation efforts and avoid approximately 120 $ktCO_2e$ of GHG emissions by 2035.

Colombia

Colombia's NDC 3.0 promotes sustainable construction to deliver safer, healthier and more resilient buildings while reducing emissions through stronger buildings codes and local enforcement capacity, green finance, widespread adoption of passive design, efficient lighting and cooling, smart energy management, and water efficiency and reuse. It also advances district cooling for high-demand urban areas, such as hospitals and public buildings, and highlights decarbonising construction materials, especially cement, via efficiency and clinker reduction. On adaptation, it emphasises the need for resilient infrastructure to maintain essential services under climate stress, and highlights nature-based solutions as alternatives to standard practices.


Photo: Unsplash

6.3
Other national policies for decarbonisation and adaptation of the buildings and construction sector

Beyond NDCs, the national policy landscape saw both improvements and rollbacks regarding the sustainability and resilience of the buildings and construction sector in 2025. Several major economies took positive steps to improve energy efficiency regulations and tighten building codes. But there was limited progress in the world's most climate vulnerable countries to strengthen the adaptative capability of buildings in the years ahead.

The **United States** experienced the most notable shift away from climate-focused building policy with the passing into law of the One Big Beautiful Bill Act, which repealed retrofit support and residential clean energy tax credit (United States, Internal Revenue Service 2025). Executive orders rolled back federal programmes that promoted low-carbon building materials, although this didn't impact Buy Clean programmes relating to steel and other construction materials (Gallucci 2025). At the sub-federal level, the implementation of building electrification targets was delayed in New York State (NY Towns 2025) while Colorado established the Building Decarbonisation Enterprise, which provides financial and technical support for decarbonisation measures to building owners (Colorado Energy Office 2025). Governments should avoid policy volatility and protect their capacity to deliver on sustainability goals.


Photo: Unsplash

Elsewhere, stronger regulations were used to drive the adoption of efficient appliances while nearly half of energy efficiency policies relied on incentives such as grants, low interest loans and targeted support (IEA 2025a).

Photo: Unsplash

In the **United Kingdom**, the Future Homes Standard came into effect and aims to reduce carbon emissions from new buildings by around 75 per cent relative to existing standards (England 2025). **China** set out a plan to expand the country's emissions trading scheme to include steel, cement and aluminium (China 2025a) and announced multi-year plans to boost green building materials and green urban development (China 2024, 2025b). **Viet Nam** passed an amendment to tighten compliance to the Law on Economical and Efficient Use of Energy, which included energy labelling for construction, alongside energy-management systems for large commercial and industrial facilities (Viet Nam, National Assembly 2025). In the **UAE**, a law came into effect requiring all private and public organisations to measure carbon emissions from all sources, which should include buildings (United Arab Emirates 2024).

There was relatively limited progress on legislative actions to address climate risks to buildings in 2025. However, building codes, standards and retrofitting for resilience were cited by a number of countries as primary tools for reducing risks to climate hazards in their NAPs. An additional 17 developing country parties submitted National Adaptation Plans since the 2024/25 edition of the GSRBC, bringing the total submissions to 75 (UNFCCC), with developed country parties submitting a further 10 NAPs. For example, **Antigua and Barbuda** emphasised retrofitting existing structures and strengthening building codes for hurricane resilience, including household-level measures and incentives for retrofits.

Uzbekistan is also noteworthy for publishing the only building-specific NAP in 2025 (UNFCCC 2025), which includes actions to improve construction standards, refurbish existing buildings, promote blue-green infrastructure, and establish dedicated financing mechanisms for adaptation measures. Further attention will be needed in the coming years to ensure more countries develop adaptation plans for the built environment and translate them into tangible action.

BOX 8

A 12-step action plan to achieve net-zero buildings

Governments are a critical source of policy for setting direction to support and guide the transformation of the building sector, but alongside industry and corporate actors, whose own policies play a vital role in addressing their own emissions for the buildings they own and operate.

The World Business Council for Sustainable Development (WBCSD) is a global community of over 220 leading businesses, which drives systems transformation to limit the impact of the climate crisis, restore nature and tackle inequality. In 2025, it published a 12-step action plan for achieving net-zero buildings (WBCSD 2025b) under the framing of a globally-endorsed Market Transformation Action Agenda for the built environment (WBCSD 2025a). The plan outlines actions for governments, industry and NGOs as well as case studies illustrating pathways to achieve net-zero across building uses, types and, geographies.

RECOMMENDATIONS

Create the conditions for decarbonising the sector:

1. Define a national trajectory to decarbonise the property sector;
2. Develop a building level methodology to assess the performance of buildings against the trajectory;
3. Build capacity both within government and the supply chain.

Enhance transparency to the general public:

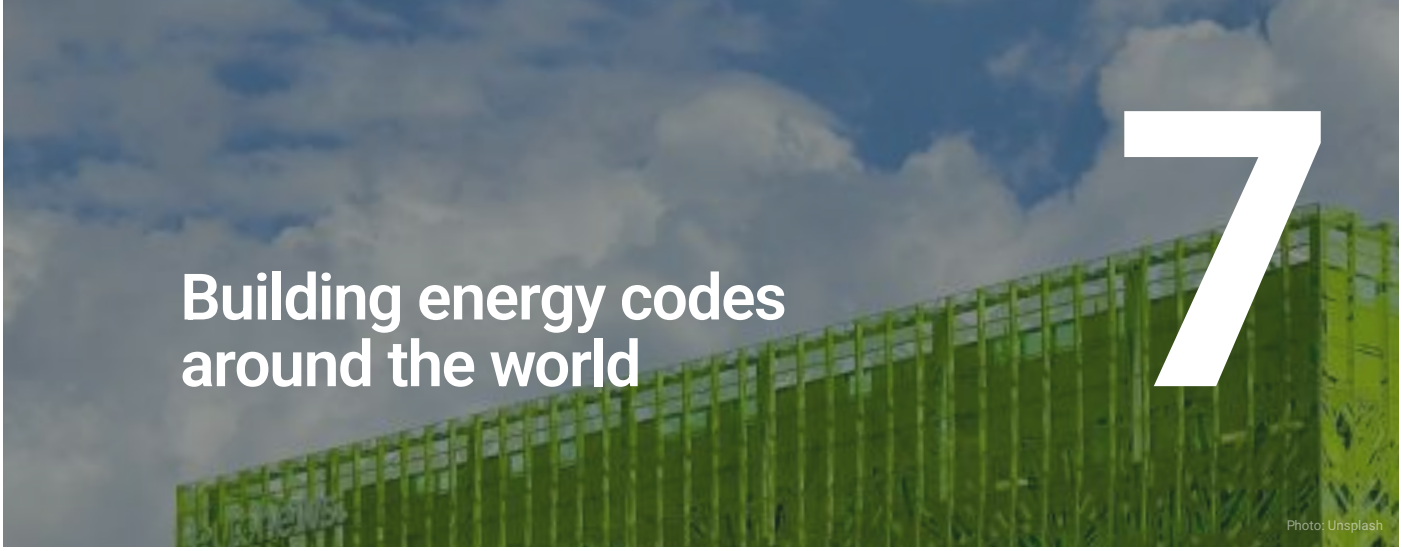
4. Mandate disclosure of buildings' energy performance against net-zero thresholds;
5. Mandate disclosure of the carbon impact of energy procurement;
6. Launch a public engagement campaign to raise awareness and gain support for mandatory minimum energy performance requirements in buildings.

Generalise performance standards:

7. Implement a regulatory framework and mandatory minimum levels for energy performance in public buildings;
8. Extend this framework to all buildings and use it to replace energy-related compliance frameworks.

Bring in incentives to achieve better-than-minimum standards:

9. Create a market incentive through a recognised net-zero building certification;
10. Mandate corporate disclosures to include the performance of buildings against net-zero;
11. Include a qualifying requirement or rate incentives for net-zero alignment within financing mechanisms;
12. Align government taxation and funding to performance against net-zero thresholds.



7 Building energy codes around the world

Ensuring that buildings are sustainable and future-proof requires adequate regulatory frameworks through building energy codes. Diving deeper from the analysis on national strategies discussed in the previous section. This section looks at global developments in building energy codes and the role they play in driving decarbonisation of new and existing buildings.

KEY TAKEAWAYS:

INCREASING

60%

of new construction worldwide follows building energy codes

Global building energy codes coverage is increasing despite regional disparities. As of mid-2025, building energy codes covered approximately 60 per cent of new construction worldwide, with widespread adoption in high-income countries, and low adoption in emerging economies.

As of 2024, only two countries – Canada and the United States – have zero-emissions aligned building codes, both of which are voluntary at the state level.

Governments should urgently upgrade building codes with requirements toward zero-emissions standards and enforcement mechanisms, especially in high-growth areas such as Africa. This should be paired with strengthened capacity building and knowledge transfer of low-carbon construction practices.

TARGET

At least all G20 countries and 75 other countries should have zero-emissions aligned building codes by 2030

7.1
Building energy codes aligned with zero-emissions principles

Building energy codes are regulatory instruments setting minimum requirements for the design, construction and retrofitting of buildings – covering aspects such as insulation, air sealing, windows, heating, cooling and ventilation systems efficiency, lighting, and, in some jurisdictions, on-site renewables.

When aligned with zero-emissions building (ZEB) requirements, these codes help reduce energy demand and improve the energy performance of new and existing buildings, thereby contributing to lower building-related emissions.

Indicator

To monitor national regulatory actions aimed at decarbonising the buildings and construction sector, the GSRBC conducts a detailed analysis of national building codes and their alignment with zero-emissions building (ZEB) requirements. This indicator reflects the aggregate number of building codes that are ZEB-aligned, using weights to distinguish between the G20 and other countries.

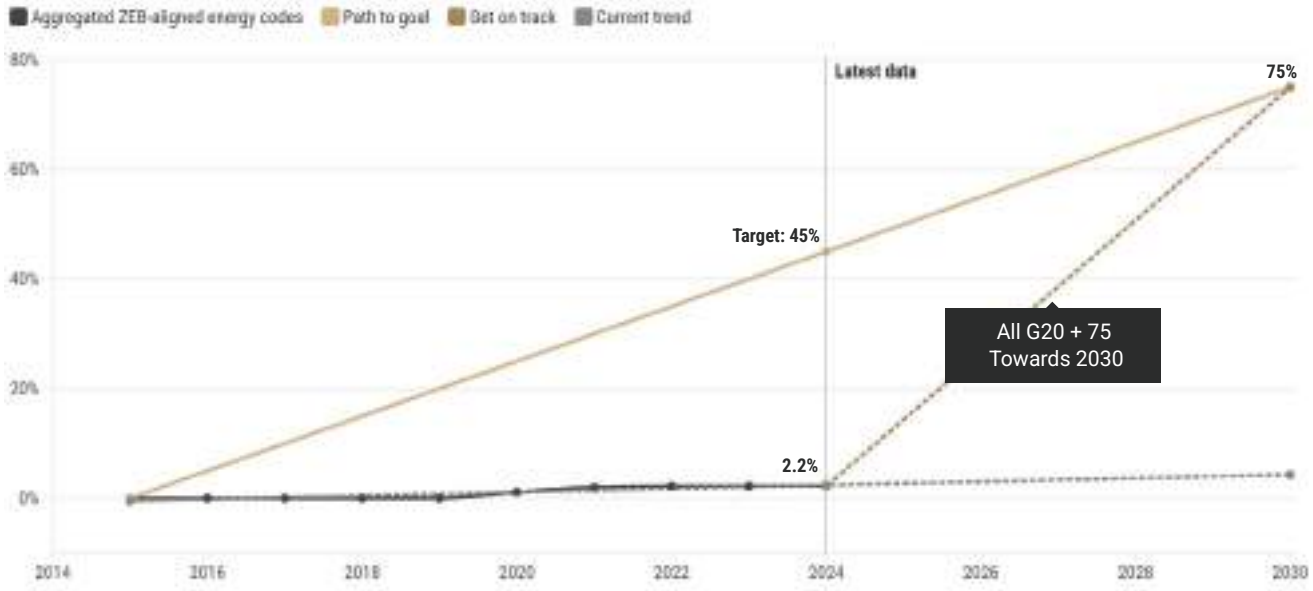


Figure 27. Aggregated ZEB-aligned building energy codes 2015-2024, path to goal, and path to get on track until 2030 (Based on GSRBC authors internal analysis)

Change observed from 2023 to 2024:

There was no change in 2024, with just two countries having zero-emissions aligned building codes.

Change observed from 2015 to 2024:

Since 2015, only Canada and the United States have established zero-emissions building codes, both of which are voluntary at the state level.

Towards 2030:

To align the sector with a 2050 net-zero pathway, all G20 members and at least 50 per cent of the rest of the world must adopt ZEB-aligned building energy codes by 2030.

As of mid-2025, 95 mandatory energy codes are in place worldwide for residential buildings and 97 for non-residential buildings, covering approximately 60 per cent of new construction (IEA 2025a) (see Figure 28).

However, significant regional disparities persist. High-income countries have achieved widespread adoption, while only 20 per cent of African nations and 29 per cent of Asia-Pacific countries have implemented building standards (UNEP 2025a). Africa should be a priority area for the adoption of building energy codes since a significant share of new construction is projected to take place on the continent by 2050 (World Green Building Council [WorldGBC] 2025b).

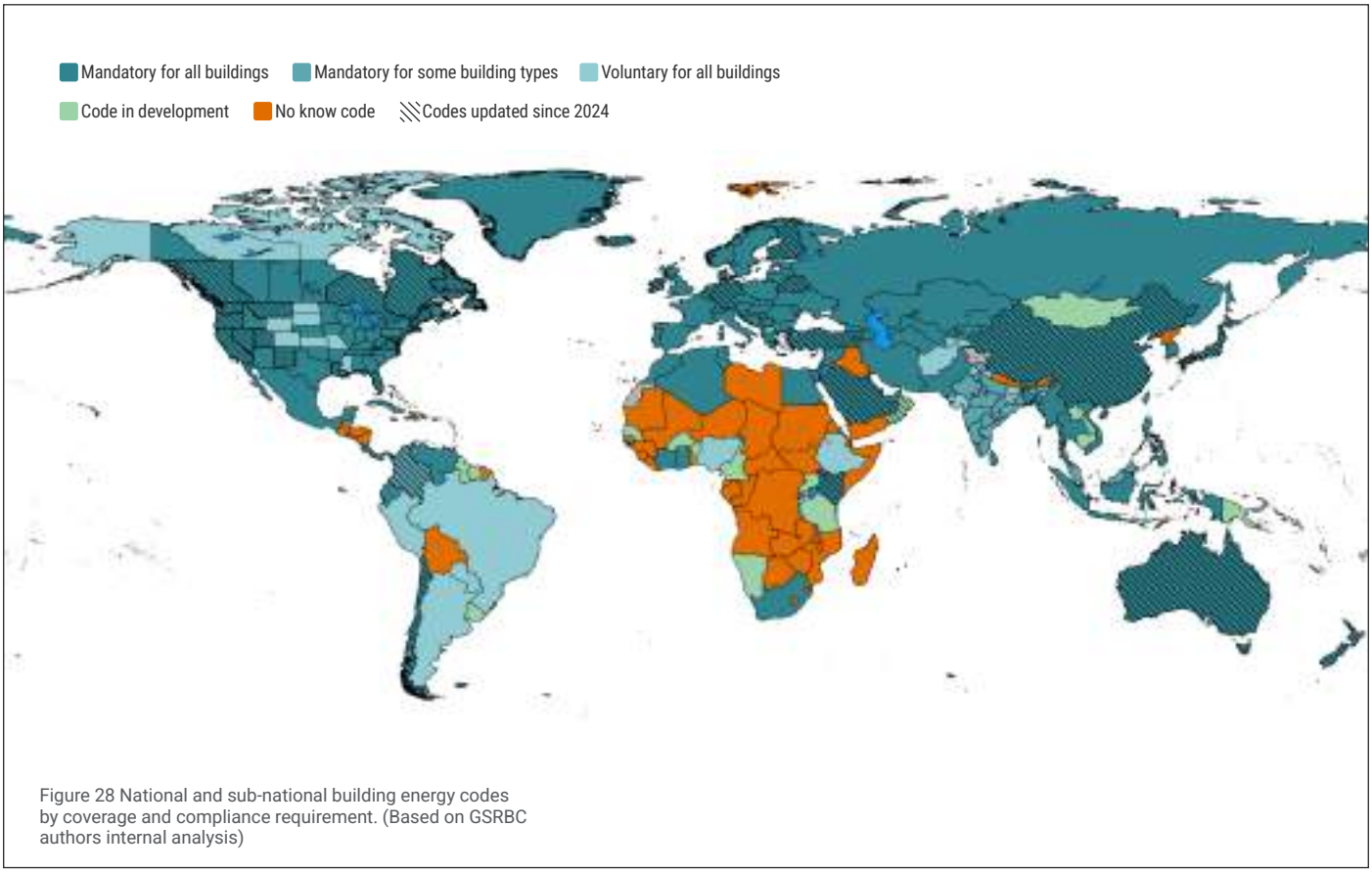


Figure 28 National and sub-national building energy codes by coverage and compliance requirement. (Based on GSRBC authors internal analysis)

Note: This map is without prejudice to the status of or the sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Eight governments have updated or adopted new building energy codes in 2025. Japan's revised Building Standards Act, effective from April 2025, mandates that all new homes and small buildings meet energy conservation standards, with minimum requirements on thermal insulation performance and primary energy consumption (Sustainability Directory 2025). This marks a positive shift in a sector that accounts for 30 per cent of Japan's total energy consumption, with additional requirements for zero-emissions houses planned for 2030 (ICLEI Japan 2025).

India's Energy Conservation and Sustainable Building Code 2024 strengthens efficiency requirements for commercial buildings with of 100kW or more and targets buildings that can achieve 20-50 per cent efficiency improvements over conventional construction (India, Bureau of Energy Efficiency 2024).

8 governments

have updated or adopted new building energy codes in 2025

Europe, through its revised Energy Performance of Buildings Directive (EPBD), which entered into force in May 2024, mandates whole-life carbon assessments for all new buildings over 1,000m² from 2028, expanding to all new construction by 2030 (European Parliament 2024). Member states must adopt national provisions that include zero-emission standards for public buildings by 2028 and all new buildings by 2030 (Interreg Europe 2024). France's RE2020 heating directive, effective from January 2025, imposes a 4kg CO_2/m²/year emission threshold and bans new fossil fuel boilers. It is projected to reduce emissions in the building sector by 40 per cent by 2030 (Légifrance 2024).

In the United States, the 2024 International Energy Conservation Code (IECC) is gradually being adopted by states and cities and is expected to reduce energy use by 7.8 per cent in residential buildings and 10 per cent in commercial ones compared to the 2021 edition (United States, Department of Energy 2024; United States, National Association of Home Builders 2024).

Passive cooling provisions remain critically underrepresented globally in building codes:

While **69 countries** mandate envelope insulation,

and **58 countries** set glazing heat transmission standards,

only **19 countries** mandate window or façade shading – a critical strategy for blocking solar radiation in hot climates (UNEP 2025a).

Pakistan's Energy Conservation Building Code 2023 emphasises low-cost passive strategies such as optimising building orientation, enhanced insulation, double glazing, and external shading, with analysis by the World Bank showing improvements to the building envelope can yield 18-37 per cent energy savings (World Bank Group 2025a; UNEP 2025a; GIZ 2026). Kenya's National Building Code 2024 also considers passive cooling strategies (see Box 9).

As part of the priority action B1. Standards and Certification from the Buildings breakthrough agenda, the World green building council and multiple organisations recently released the interim report on Definitions and principles for Near-zero emission and resilient buildings (Global Alliance for Buildings and Construction [GlobalABC] 2025c). The report introduces a qualitative definition of Near-zero emission and resilient buildings designed to work across diverse national contexts and jurisdictions across high-, middle- and low-income economies. The definition comprises modular building blocks introducing essential principles, from reducing emissions, to embedding whole-life cycle measures in policies and ensuring resilience to climate risks. This represents a crucial opportunity for countries to adhere to this initiative. By aligning around common principles, countries can benchmark progress, engage in high-level political dialogue, and help ensure that resilient, low-emission buildings are achievable, affordable, and accessible worldwide.

7.2
Towards 2030: deploying ZEB-aligned building energy codes

ZEB-aligned building energy codes are among the most stringent building-code approaches and are necessary for aligning the sector with climate neutrality goals The IEA's NZE scenario requires all new buildings and 20 per cent of the existing building stock to be zero-carbon ready by 2030 (IEA 2026).

That requires all G20 members and at least half of the rest of the world to have ZEB-aligned building energy codes by 2030[19]. Since 2015, only two countries – Canada and the United States – have established zero-emissions building codes, both of which are voluntary at the state level.

In the EU, Energy Performance of Buildings Directive (EU/2024/1275), adopted in May 2024, strengthens energy performance requirements for new buildings by requiring them to meet the ZEB standard from January 2028 for publicly owned buildings and from January 2030 for all other new buildings. However, further ambition is required to extend these principles to other global regions and to expand the scope to existing buildings.

What can governments do now to ensure that new construction and renovations reflect the need for more sustainable construction and building operation practices?

RECOMMENDATION

Develop or update building energy codes

1. Align building energy codes with whole life cycle principles, setting out embodied and operational emissions limits, reporting mechanisms and tools for calculations.
2. Update building energy codes to include energy efficiency and sufficiency principles.
3. Incorporate climate resilience requirements in building energy codes.
4. Couple the development of building energy codes with regulatory measures on the energy efficiency of appliances, including heating and cooling systems. Ensure building energy codes are adapted to the regional context and climate, integrating passive cooling and heating strategies with vernacular design principles and traditional materials where appropriate while maintaining alignment with zero-emissions objectives.

RECOMMENDATION

Accelerate adoption and compliance

1. Provide long-term market certainty by establishing clear pathways for tightening building energy code requirements toward zero-emissions standards.
2. Develop building energy codes for retrofitting, considering embodied emissions and linking their implementation to existing retrofitting strategies.
3. Introduce mandatory compliance and enforcement mechanisms, including regular inspections, performance verification and penalties to ensure that codes translate into real energy savings.
4. Strengthen capacity building and knowledge transfer between countries of low-carbon construction practices using directives and standards, particularly in regions with ongoing or expected high levels of new construction.

BOX 9

Examples of building energy codes that were recently updated

Kenya

Kenya's National Building Code 2024 was launched in July 2024 and came into force in March 2025. It sets standards for safety, sustainability and energy efficiency across residential, commercial and public infrastructure (Kenya, National Construction Authority 2024). The code mandates comprehensive passive cooling strategies including shading, natural ventilation, insulation, evaporative cooling, and reflective coatings. Together with Kenya's endorsement of the Declaration de Chaillot and its leadership role in the Intergovernmental Council for Buildings and Climate, these reforms position the country as a regional example for low- and middle-income countries seeking to embed climate-responsive design in national regulation (UNEP 2025a).


Photo: Unsplash


Photo: Unsplash


Photo: Unsplash

California

The 2025 edition of California's Title 24, effective from January 2026, expands the use of heat pumps in newly constructed residential buildings, prepares buildings to switch to electric systems and strengthens ventilation standards (California Energy Commission 2024). The Code mandates new buildings to install "cool roofs" that reflect solar radiation and reduce the heat island effect, with three-year reviews to address emerging climate risks (UNEP 2025a). It also enhances building envelope requirements, expands renewable energy and storage provisions, and updates field verification procedures (Vert Energy Group, 2025). The residential provisions will apply until 2031, while non-residential standards will be updated every three years (California Energy Commission 2024).

Japan

Since April 2025, Japan has made energy-saving standards mandatory for nearly all new buildings, requiring all new houses to meet higher levels of thermal insulation and energy consumption, with building permits now contingent on compliance with energy standards under the revised Building Energy Conservation Act. The regulations aim to reduce the buildings sector's 30 per cent share of Japan's total energy consumption and aims to achieve net-zero energy consumption for newly constructed buildings by 2030 and all buildings by 2050 (Japan, Center for Environment and Energy Conservation 2025).

Photo: Unsplash

Photo: Unsplash

Singapore

Since 2021, Singapore has required all new public buildings and existing ones undergoing major retrofitting to deliver at least 60 per cent energy savings compared to 2005 levels (Singapore, Ministry of Sustainability and the Environment 2023). In September 2025, the Building and Construction Authority introduced the Mandatory Energy Improvement Regime, which requires existing energy-intensive buildings to conduct audits and develop plans to reduce the intensity of their energy use by at least 10 per cent, with potential heavy fines for non-compliant buildings (Reccessary 2024; Resync 2024; Singapore, Building and Construction Authority 2025a). By 2030, the Singapore Green Building Masterplan aims at making 80 per cent of buildings more sustainable, improve the energy efficiency of the most sustainable buildings by 80 per cent compared to 2005 levels, and ensure that 80 per cent of new developments are super-low-energy buildings from 2030 onwards (Singapore Green Building Council 2024).

8 Green building certification around the world

Besides regulatory measures such as building energy codes, voluntary instruments such as green building certifications can mobilise the industry to drive greater sustainability in buildings. This section discusses the growth of green building certifications worldwide.

KEY TAKEAWAYS:

INCREASING

13.6pts

uptake of green building certification schemes since 2015

The uptake of green building certification schemes has grown steadily since 2015, increasing globally by 13.6 points – equivalent to around two thirds of the increase needed to stay on track to achieve net-zero emissions by 2050.

The number of projects certified continued to grow in 2024 and the gap to a net-zero-aligned pathway reduced for the first time, thanks to local tailoring, financial incentives and awareness campaigns in the construction industry. However, cumulative growth was still 6.1 points lower than the target for that year.

Governments should use green certification schemes to amplify their decarbonisation policies, by aligning schemes to the national context and integrating them into building codes as well as procurement and social housing requirements to accelerate the transformation of the market

8.1
Growth in green building certification

A green building certification is a third-party verification process that evaluates whether a building meets defined environmental performance standards across its design, construction and operation.

The data available up to 2024 shows that multiple certification schemes experienced a similar or higher growth compared to the previous year (i.e. from 2022 to 2023) in terms of the number of certified projects. Data from fourteen certification schemes, collected and processed directly from their public websites or through private communications, shows the total number of green building certifications almost tripled globally between 2015 and 2024.

Indicator

To monitor voluntary efforts to decarbonise the building stock, the GSRBC analyses the uptake of green building certification worldwide, using available data from 14 certification schemes. The total annual number of certified projects is aggregated using weights for each scheme based on the number of certifications issued and the number of countries where the scheme operates.

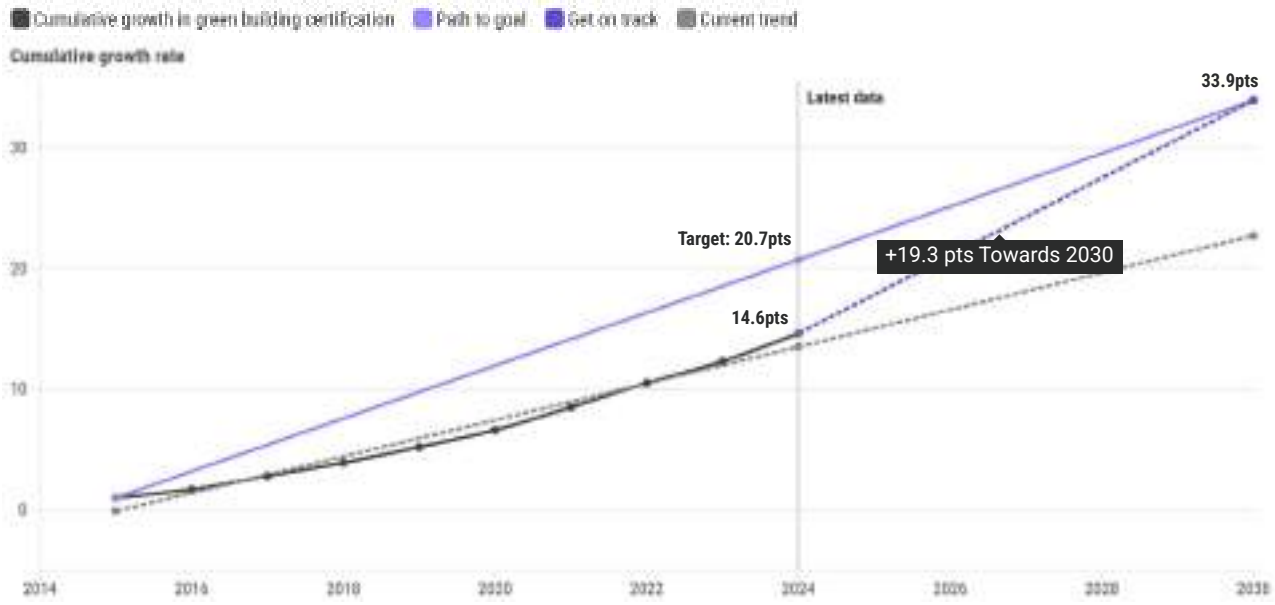


Figure 29. Cumulative growth in green building certification 2015-2024, path to goal, and path to get on track until 2030 (Based on GSRBC authors internal analysis)

Change observed from 2023 to 2024:

Green building certification uptake increased by 2.3 points in 2024, the highest growth observed since 2015.

Change observed from 2015 to 2024:

Green building certification uptake has increased by 13.6 points since 2015, around two thirds of the 19.7 points increase needed to stay on track to achieve net-zero emissions by 2050.

Towards 2030:

To align the sector with a 2050 net-zero pathway, the cumulative growth of green building certification uptake should rise to 33.9 points by 2030 – a 19.3 point increase from 2024 levels.

Certification schemes use predetermined criteria and scoring frameworks to assess buildings' sustainability outcomes and to ensure comparability between projects. There are more than 40 major certification schemes worldwide, some of which operate in multiple countries, while others operate exclusively within national markets.

This report assessed 14 certification schemes:

- BEAM Plus,
- Building Research Establishment Environmental Assessment Methodology (BREEAM),
- Comprehensive Assessment System for Built Environment Efficiency (CASBEE),
- German Sustainable Building Council (DGNB),
- Excellence in Design for Greater Efficiencies (EDGE),
- GREEN STAR,
- Green Rating for Integrated Habitat Assessment (GRIHA),
- Indian Green Building Council (IGBC),
- Leadership in Energy and Environmental Design (LEED),
- Miljobyggnad,
- MINERGIE,
- Passive House,
- Saaf,
- and WELL.

With more than 40 major certification schemes worldwide, monitoring each scheme is challenging due to limited publicly available data. Ideally, this assessment would monitor the floor area of certified buildings. However, multiple certification schemes do not consistently and regularly publish these figures.

The GSRBC aims to gradually increase the number of schemes it monitors as more projects are certified by emerging schemes. To achieve this, certification schemes need to provide more consistent and transparent data about the number of certified buildings and their floor area. This minimum data can already enhance the understanding of the building stock being certified, which can support better informed policy decision-making. Understanding how many buildings (and floor area) and from which building segments are being certified can support the identification of gaps. This can facilitate the development of incentives, awareness campaigns, and other strategies to address the segments and regions where building certification is not being deployed.

Moreover, certifications do not always translate into improved energy or emissions performance, highlighting the need for more transparency and stronger post-certification monitoring. Making this data available can increase trust from potential certification users. It can provide more accurate insights into the actual performance of the certified building stock, providing investors with better understanding of the benefits of opting for green building certification.

8.2
Towards 2030: leveraging the potential of green building certification

Since 2015, green building certification uptake has grown by 13.6 points, around two thirds of the increase needed by 2024 to stay on a path to net-zero emissions by 2050.

The goal for this indicator is calculated based on the growth of the global floor area. Total building floor area is expected to grow 33.9 per cent by 2030, compared to 2015 levels (IEA 2023). The cumulative growth of building certifications should reach the same level to align the sector with a 2050 net-zero pathway, which represents an increase of 19.3 points compared to 2024 levels.[20]

What can governments do now to increase the adoption of green certification and its effectiveness?

RECOMMENDATION

Enhance conditions for the uptake of green certification

1. Support the alignment of green building certification schemes to national contexts, such as climate, construction practices and buildings typologies, to facilitate uptake.
2. Create a roadmap for the uptake of certifications starting with deployment in public buildings and social housing projects.
3. Systematically integrate green certifications with national building energy codes and public procurement frameworks to reinforce market uptake.
4. Embed certification requirements and incentives in Environmental, Social and Governance (ESG) frameworks and emissions reporting.

RECOMMENDATION

Increase relevance and impact

1. Strengthen post-certification monitoring and performance verification to ensure that certified buildings deliver measurable energy and emissions reductions in operation.
2. Promote the inclusion of whole life cycle assessments in certifications, aligned with national definitions of near-zero and zero-emissions buildings.
3. Promote the inclusion of nationally-adapted climate resilience in certifications.
4. Build capacity for the deployment of certifications through education, training and skills development.

BOX 10

Examples of where green building certification is significantly growing

Colombia


Photo: Unsplash

Colombia's national green certification scheme CASA has registered more than three million square metres, around 37 per cent of which is social housing (Casa Colombia 2024). Tax incentives and close engagement with the construction industry have supported the increase in certifications in the country (Camacol - Cámara Colombiana de la Construcción 2025a, 2025b). Certification schemes such as LEED and EDGE have also considerably increased their certifications figures in Colombia (Consejo Colombiano de Construcción Sostenible 2025). LEED has certified around seven million square metres of floor area, while EDGE has certified around 23.1 million square metres, 72 per cent corresponding to social housing (Camacol - Cámara Colombiana de la Construcción 2026). In total, in the last three years, 22 per cent of new homes in Colombia have been registered in sustainable certification systems, consolidating the country as a regional leader (Asociación Colombiana de Informática, Sistemas y Tecnologías Afines 2025).


Photo: Unsplash

India

India has several green building rating systems adapted for the Indian context led by certification bodies such as the IGBC, GRIHA and the Green Business Certification Institute (GBCI)(Green Business Certification Institute India 2026). GRIHA has registered over 3,869 projects, covering approximately 86.5 million square metres, while IGBC has more than 18,620 registered projects representing about 1.4 billion square metres. The steady growth of green building projects reflects the growth in the buildings and construction sector but is also driven by a combination of financial incentives (e.g. tax benefits and preferential loans) and non-financial incentives (e.g. fast-track approvals and additional permissible floor area) (Green Business Certification Institute India 2023). Public procurement and construction guidelines for government buildings further support their uptake.[21] Green building councils are also providing networking and capacity-building activities to enhance awareness, technical skills and human resources (Indian Green Building Council 2026a, 2026b; GRIHA 2026a), and work with industry to ensure the availability of certified building materials, components and products (Indian Green Building Council 2026c; GRIHA 2026b).

Türkiye

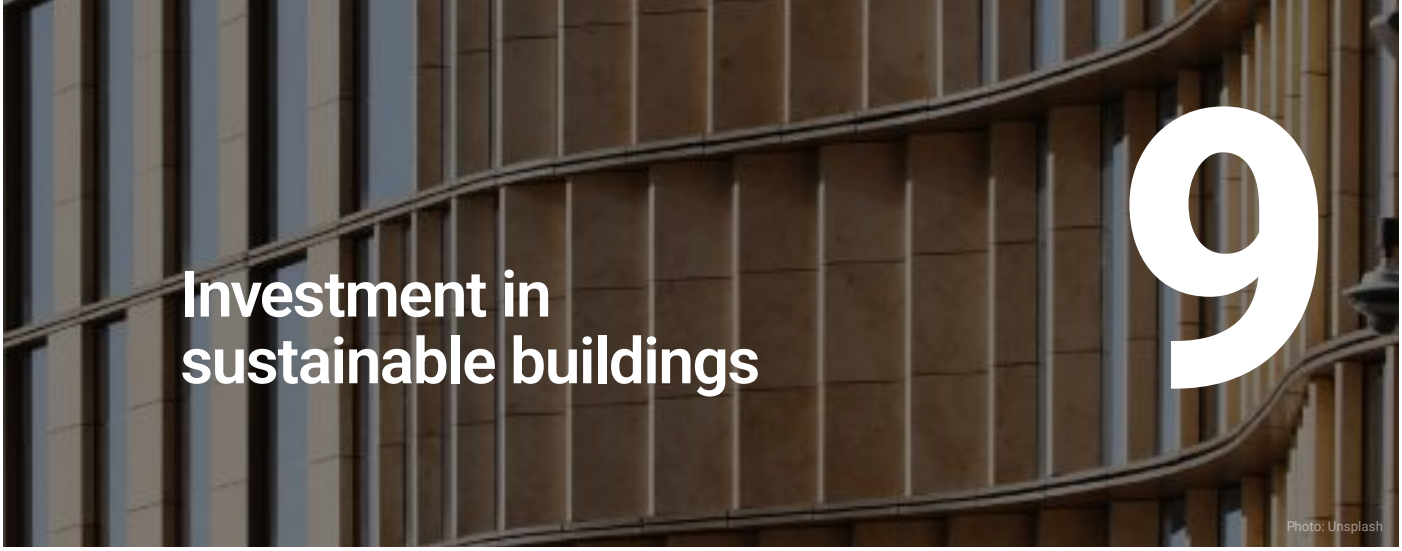

Photo: Unsplash

LEED and BREEAM are popular green building certification schemes in Türkiye, followed by DGNB, EDGE and WELL (Samu 2019; Thomolları and Toğan 2020; Baker McKenzie 2021). In addition, Türkiye has at least two regional green building rating systems, B.E.S.T administered by the Environmentally Friendly Green Buildings Association (ÇEDBİK) and a national voluntary rating system called Yes-TR developed by the Ministry of Environment, Urbanisation, and Climate Change. In the absence of strong financial incentives for green buildings (Avci 2023), regulations, awareness campaigns and development incentives have driven the uptake of certifications and improved energy efficiency (Global Center on Adaptation and World Resources Institute 2019; Green Economy Financing Facility and European Bank for Reconstruction and Development 2021; Turan 2024; International Climate Initiative 2026). Most green buildings are located in the densely populated and industrialised western region of the country (Thomolları and Toğan 2020).


Photo: Unsplash

China

China's latest green building assessment standard was approved by the Ministry of Housing and Urban-Rural Development (MoHURD) as a national standard, and put into effect in 2019. The evaluation framework covers five main categories: safety and durability, health and comfort, convenience of life, resource conservation, and environmental liveability (WorldGBC 2022). By the end of 2024, the cumulative certified building area in regions such as Shanghai had reached 422 million square meters across a total of 1,244 projects (Shanghai Green Building Council 2025).



9 Investment in sustainable buildings

Photo: Unsplash

To enable the policy framework and deliver improvements required to tackle the rising emissions, accelerate the observed slow reduction of buildings' energy intensity, and increase renewables, as described in Sections 3, 4, and 5, substantial and effective investments are needed.

Priority areas include improving energy efficiency, electrifying heating and cooling, deploying low-carbon construction materials, and integrating renewable energy solutions. This section presents investment trends to decarbonise buildings.

KEY TAKEAWAYS:

Investment in energy efficiency and electrification in buildings has risen over the last decade. However, there is a growing investment gap to deliver emissions reductions and future-proof the building stock in line with climate goals.

SINCE 2015

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has been invested in improving buildings' energy efficiency – **less than two thirds of the USD 3.6 trillion that was needed over the period to stay on track to achieve net-zero emissions by 2050.**

Global annual investment in building energy efficiency has increased steadily over the past decade, reaching around USD 275 billion in 2024 – a 38 per cent increase compared to 2015 levels and a 3 per cent increase on 2023. Governments have deployed green loans, retrofitting programmes and climate bonds to support investment. To maximise social impact, gender-responsive building finance approaches, including targeted support for women-headed households, inclusive credit mechanisms, and safeguards should be adopted to ensure that low-income and informal residents benefit from efficiency and retrofit programmes.

Energy efficiency investment needs to accumulate an additional USD 3.6 trillion by 2030 to align investment levels to what is needed under a 2050 net-zero pathway. Governments should provide long-term regulatory certainty to boost investment

9.1
Investment in buildings' energy efficiency and decarbonisation

Global investment in building energy efficiency has increased steadily over the past decade, accumulating USD 2.3 trillion between 2015 and 2024. This represents less than two thirds of the needed target for the period.

Indicator

The investment indicator tracks cumulative investment to improve energy efficiency in the building sector. Observed investments are added annually to obtain the cumulative value.

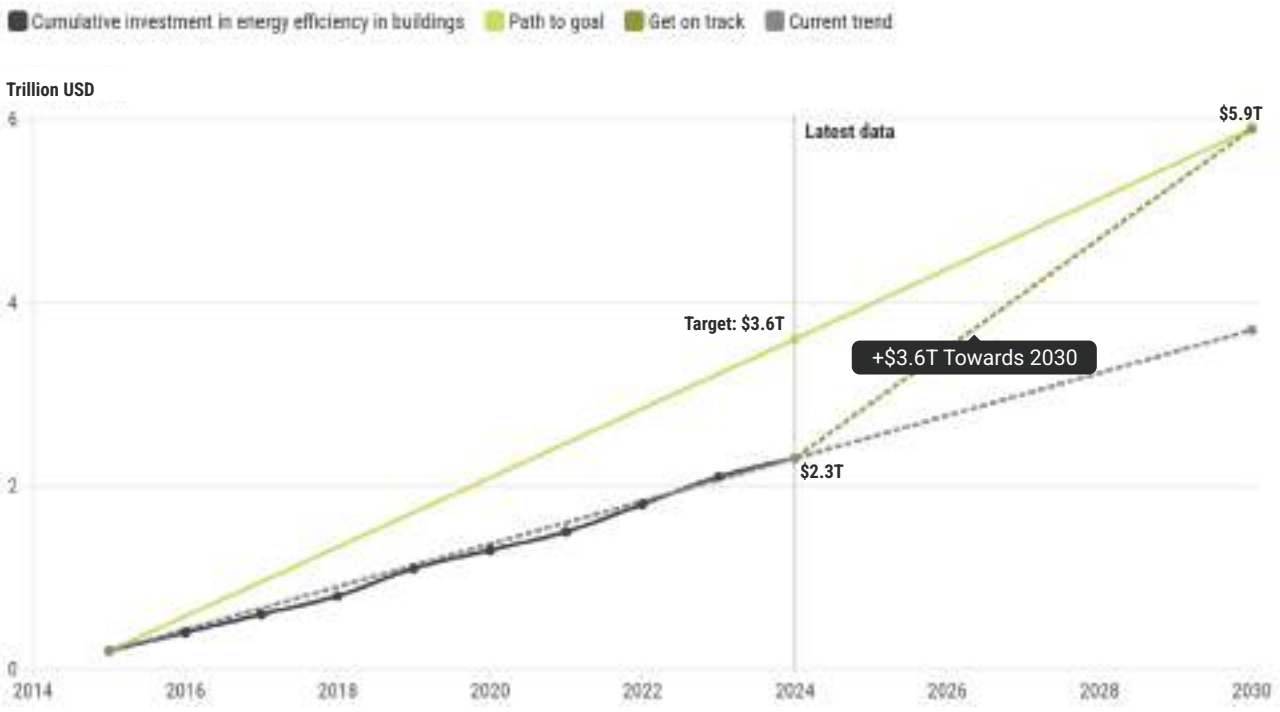

Figure 30. Cumulative investments in energy efficiency in buildings 2015-2024, path to goal, and path to get on track until 2030 (Based on (IEA 2025f) and GSRBC authors internal analysis)

Change observed from 2023 to 2024:

Annual investment in energy efficiency increased by 3 per cent in 2024 compared to 2023.

Change observed from 2015 to 2024:

Around USD **2.3 trillion have been invested** in energy efficiency since 2015. This represents **less than two thirds** of the USD 3.6 trillion needed to stay on track to achieve net-zero emissions by 2050.

Towards 2030:

To align the sector with a 2050 net-zero pathway, cumulative investment in building energy efficiency needs to reach USD 5.9 trillion by 2030 – an increase of USD 3.6 trillion compared to 2024 levels, this represents around USD 592 billion annually.

Global annual investment in building energy efficiency alone rose over the past decade, reaching USD 275 billion in 2024. This represents 3 per cent increase compared with 2023 levels and a 38 per cent rise compared to 2015 (IEA 2025f). Budget constraints compelled certain governments to reduce financial incentives for energy-efficient, especially in the European Union, which is focused on energy-efficient retrofits of older buildings (IEA 2025f). Combining energy efficiency and electrification across the buildings sector, the total investment reached USD 380 billion in 2024 (IEA 2025e)(see Figure 31).

$275B

investment reached for energy efficiency across the buildings sector

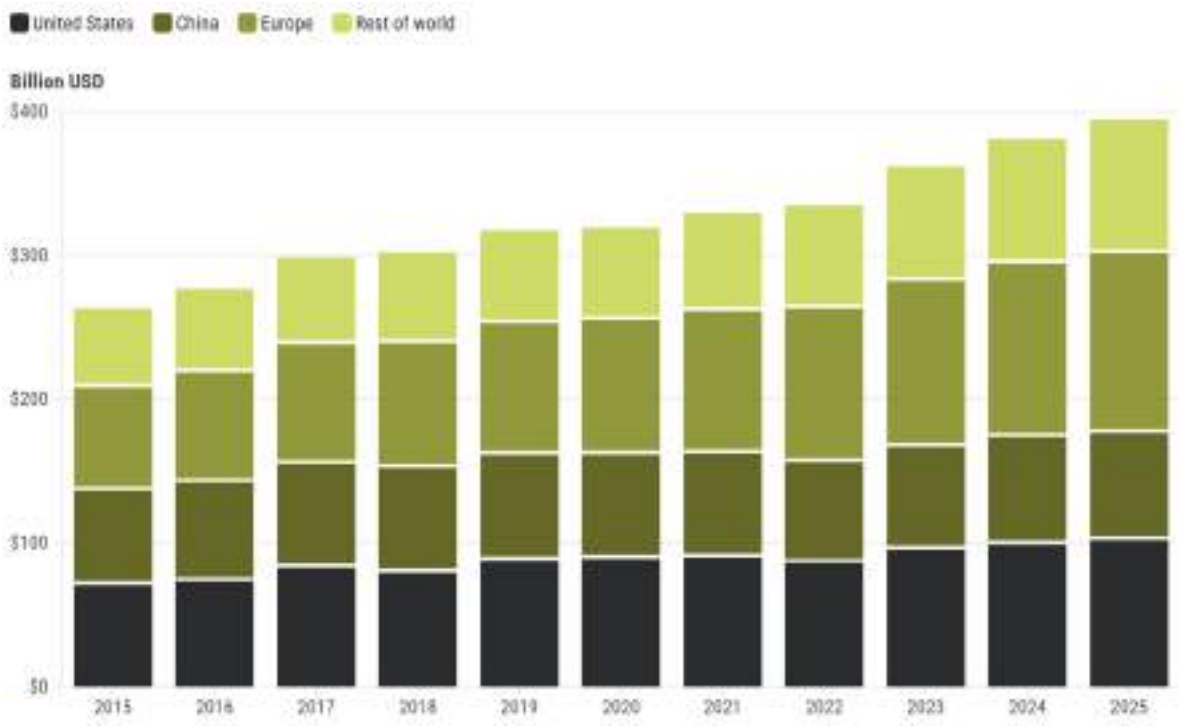

Figure 31. Investments in energy efficiency and electrification in the buildings sector, 2015-2024 (Based on (IEA 2025f))

Investment in buildings is enabled through multiple financial mechanisms, such as commercial finance, public financing schemes, and international development finance, with the relative importance of each source varying by region and market maturity. Development banks play a critical role in funding the transformation of the building sector. For example, the European Investment Bank established a

housing action plan with EUR 10 billion of investment earmarked over the next two years (European Investment Bank 2025). The World Bank's International Bank for Reconstruction and Development (IBRD) committed USD 24.5 billion for "environment, infrastructure and natural resource management" and an additional USD 9.5 billion on "urban development and land administration [and] management" with a portion going to building energy efficiency, while the International Development Association (IDA) committed similar levels (World Bank Group 2025b). In November 2025, the World Bank and Global Environment Facility (GEF) launched a new phase of their programme to invest in sustainable development in cities, targeting decarbonisation and resilience (The Global Platform for Sustainable Cities 2025).

The Global Property Linked Finance Initiative (GPLFI), launched in September 2025, aims to transform property-linked finance (PLF) into a globally recognised asset class (GPLFI, 2025a). The initiative promotes structures that attach repayment obligations to the property rather than the owner, enabling long-tenor finance that can transfer on sale and directly addresses barriers to deep retrofitting. GPLFI is organised around three core pillars: developing globally applicable PLF principles and country pathways; using high-level political engagement to secure commitments to national PLF markets; and creating dedicated capital-market vehicles. The PLF Principles aim to standardise, de-risk and scale investment in near-zero-emission and climate-resilient buildings (GPLFI 2025b).

The Belém Call for Action for Sustainable and Affordable Housing, which was launched by the Intergovernmental Council for Buildings and Climate (ICBC) in November 2025, sets targets to tackle housing problems related to climatic crisis (see Deep Dive). In particular, ICBC members called for the creation of an Affordable and Sustainable Housing Finance Alliance to finance sustainable and affordable housing (UNEP 2025b).

The World Green Building Council (WorldGBC) is supporting initiatives to accelerate investment in building sustainability. A key challenge for investors is determining where capital can deliver the greatest impact. Investment taxonomies that define criteria that qualify investments as "green" can support decision-making. Green building councils are developing taxonomies globally, with developments in the ASEAN region and the European Union, to help direct financial flows toward low-carbon building projects (WorldGBC 2025a).

9.2
Towards 2030: scaling-up investment in buildings' energy efficiency

While investments in energy efficiency have grown, up to 2024, the total investments accumulated were 1.3 USD trillion below the needed value for the overall 2015-2024 period.

To put the sector on track to achieve the 2050 goal, cumulative investments need to reach USD 5.9 trillion by 2030 – an increase of USD 3.6 trillion compared to 2024 levels.[22] This investment gap reflects a set of structural bottlenecks that continue to constrain capital mobilisation at scale, including fading public support schemes, high upfront costs, and policy uncertainty (IEA 2025f).

What can governments do now to enable the increase of investments in energy efficiency and other sustainable actions?

RECOMMENDATION

Improve the conditions for investments

1. Provide regulatory clarity by establishing clear timelines for upgrading building energy codes and tightening requirements toward zero-emission standards.
2. Implement fiscal incentives and tax benefits to reward energy efficiency and sufficiency improvements.
3. Gather data about the co-benefits of investment in energy efficiency in local and national contexts, integrating them into funding schemes and national and local budget allocation strategies.
4. Strengthen public and private collaboration, for example, using public-private partnerships to enable private sector financing of government-backed initiatives.

RECOMMENDATION

Support acceleration

1. Promote gender-responsive financing, including support for women-headed households and inclusive credit mechanisms.
2. Use neighbourhood and district-level financial support schemes, procurement, construction, retrofitting and repurposing practices as well as technical solutions to promote energy efficiency and renewable deployment.

3. Conduct opportunity cost analysis for energy-efficient interventions and the cost of extending the life of buildings to inform building owners and other investors.

BOX 11

Examples of building investment and financing activities

Canada

Canada's federal government introduced multiple financing and regulatory measures in early 2025 to accelerate building decarbonisation. The 2025 budget increased Canada Infrastructure Bank's capitalisation from CAD 35 billion to CAD 45 billion, which would enable it to provide long-term and low-cost finance for energy-efficient buildings (Canada, Department of Finance 2024). In early 2025, the government launched the Secondary Suite Loan Program, which allows homeowners to refinance up to 90 per cent of their home's post-retrofitting value to a maximum of CAD 2 million over 30 years to add secondary rental units (Huebl 2024). The Build Canada Homes programme introduced a 20 per cent construction emissions reduction target, while a new Green and Transition Taxonomy and Sustainable Bond Framework aims to de-risk capital allocation for low-carbon buildings (Canada, Prime Minister 2025)

United Kingdom

In July 2025, the UK government announced a GBP 2.5 billion low-interest loan scheme to support the delivery of social and affordable housing at 0.1 per cent interest with 25-year duration, administered by the National Housing Bank (Homes England) with GBP 1.5 billion allocated to London (United Kingdom, Ministry of Housing, Communities & Local Government 2026). Other ongoing programmes include the Energy Company Obligation (ECO4) scheme, which provides up to GBP 30,000 per household for improving heating systems and insulation in low-income households, and the Great British Insulation Scheme, which covers up to 75 per cent of insulation costs for households with low EPC ratings or low council tax bands, demonstrating continued public investment in residential energy efficiency despite budget constraints (Jackman 2025).

New Zealand

In April 2025, the Climate Bonds Initiative confirmed that residential buildings certified under the New Zealand Green Building Council's green rating scheme at 6 stars or above are eligible under the Climate Bonds Standard for expediting financing transactions for residential buildings (New Zealand Green Building Council 2025). New Zealand's major banks offer loans with preferential rates for commercial properties achieving 5-Star Green Star or higher, residential properties with 6-Star Homestar or higher and office buildings with 4-Star NABERSNZ or higher certification, alongside sustainability-linked loans that provide discounted rates for projects meeting renewable energy, energy efficiency and sustainable land use criteria (Formance 2025).

10

Future-proofing the buildings sector: monitoring resilience and adaptation risks

Photo: Unsplash

Efforts for the decarbonisation of the buildings and construction sector should not be deployed only based on mitigations actions.

The transformation of the sector should consider current and future impacts of climate change to ensure that the investments and naturals resources spent in the transformation of the sector not only contribute to reducing emissions but also protect the sector, buildings users, and all the actors in the construction supply chain from current and future impacts of climate change.

Buildings must be able to withstand intensifying climate risks such as extreme weather. This requires resilience and adaptation measures to be implemented across individual structures, including women, children, elderly persons and people with disabilities, and at the urban scale to protect building users and citizens. This chapter reviews key frameworks advancing these efforts and outlines forthcoming GSRBC indicators to track buildings resilience as it scales **(see Section 12)**.

KEY TAKEAWAYS:

Amid increasing climate risks, it is crucial to **ensure that new and existing buildings are future-proof, resilient and adaptable.**

To identify communities, buildings and other infrastructure that face existing and future climate risks and to develop adequate adaptation solutions to address them, **governments should collect and monitor data on hazard exposure, structural vulnerability and adaptation capacity.**

To identify the exposure of women, children, elderly persons and people with disabilities to climate risks in buildings, particularly in informal settlements and inadequate housing, **governments should develop gender-responsive resilience planning, data collection, and design standards.**

10.1
Adaptation and resilience in buildings and construction

In 2025, there were multiple efforts to engage with ways to improve climate resilience and adaptation in buildings. A report from the European Commission Joint Research Centre assessed how structural design standards need to evolve to account for climate-driven hazards and how to harmonise climate data to inform engineering practices.

It also identified gaps to improve wildfire resilience in the wildland–urban interface and summarised lessons from European Union member state case studies to set research priorities for climate-resilient built infrastructure (Dimova et al. 2025).

In November 2025, the World Federation of Engineering Organization set out 15 guidelines for engineers to integrate climate adaptation and resilience across infrastructure and buildings' life cycle (World Federation of Engineering Organizations 2025). In its report, the American Institute of Architects (AIA) urged architects to treat escalating climate hazards as the basis for design conditions, use forward-looking risk and vulnerability assessments to set performance goals and select resilience strategies that will cover buildings' full service life (American Institute of Architects Strategic Council 2025).


Photo: Unsplash

Transport infrastructure also needs to be considered in adaptation strategies for the built environment. Adaptation principles for urban mobility should be embedded in transport planning and projects to enable cross-sector, multilevel and locally informed resilience (France, Agence de la transition écologique, CODATU, and MobiliseYourCity 2025).

To drive action around adaptation, the Global Alliance for Buildings and Construction (GlobalABC) Adaptation Hub launched its Adaptation Pathways framework at COP30 in November 2025 (GlobalABC, Adaptation Hub, 2025). The framework was designed to guide actionable, step-by-step pathways that guide all stakeholders in the buildings and construction sector toward a climate-resilient future, defining actions to accelerate climate resilience for national governments, building owners and civil society organisations. It describes adaptation as a continuous and collaborative process rather than a one-time intervention, emphasising that early action can unlock long-term systemic change.

10.2
A framework for different adaptation and resilience domains

Adaptation and resilience risks can be measured in different ways depending on the geographic context. For example, in regions with high levels of informal housing development, very few buildings would meet structural stability measures that almost all buildings in other regions would have to pass. The availability and quality of the data will also limit what can be tracked over time under a global indicator framework.

Some examples of adaptation and resilience indicators are presented in Table 1. Although not comprehensive, they give a clear sense of how different adaptation domains can be translated into empirical indicators that provide a consistent picture over time. The operationalisation of some of these indicators is being explored and assessed in the ongoing initiative to scale up the GSRBC, see Section 13.

TABLE 1
Example indicators across different adaptation and resilience domains

DOMAIN	EXAMPLE INDICATOR	TYPICAL METRIC OR UNIT
Hazard exposure	**Buildings in flood-prone areas**	Number or per cent of buildings in 1-in-100-year or 1-in-500-year flood zones
	Buildings in wildfire risk zones	Number or per cent of buildings in high or very high wildfire hazard areas
	Heat-exposed buildings	Number or per cent of buildings experiencing >X extreme heat days per year (for example >35°C)
	Coastal and storm surge exposure	Number or per cent of buildings within coastal flood or storm surge zones
Structural vulnerability	**Non-compliant building stock**	Per cent of buildings not meeting current resilience or energy codes
	Flood-proofing deficit	Per cent of buildings in the flood plain, without barriers
	Passive cooling deficit	Per cent of buildings lacking shading, ventilation, or cool roofs
	Building stock age	Per cent of buildings built before modern hazard-resilient standards
Adaptation capacity	**Climate-resilient new buildings**	Per cent of new buildings meeting climate-resilient design standards
	Retrofitted building stock	Per cent of existing buildings upgraded with resilience measures
	Risk assessment coverage	Per cent of buildings with completed climate risk assessments
	Insurance coverage	Per cent of buildings insured against climate hazards
Institutional and governance capacity	**Existence of resilience building codes or standards**	Per cent of buildings meeting resilience standards and energy codes
Socio-economic vulnerabilities	**Exposure of low-income households to climate hazards**	Per cent of the lowest income quintile located in high-risk hazard zones
	Exposure of female-headed households to climate hazards	Per cent of female-headed households located in high-risk hazard zones

11 Roadmaps to drive transformation: from strategy to implementation

In addition to the adequate policy framework, the substantial investments, and the considerations on adaptation and resilience discussed in **Sections 6 to 10**, a clear direction of travel is critical to put the buildings and construction sector on track to become a zero-emission, resilient and socially just sector during this decisive decade for climate action.

Roadmaps can turn strategic ambitions into practical implementation frameworks. Countries and their partner organisations are increasingly embedding roadmap priorities to transform the buildings and construction sector into national policies. This section discusses recent developments worldwide.

KEY TAKEAWAYS:

Roadmaps are an effective tool to decarbonise and future-proof the buildings sector, but to achieve measurable emissions reductions, they must be accompanied by a robust regulatory framework, effective finance mobilisation, and strengthened industry capacity, accountability and performance tracking.

Roadmaps should be coupled with strategies to align targets for the buildings sector with national climate commitments and housing plans, measures to strengthen collaboration between public institutions to avoid siloed approaches; improved monitoring of the building sector and effectiveness of policies, plans to create and enhance workforce in the sector, including promoting women's participation in technical, skilled and leadership roles, ensuring safe and inclusive working conditions, and supporting gender-responsive skills and training programmes for green construction and retrofitting.

When developing a roadmap, governments should ensure they have clear ownership of its objectives and support from public bodies to deliver them as well as the capacity to link roadmap priorities with energy codes, procurement requirements and financing programmes. The coming years will test whether roadmaps can drive, sustain and scale the implementation of carbon-cutting and adaptation measures in the buildings sector.

11.1
Regional and national roadmaps for buildings and construction following the GlobalABC methodology

The GlobalABC supports the development of national roadmaps to deliver a zero-emission, efficient and resilient buildings and construction sector through government-led processes and a systematic methodology that supports national ownership, coordination and delivery.

These roadmaps are designed to translate national ambition into actionable implementation steps by strengthening institutional leadership, aligning stakeholders and linking priorities to policy instruments and investment planning.

Bangladesh, for example, has integrated its buildings and construction roadmap into its NDC 3.0 submission, formalising sectoral targets within its national climate commitments. This comes in addition to ramping up efforts to reduce buildings' embodied and operational emissions, scaling low-carbon materials and strengthening urban resilience (GlobalABC 2025a).

Jordan is developing a Climate action roadmap for buildings and construction in line with the GlobalABC methodology and its NDC 3.0. Led by the Ministry of Energy and Mineral Resources with technical support from Germany, the process has established a comprehensive baseline for buildings' operational and embodied emissions, strengthened cross-ministerial coordination and improved monitoring of the sector's climate risks and impacts (Jordan Times 2025).


Photo: Unsplash

Building sector roadmaps are also being implemented in **Ghana** (GlobalABC 2024a) and **Senegal** (GlobalABC 2024c), where priorities include low-carbon materials, workforce capacity, improved urban planning, and long-term emissions reduction pathways. UNEP and GlobalABC are supporting both countries to link their roadmap priorities with their NDC 3.0 targets.

At the sub-national level, the Indian state of **Odisha**, illustrates how GlobalABC-aligned roadmaps can drive regulation reform, climate-responsive planning and regionally tailored mitigation strategies, underscoring the growing role subnational actors play in transforming the sector (GlobalABC 2024b).

These GlobalABC-supported initiatives demonstrate how building sector roadmaps are being embedded in national climate strategies and are leading to greater policy coherence and a stronger institutional capacity to deliver.

Figure 32. Climate Action Roadmaps for Buildings and Construction
(Based on sections authors internal analysis)

Note: Arab League: United Arab Emirates, Bahrain, Qatar, Kuwait, Saudi Arabia, Oman, Yemen, Morocco, Algeria, Tunisia, Libya, Egypt, Lebanon, Jordan, Gaza and West Bank, Iraq, Mauritania, Sudan, Somalia, Djibouti, Comoros, Syria. China's Greater Bay Area*: Guangdong-Hong Kong-Macau. ASEAN*: Association of Southeast Asian Nations. Eight key areas*: urban planning, new buildings, existing buildings, building operations, appliances and systems, materials, resilience and clean energy.*

11.2
Other green building roadmap initiatives around the world

Beyond GlobalABC-led initiatives, other organisations are supporting countries implementing green building roadmaps.

In **Kenya**, the Global Buildings Performance Network (GBPN) is supporting the State Department for Public Works to develop a national buildings and construction sector decarbonisation roadmap (2026–2040), which aims to strengthen green building standards and codes, energy efficiency and electrification measures, low-carbon materials deployment, passive design and cooling, and enhanced measuring, reporting and verification systems. The process has resulted in the establishment of a national baseline for

buildings' emissions, the identification of high-impact mitigation opportunities – particularly in residential and affordable housing – and the development of a toolkit to ensure inclusive implementation. The approach offers a replicable model for translating global commitments into national strategies (GBPN 2024).

Indonesia is launching city-level green building roadmaps in five major cities, alongside technical guidelines and peer-to-peer learning to accelerate adoption across the country. At a national level, the first phase of the Green Affordable Housing Roadmap (2025-2029) builds on the National Green Building Roadmap – which clarified the role of ministries and set out performance benchmarks and actions for emissions reductions across new and existing buildings – and integrates health, resilience and efficiency principles (GBPN 2026).

Across **Europe**, the WorldGBC's BuildingLife initiative (WorldGBC 2026) is supporting national green building councils to implement roadmaps with a focus on accountability, whole-life carbon emissions and policy integration. For example, France is mobilising the industry and scaling the collection of data on buildings' life cycle emissions, as well as promoting circular economy and retrofitting programmes. Germany has introduced a national digital monitoring platform for its roadmap, practitioner training and municipal engagement. Finland is focusing on corporate accountability and emissions transparency. Hungary has integrated its roadmap's objectives across the government. Italy is seeking corporate commitments for decarbonisation, advancing city-level delivery and whole-life carbon benchmarks, while promoting low-carbon and bio-based materials. The Netherlands has linked roadmap objectives to investor decisions through Scope 3 guidance, retrofitting frameworks and municipal procurement pilot schemes. Spain has introduced a sustainable heating roadmap, whole-life carbon benchmarks and a taxonomy platform to support green finance. The United Kingdom is progressing retrofit programmes and standards to reduce embodied carbon emissions in buildings, including by piloting the Net Zero Carbon Buildings Standard pilot.

In the **Americas**, WorldGBC supported seven national green building councils, bringing together over 420 stakeholders and producing national frameworks to determine priorities, with regional coordination reinforced through the Americas Manifesto ahead of COP30 (WorldGBC 2025c).

To be effective and deliver zero-emissions, efficient and resilient buildings, roadmaps will need to be integrated into national climate and housing commitments, regulatory frameworks, corporate investment decisions, and local implementation plans. Success will require strong government ownership, clear industry accountability, effective financial alignment, rigorous performance tracking, and the expansion of real-world projects that demonstrate how to turn roadmap objectives into tangible transformation across the global buildings and construction sector.

12 Priority actions: accelerating the observed progress

Photo: Unsplash

To accelerate the transition of the buildings and construction sector to a zero-emission, efficient, resilient and socially just sector, policymakers should focus now on the following areas to achieve the forthcoming 2030 milestones and align the sector towards the net-zero goal by 2050:

1. Reversing the trend of growing emissions requires governments to adopt plans for the phase-out of fossil-fuel heating and cooking, scale up deep retrofitting and leverage public procurement to demand low-carbon solutions for buildings' energy supply. These policies need to deliver results which can be traced with quantitative observations.

2. The energy intensity of the global building stock needs to fall by 25 per cent by 2030 compared to current levels to stay on track with the IEA's NZE scenario. Governments should update building energy codes to include energy efficiency and sufficiency principles, set minimum performance standards for existing buildings, and promote passive heating and cooling designs and retrofits to reduce energy needs

3. The share of renewables in buildings' power supply needs to increase from 17 per cent to 46 per cent by 2030 from 2024 levels. To speed up the adoption of on-site renewables, governments should consider renewable heat and electricity in buildings as a technology deployment challenge, not solely as a power-sector issue.

4. The role of the buildings and construction sector in the overall strategy to address climate change needs to be systematically recognised and made actionable. Governments need to develop extensive building strategies within their NDC, including actions and targets for building energy codes and energy supply, efficiency of appliances, green building certifications, material supply chain and circularity, urban planning, and finance.

5. At least all G20 countries and 75 other countries should have zero-emissions aligned building codes by 2030. Governments should urgently upgrade building codes with requirements toward zero-emissions standards and enforcement mechanisms, especially in high-growth areas such as Africa. This should be paired with strengthened capacity building and knowledge transfer of low-carbon construction practices.

6. Governments should use green certification schemes to amplify their decarbonisation policies, by aligning schemes to the national context and integrating them into building codes as well as procurement and social housing requirements to accelerate the transformation of the market.

7. The housing sector influences a large portion of the activities of the buildings and construction sector worldwide, representing a large portion of the global building floor area and energy demand, which contributes to a large extent to the impact of the buildings and construction sector on climate change. In addition to climate change, housing affordability is a major and increasing global challenge. To ensure that actions that address one crisis do not aggravate the other and hinder progress in both, governments should consider housing affordability and the housing sector's role in tackling climate change together.

13 Building on a strong foundation: scaling up the GSRBC

Photo: Unsplash

The GlobalABC was formed at COP21 to catalyse global action and serve as a trusted platform for setting targets and tracking progress, by supporting the priorities of its 400 members, including 71 countries. In the past 10 years, the need for action to support change has become more critical than ever before, as the world faces multiple energy, climate and societal crises.

Transformative actions on the buildings and construction sector can foster fair economic development, enhance safety and public health, advance social justice and cultural cohesion, enhance and protect natural systems and biodiversity, and reduce waste and pollution. The buildings sector also acts as a strategic connecting point between mitigation actions that address greenhouse gas emissions, but also enables resilience against current and future climate change. However, ten years after the adoption of the Paris Agreement, the buildings and construction sector remains off track from the path to decarbonisation.

To accelerate the transition of the buildings and construction sector to a zero-emission, efficient, resilient and socially just sector, decision-makers require robust and timely evidence to assess progress and design effective strategies. They also need an engaged community of stakeholders to spur collective action and clear messages that connect to peoples' lived reality and foster support for change.

Forthcoming editions of this report will show how the sector can act as a catalyst for achieving the Paris Agreement goals while delivering resilient buildings that support quality and affordable housing and inclusive economic growth.

Previous Global Status Reports for Buildings and Construction

The GSRBC is scaling into a global, action-oriented evidence platform that will lead the conversation on decarbonising the buildings sector.

As a result, the GSRBC is:

1 ACTION

Building the information foundation

- **Expanding indicators,** by collecting data, designing new indicator frameworks and improving methodologies to integrate equity and affordability.
- **Providing more granular regional evidence,** particularly in low- and middle-income countries, which are experiencing the fastest building growth.

2 ACTION

Building an engaged community

- **Creating a global, collaborative knowledge ecosystem** by engaging technical leads, expert advisors and regional organisations, including GlobalABC's 400+ members and 23 partner organisations.
- **Supporting the community with information and data** by gathering evidence to evaluate and set out locally appropriate pathways and best practices for diverse socio-economic and climatic contexts.

3 ACTION

Building a conversation

- **Building a platform** to communicate the strategies and actions that are needed for a just transformation of the buildings sector that supports livelihoods and productivity.
- **Fostering greater support for action** by raising awareness of why action is needed and supporting decision-makers to accelerate the sector's transition.

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Endnotes

1 Nationally determined contributions are key to the Paris Agreement and the achievement of its long-term goals, since they comprise the efforts by each country to reduce national emissions and adapt to the impacts of climate change.

2 Since January 2025, the NDC 3.0 round has raised reporting requirements on country climate intentions from pledge statements toward standardised national plans (UNFCCC 2026). Parties are expected to communicate 2035-oriented NDCs.

3 Sufficiency is a set of policy measures and daily practices which avoid the demand for energy, materials, land, water, and other natural resources, while delivering wellbeing for all within planetary boundaries. Applying sufficiency principles to buildings requires i) optimising the use of buildings, ii) repurposing unused existing ones, iii) prioritising multi-family homes over single-family buildings and iv) adjusting the size of buildings to the evolving needs of households (Yamina Saheb 2021).

4 Construction cost inflation reflects an imbalance between supply and demand in the construction sector, where the costs of materials, labour, equipment, and overhead rise faster than overall inflation. It signals pressures such as limited capacity, labour shortages, and increasing material prices and is a marker of the economic health of the construction industry and viability of construction activities.

5 Assuming the lifetime of a building is between 80 and 90 years.

6 The INDICATE initiative and an upcoming follow-up report to the interim report Buildings Breakthrough Interim Report: Definition and principles for Near-Zero Emission and Resilient Buildings (NZERBs) released by the Building breakthrough initiative can provide guidance in this regard.

7 Resources such as the recent interim report Buildings Breakthrough Interim Report: Definition and principles for Near-Zero Emission and Resilient Buildings released by the Buildings Breakthrough initiative can provide guidance for this task. The interim report introduces a qualitative definition of a Near–Zero Emission and Resilient Building (NZERB), along the key building blocks or principles required to achieve it.

8 Sufficiency is a set of policy measures and daily practices which avoid the demand for energy, materials, land, water, and other natural resources, while delivering wellbeing for all within planetary boundaries. Applying sufficiency principles to buildings requires i) optimising the use of buildings, ii) repurposing unused existing ones, iii) prioritising multi-family homes over single-family buildings and iv) adjusting the size of buildings to the evolving needs of households (IPCC 2022).

9 Please consider that the building energy intensity here is seen as an indicator of the energy efficiency of the operational stage, i.e. the energy required for the operation of the building.

10 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

11 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

12 Nationally determined contributions are key to the Paris Agreement and the achievement of its long-term goals, since they comprise the efforts by each country to reduce national emissions and adapt to the impacts of climate change.

13 Since January 2025, the NDC 3.0 round has raised reporting requirements on country climate intentions from pledge statements toward standardised national plans (UNFCCC 2026). Parties are expected to communicate 2035-oriented NDCs.

14 As part of the Global Buildings Climate Tracker methodology, the goal for this indicator considers that advanced economies should reach net-zero emissions in advance of others, i.e. by 2030 all G20 members and at least 50 per cent of the remaining countries should already have in place an extensive strategy for their buildings and construction sector.

15 Global Stocktakes are evaluation of the world's current climate action situation. They happen every five years, they help identify the gaps to the objectives of the Paris Agreement.

16 The complete set of submissions is available at the NDC Registry.

17 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

18 Note that only the results until 2024 are included in the calculations for the Global Buildings Climate Tracker to ensure the consistency with the time span for which the other six indicators are available. The value presented for 2025 is based on the new analysis methodology and the new set of NDCs submitted under the 3.0 phase.

19 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

20 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

21 This is an example but there are many other such initiatives between various state governments, municipalities and public bodies, and public and private sector units.

22 For further details on the indicator, goal for 2050 and the tracking methodology please see Annex: Global Buildings Climate Tracker Methodology.

References

American Institute of Architects Strategic Council (2025) Climate Corner: Design for Resilience. Available at: https://www.aia.org/sites/default/files/2025-06/ClimateCorner_June2025_Resilience%20final.pdf.

Asian Insiders (2025) Asia's Construction Industry 2025 Building for Tomorrow. Available at: https://asianinsiders.com/wp-content/uploads/2025/03/Asian-Insiders-Construction-Report-250321-Draft.pdf.

Asociación Colombiana de Informática, Sistemas y Tecnologías Afines (2025) Colombia, segundo país del mundo con más proyectos certificados por sostenibilidad, ACIS. Available at: https://www.acis.org.co/blog/noticias-2/colombia-segundo-pais-del-mundo-con-mas-proyectos-certificados-por-sostenibilidad-746 (Accessed: 18 February 2026).

Australia Clean Energy Council (2025) Rooftop solar and storage report January—June 2025. Available at: https://cleanenergycouncil.org.au/getmedia/4bb1033a-e903-4dd7-a30c-5de488de1b97/cec_rooftop-solar-and-storage-report_jan_june2025.pdf.

Avci, O. (2023) 'Green building tax incentives: selected country cases and implications for Türkiye', Issues on Sustainability, Economics & History [Preprint], (1).

Baker McKenzie (2021) Global Sustainable Buildings Guide: Türkiye. Available at: https://resourcehub.bakermckenzie.com/en/resources/global-sustainable-buildings/europe-middle-east-and-africa/turkiye/topics/green-certification (Accessed: 18 February 2026).

Bank for International Settlements (2025) Comparative view of Advanced economies - Selected residential property prices, Nominal, Year-on-year changes, in per cent. Available at: https://data.bis.org/topics/RPP/BIS%2CWS_SPP%2C1.0/Q.5R.N.771?additional_ts=BIS%2CWS_SPP%2C1.0%255EQ.4T%2BXM%2BJP%2BXW%2BUS%2BIN.N.771&view=chart&filter=TIMESPAN%3D2015-01-01_2024-11-09 (Accessed: 12 February 2026).

Bank of Japan (2023) 'Energy Efficiency in Japan: Developments in the Business and Household Sectors, and Implications for Carbon Neutrality'.

Benke, B. et al. (2025) 'A Harmonized Dataset of High-resolution Whole Building Life Cycle Assessment Results in North America'. Research Square. Available at: https://doi.org/10.21203/rs.3.rs-6108016/v1.

British Standards Institution (2011) Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method. London: BSI. Available at: https://knowledge.bsigroup.com/products/sustainability-of-construction-works-assessment-of-environmental-performance-of-buildings-calculation-method (Accessed: 25 March 2026).

Bundesnetzagentur (2026) Growth in renewable energy in 2025. Available at: https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/EN/2026/20260108_EEG.html (Accessed: 17 February 2026).

Bundesverband energieeffiziente Gebäudehülle e.V. (2025) Sanierungsquote. Available at: https://buveg.de/sanierungsquote/ (Accessed: 12 February 2026).

Buro Happold (2025) 'Denmark's ambitious new CO_2 standards for construction: What you need to know', 10 November. Available at: https://www.burohappold.com/news/denmark-sets-stricter-co2-emissions-rules-for-construction-what-you-need-to-know/ (Accessed: 16 February 2026).

California Energy Commission (2024) '2025 California Energy Code'. Available at: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency.

Camacol - Cámara Colombiana de la Construcción (2025a) Incentivos tributarios para proyectos con certificación Edge. Available at: https://camacol.co/actualidad/publicaciones/revista-urbana/104/sostenibilidad/incentivos-tributarios-para-proyectos (Accessed: 18 February 2026).

Camacol - Cámara Colombiana de la Construcción (2025b) RUTA NACIONAL CAMACOL VERDE, UN RECORRIDO QUE NO TIENE REVERSA. Available at: https://camacol.co/actualidad/publicaciones/revista-urbana/103/sostenibilidad/ruta-nacional-camacol-verde-un-recorrido (Accessed: 18 February 2026).

Camacol - Cámara Colombiana de la Construcción (2026) EDGE Buildings | Certificación Sostenible de Edificaciones, Camacol - Cámara Colombiana de la Construcción. Available at: https://camacol.co/productividad-sectorial/sostenibilidad/edge (Accessed: 18 February 2026).

Canada, Department of Finance (2024) 2024 Fall Economic Statement: Making it easier for homeowners to build secondary suites. Available at: https://www.canada.ca/en/department-finance/news/2024/12/2024-fall-economic-statement-making-it-easier-for-homeowners-to-build-secondary-suites.html (Accessed: 19 February 2026).

Canada, Prime Minister (2025) Prime Minister Carney launches Build Canada Homes to supercharge homebuilding across the country, Prime Minister of Canada. Available at: https://www.pm.gc.ca/en/news/news-releases/2025/09/14/prime-minister-carney-launches-build-canada-homes (Accessed: 19 February 2026).

Casa Colombia (2024) Más de 100 Proyectos Registrados en CASA Colombia: Hito para las viviendas sostenibles y saludables en el país. Available at: https://casa.cccs.org.co/wp-content/uploads/2024/06/100-Proyectos-CASA-info-noticias.pdf.

China (2024) 关于进一步扩大政府采购支持绿色建材促进建筑品质提升政策实施范围的通知_国务院部门文件_中国政府网. Available at: https://www.gov.cn/zhengce/zhengceku/202501/content_6997931.htm (Accessed: 19 February 2026).

China (2025a) China expands carbon trading market to steel, cement, aluminum smelting sectors. Available at: https://english.www.gov.cn/news/202503/27/content_WS67e487ddc6d0868f4e8f1358.html (Accessed: 9 March 2026).

China (2025b) China unveils two-year plan to boost building materials sector. Available at: https://english.www.gov.cn/english.www.gov.cn/news/202509/24/content_WS68d3de65c6d00ca5f9a0666d.html (Accessed: 19 February 2026).

China, National Bureau of Statistics (2025) Report on the 2024 national housing market situation. Available at: https://www.stats.gov.cn/sj/zxfb/202501/t20250117_1958328.html.

Clean Cooking Alliance (2023) 'Women & Clean Cooking'. Available at: https://cleancooking.org/the-issues/women-and-clean-cooking/ (Accessed: 8 April 2026).

Climate Change Committee (2025) Progress in reducing emissions - 2025 report to Parliament. Available at: https://www.theccc.org.uk/publication/progress-in-reducing-emissions-2025-report-to-parliament/ (Accessed: 12 February 2026).

Colorado Energy Office (2025) Building Decarbonization Enterprise Fund. Available at: https://energyoffice.colorado.gov/

building-decarbonization-enterprise-fund (Accessed: 18 February 2026).

Consejo Colombiano de Construcción Sostenible (2025) Enlace Verde. Available at: https://www.cccs.org.co/wp-content/uploads/2025/04/Boletin-Enlace-Verde-2025_Q1.pdf.

Data Insights Market (2026) Latin America Construction Market Growth Opportunities and Market Forecast 2026-2034: A Strategic Analysis. Available at: https://www.datainsightsmarket.com/reports/latin-america-construction-market-17262 (Accessed: 25 February 2026).

Dimova, S. et al. (2025) Lifetime Assessment of European Reinforced Concrete Structures Subjected to Climate Change-Induced Carbonation, JRC Publications Repository. Available at: https://doi.org/10.1002/cepa.3341.

Economic Times Energy World (2025) India adds 4.9 GW rooftop solar capacity in Jan-Sept period of 2025; installations soar 161% YoY: Report, ETEnergyworld.com. Available at: https://energy.economictimes.indiatimes.com/news/renewable/india-rooftop-solar-installations-surge-to-49-gw-in-2025-up-161-yoy/125563436 (Accessed: 27 February 2026).

EMBER (2025) China Energy Transition Review 2025. Available at: https://ember-energy.org/latest-insights/china-energy-transition-review-2025/.

EnDK (2025) 'MoPEC 2025', Hub énergie bâtiment. Available at: https://hubenergiebatiment.ch/politique-energetique-des-cantons/mopec-2025/ (Accessed: 2 March 2026).

England, R. (2025) 'Everything you need to know about the Future Homes Standard | Elemental London', elemental, 17 January. Available at: https://elementallondon.show/features/everything-you-need-to-know-about-the-future-homes-standard/ (Accessed: 19 February 2026).

European Commission (2025) COMMISSION DELEGATED REGULATION (EU) …/... of 16.12.2025 amending Annex III to Directive (EU) 2024/1275 of the European Parliament and of the Council as regards the Union framework for the national calculation of life-cycle global warming potential. Available at: https://energy.ec.europa.eu/document/download/a13f9997-fe46-40ec-b158-86149e978624_en?filename=C_2025_8723_1_EN_ACT_part1_v5.pdf.

European Commission (2026) Climate-friendly alternatives to HFCs - Climate Action. Available at: https://climate.ec.europa.eu/eu-action/fluorinated-greenhouse-gases/climate-friendly-alternatives-hfcs_en (Accessed: 24 February 2026).

European Construction Industry Federation (2025) FIEC 2025 Statistical Report EUROPEAN UNION. Available at: https://fiec-statistical-report.eu/european-union.

European Environment Agency (2025a) Decreasing threshold limit values for carbon footprint from buildings and Strategy for a holistic building regulation (HOB). Available at: https://www.eea.europa.eu/en/circularity/knowledge/circular-economy-country-pages/copy_of_rules-and-standards/decreasing-threshold-limit-values-for-carbon-footprint-from-buildings-and-strategy-for-a-holistic-building-regulation-hob-1 (Accessed: 16 February 2026).

European Environment Agency (2025b) Greenhouse gas emissions from energy use in buildings in Europe. Available at: https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-energy (Accessed: 12 February 2026).

European Heat Pump Association (2025) 'Heat pump sales up 9% in 2025 so far', European Heat Pump Association, 17 October. Available at: https://ehpa.org/news-and-resources/market-data/heat-pump-sales-up-9-in-2025-so-far/ (Accessed: 16 February 2026).

European Investment Bank (2025) EIB Group and European Commission lay foundations for a new pan-European investment platform for affordable and sustainable housing, European Investment Bank. Available at: https://www.eib.org/en/press/all/2025-123-eib-group-and-european-commission-lay-foundations-for-a-new-pan-european-investment-platform-for-affordable-and-sustainable-housing (Accessed: 19 February 2026).

European Parliament (2024) Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast) (Text with EEA relevance). Available at: http://data.europa.eu/eli/dir/2024/1275/oj (Accessed: 17 February 2026).

Formance (2025) Green Lending for NZ Developers | Sustainable Financing Guide. Available at: https://www.formance.co.nz/learn/green-financing-for-property-developers-in-new-zealand/ (Accessed: 19 February 2026).

France, Agence de la transition écologique, CODATU, and MobiliseYourCity (2025) Adaptation of urban mobility and the built environment to climate change: Nine principles for effective action (Full report). Agence de la transition écologique (ADEME). Available at: https://www.mobiliseyourcity.net/sites/default/files/2025-10/Adaptation%20of%20urban%20mobility%20and%20the%20built%20environment%20to%20climate%20change%20-%20Nine%20principles%20for%20effective%20action_compressed.pdf.

France, Ministère de la Transition écologique et de la Cohésion des territoires (2020) 'Guide RE2020'.

Gallucci, M. (2025) Trump rescinds federal program to boost low-carbon building materials, Canary Media. Available at: https://www.canarymedia.com/articles/policy-regulation/trump-rescinds-federal-program-to-boost-low-carbon-building-materials (Accessed: 18 February 2026).

GIZ (2026) Energy transition. Available at: https://www.giz.de/en/expertise/infrastructure/energy-transition (Accessed: 17 February 2026).

Global Alliance for Buildings and Construction (2024a) Climate Action Roadmaps For Buildings and Construction Ghana. Available at: https://globalabc.org/sites/default/files/2024-11/Climate%20Action%20Roadmap_GHANA.pdf.

Global Alliance for Buildings and Construction (2024b) Climate Action Roadmaps for Buildings and Construction: Step-by-Step Guidance. Available at: https://globalabc.org/climate-action-roadmaps-buildings-and-construction (Accessed: 27 February 2026).

Global Alliance for Buildings and Construction (2024c) Feuille de route pour l'action climatique dans le secteur du bâtiment et de la construction au Sénégal. Available at: https://globalabc.org/sites/default/files/2024-10/Climate%20Action%20Roadmaps%20for%20Buildings%20and%20Construction%20Senegal.pdf.

Global Alliance for Buildings and Construction (2025a) Bangladesh's NDC 3.0 (2025) Recognizes the Building and Construction Sector as a Key Climate Priority. Available at: https://globalabc.org/news/bangladeshs-ndc-30-2025-recognizes-building-and-construction-sector-key-climate-priority (Accessed: 27 February 2026).

REFERENCES (CONT.)

Global Alliance for Buildings and Construction, Adaptation Hub (2025b) ADAPTATION PATHWAYS. Available at: https://globalabc.org/sites/default/files/inline-files/adaptation-pathways-report---v2.pdf.

Global Alliance for Buildings and Construction, Adaptation Hub (2025c) Buildings Breakthrough: Interim Report – Definition and Principles for Near-Zero Emission and Resilient Buildings (NZERBs). Paris: Global Alliance for Buildings and Construction. Available at: https://globalabc.org/sites/default/files/inline-files/adaptation-pathways-report---v2.pdf.

Global Buildings Performance Network (2024) 'Kenya Launches Building Decarbonization Roadmap', GBPN, 21 August. Available at: https://gbpn.org/kenya-launches-building-decarbonization-roadmap/ (Accessed: 27 February 2026).

Global Buildings Performance Network (2026) 'Industry Leaders Convene for Green Housing Roadmap', GBPN. Available at: https://gbpn.org/industry-leaders-convene-for-green-housing-roadmap/ (Accessed: 27 February 2026).

Global Center on Adaptation and World Resources Institute (2019) 'This Turkish city has become a world leader in energy-efficient buildings. This is how it did it', Global Center on Adaptation, 24 July. Available at: https://gca.org/this-turkish-city-has-become-a-world-leader-in-energy-efficient-buildings-this-is-how-it-did-it/ (Accessed: 18 February 2026).

Global Property Linked Finance Initiative (2025a) 'Global Property Linked Finance Initiative'. Available at: https://www.propertylinkedfinance.com/ (Accessed: 19 February 2026).

Global Property Linked Finance Initiative (2025b) Global Property Linked Finance Initiative, Property Linked Finance Principles. Available at: https://www.propertylinkedfinance.com/wp-content/uploads/2025/11/GFI-GPLFI-REPORT.pdf.

Green Business Certification Institute India (2023) Government incentives for green building projects in India. Available at: https://www.gbci.org/government-incentives-green-building-projects-india (Accessed: 18 February 2026).

Green Business Certification Institute India (2026). Available at: https://www.gbci.org/india (Accessed: 18 February 2026).

Green Economy Financing Facility and European Bank for Reconstruction and Development (2021) 'TuREEFF (Turkish Residential Energy Efficiency Financing Facility)'. Available at: https://ebrdgeff.com/seff_facilities/turkiye-residential/ (Accessed: 18 February 2026).

Green Rating for Integrated Habitat Assessment (2026a) Events | Green Rating for Integrated Habitat Assessment. Available at: https://www.grihaindia.org/all-events (Accessed: 18 February 2026).

Green Rating for Integrated Habitat Assessment (2026b) Product Catalogue. Available at: https://www.grihaindia.org/products-catalogue (Accessed: 18 February 2026).

Huebl, S. (2024) 'Canada's Secondary Suite Loan Program expands to $80,000 loans with 2% over 15 years', CMT News, 10 December. Available at: https://www.canadianmortgagetrends.com/2024/12/canadas-secondary-suite-loan-program-expands-to-80000-loans-with-2-over-15-years/ (Accessed: 19 February 2026).

ICLEI Japan (2025) Sustainable Energy in Action. Available at: https://japan.iclei.org/en/news/sustainable-energy-in-action/ (Accessed: 17 February 2026).

India, Bureau of Energy Efficiency (2024) Energy Conservation & Sustainable Building Code. Available at: https://beeindia.gov.in/sites/default/files/BEE_ECSBC_2024.pdf.

India, Press Information Bureau (2025) PM Surya Ghar: India's Solar Revolution. Available at: https://static.pib.gov.in/WriteReadData/specificdocs/documents/2025/mar/doc2025313520001.pdf.

Indian Green Building Council (2026a) Attend IGBC Events | Drive Innovation and Green Practices in India. Available at: https://igbc.in/events (Accessed: 18 February 2026).

Indian Green Building Council (2026b) IGBC Green Education: Shaping India's Future Leaders. Available at: https://igbc.in/education (Accessed: 18 February 2026).

Indian Green Building Council (2026c) IGBC Green New Buildings Rating System. Available at: https://igbc.in/igbcgreen-newbuildings/ (Accessed: 18 February 2026).

Intergovernmental Panel on Climate Change (2022) Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. Available at: https://www.ipcc.ch/report/ar6/wg3/chapter/chapter-9/ (Accessed: 7 April 2026).

Intergovernmental Panel on Climate Change (ed.) (2023) Climate Change 2022 - Mitigation of Climate Change: Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press. Available at: https://doi.org/10.1017/9781009157926.

International Climate Initiative (2026) Energy efficiency in public buildings in Turkey. Available at: https://www.international-climate-initiative.com/en/project/energy-efficiency-in-public-buildings-in-turkey-11-i-047-tur-g-energieeffizienz-in-oeffentlichen-gebaeuden-dkti/ (Accessed: 18 February 2026).

International Energy Agency (2021) Japan 2021 Energy Policy Review. OECD (IEA Energy Policy Reviews). Available at: https://doi.org/10.1787/72bb987a-en.

International Energy Agency (2023) Global floor area and buildings energy intensity in the Net Zero Scenario, 2010-2030 – Charts, International Energy Agency. Available at: https://www.iea.org/data-and-statistics/charts/global-floor-area-and-buildings-energy-intensity-in-the-net-zero-scenario-2010-2030 (Accessed: 18 February 2026).

International Energy Agency (2025a) Energy Efficiency 2025, IEA. Available at: https://www.iea.org/reports/energy-efficiency-2025 (Accessed: 17 February 2026).

International Energy Agency (2025b) Financing Electricity Access in Africa. Available at: https://www.iea.org/reports/financing-electricity-access-in-africa (Accessed: 16 February 2026).

International Energy Agency (2025c) 'Global Energy Review 2025'.

International Energy Agency (2025d) Japan - Countries & Regions, IEA. Available at: https://www.iea.org/countries/japan/efficiency-demand (Accessed: 16 February 2026).

International Energy Agency (2025e) 'The Breakthrough Agenda Report 2025'. Available at: https://www.iea.org/reports/breakthrough-agenda-report-2025.

REFERENCES (CONT.)

International Energy Agency (2025f) World Energy Investment 2025. Available at: https://iea.blob.core.windows.net/assets/1c136349-1c31-4201-9ed7-1a7d532e4306/WorldEnergyInvestment2025.pdf.

International Energy Agency (2025g) World Energy Outlook 2025. Paris: International Energy Agency. Available at: https://www.iea.org/reports/world-energy-outlook-2025.

International Energy Agency (2026) Buildings - Energy System, IEA. Available at: https://www.iea.org/energy-system/buildings (Accessed: 17 February 2026).

Jackman, J. (2025) 'Government Grants for Home Improvements in 2025', The Eco Experts. Available at: https://www.theecoexperts.co.uk/solar-panels/grants-for-home-improvements (Accessed: 19 February 2026).

Jameel, R. and Silva, S.K. (2026) Solar industry: Future of Sri Lanka, Daily FT. Available at: https://www.ft.lk/columns/Solar-industry-Future-of-Sri-Lanka/4-786789 (Accessed: 17 February 2026).

Japan, Center for Environment and Energy Conservation (2025) '**2025年4月に迫る建築基準法の改正｜6つの改正ポイントを詳しく解説 | 環境・省エネルギー計算センター**' , 環境・省エネルギー計算センター | 環境省エネセンター, 10 February. Available at: https://www.ceec.jp/column/kenchikukizyunho-2025-04/ (Accessed: 19 February 2026).

Japan, Ministry of Land, Infrastructure, Transport and Tourism (2016) 'Overview of the Act on the Improvement of Energy Consumption Performance of Buildings'. Available at: https://www.mlit.go.jp/common/001134876.pdf.

Jordan Times (2025) Jordan launches roadmap to decarbonise building sector by 2030, Jordan Times. Available at: https://jordantimes.com//news/local/jordan-launches-roadmap-decarbonise-building-sector-2030 (Accessed: 27 February 2026).

Jowett, P. (2025) 'Pakistan adds 1.2 GW of net-metering capacity in H1', pv magazine International, 6 August. Available at: https://www.pv-magazine.com/2025/08/06/pakistan-adds-1-2-gw-of-net-metering-capacity-in-h1/ (Accessed: 27 February 2026).

Kenya, National Construction Authority (2024) The National Building Code 2024. Available at: https://www.nca.go.ke/building-code (Accessed: 17 February 2026).

Lavagna, M. et al. (2025) 'Life Cycle Assessment of building stocks across World regions: A systematic literature review of existing studies and prevalent approaches', IOP Conference Series: Earth and Environmental Science, 1554(1), p. 012098. Available at: https://doi.org/10.1088/1755-1315/1554/1/012098.

Légifrance (2024) Décret n° 2024-1258 du 30 décembre 2024 modifiant les exigences de performance énergétique et environnementale des constructions de bâtiment en France métropolitaine, 2024-1258.

Li, C. et al. (2025) 'Carbon footprint of the construction sector is projected to double by 2050 globally', Communications Earth & Environment, 6(1), p. 831. Available at: https://doi.org/10.1038/s43247-025-02840-x.

New Zealand Green Building Council (2025) Guidance on green building ratings for sustainable finance. Available at: https://nzgbc.org.nz/hubfs/NZGBC%20Sustainable%20Finance%20Guide%20V2.pdf?hsLang=en#:~:text=milestones%20to%20achieve.-,Green%20Star%20Communities%20NZ%20v1.,contact%20us%20for%20more%20information.&text=Quicker%2C%20more%20accessible%20sustainable%20finance,credit%20for%20electric%20vehicle%20charging.

Nextmsc (2025) 'Middle East Construction Market by Type (Renovation, and New Construction), by Sector (Real Estate and Others), by Construction Method (Traditional Construction, Prefabricated/Modular Construction, 3D Printed Construction, Green/Sustainable Construction), and by Type of Contractor (Large Contractor, Medium Contractor and Small Contractor) – Regional Industry Trends and Forecast, 2025–2030'. Available at: https://www.nextmsc.com/report/middle-east-construction-market.

NY Towns (2025) Update for Town Officials: Delay of the All-Electric Buildings Act. Available at: https://www.nytowns.org/common/Uploaded%20files/Update%20on%20All%20Electric%20Buildings%20Act.pdf.

OneClickLCA (2021) Embodied carbon benchmark for European buildings. Available at: https://oneclicklca.com/hubfs/Ebooks/Embodied-Carbon-Benchmarks-for-European-Buildings-10-June-2021-FINAL.pdf.

Organization for Economic Cooperation and Development and Climate Club (2025) Carbon intensity metrics in the steel and cement sectors of Climate Club members: 2023-24 work programme Pillar 1, Module 1 "Overcoming the Challenges in Emissions Intensity Metrics. OECD Publishing. Available at: https://doi.org/10.1787/56681870-en.

Publicover, B. (2025) 'India installs 3.2 GW of rooftop solar in 2024, driven by residential growth', pv magazine International, 5 March. Available at: https://www.pv-magazine.com/2025/03/05/india-installs-3-2-gw-of-rooftop-solar-in-2024-driven-by-residential-growth/ (Accessed: 27 February 2026).

Reccessary (2024) Singapore to mandate 10% energy cut for large buildings starting 2025, Reccessary. Available at: https://www.reccessary.com/en/news/energy-intensive-buildings-forced-to-improve-efficiency-in-singapore (Accessed: 17 February 2026).

Research and Markets (2025a) India Construction Industry Databook Series - Market Size & Forecast by Value & Volume, 40+ Market Segments Across Residential, Commercial, Industrial, Institutional, Infrastructure, City-Level Construction by Value and Cost Structure, Q4 2025 Update. Available at: https://www.researchandmarkets.com/reports/5918199/india-construction-industry-databook-series?utm_code=crc769&utm_exec=chdomspi.

Research and Markets (2025b) Mexico Construction Market, Q4 2025. Available at: https://www.researchandmarkets.com/reports/5767965/mexico-construction-market-size-trends?utm_code=ljsx9s&utm_exec=chdomspi.

Resync (2024) 'Singapore Imposes Penalties of Up to S$150,000 for Energy-Intensive Buildings'. Available at: https://www.resynctech.com/singapore-imposes-penalties-of-up-to-s150000-for-energy-intensive-buildings/ (Accessed: 17 February 2026).

Röck, M. et al. (2024) 'Global Buildings Database Seed on Whole Life Carbon Emissions, Energy Performance, and Material Intensity (GBDB CarbEnMats)'. Zenodo. Available at: https://doi.org/10.5281/zenodo.13222041.

Samu, H. (2019) 'Greenox: Turkey's First Vertical Forest', EDGE Buildings, 30 January. Available at: https://edgebuildings.com/greenox-turkeys-first-vertical-forest-story/ (Accessed: 18 February 2026).

Sawyer, D. and Stiebert, S. (2025) 'Canada's emissions flatlined in 2024, early estimate shows (440 Megatonnes)', 440 Megatonnes: Tracking Canada's path to net zero. Available at: https://440megatonnes.ca/insight/canada-emissions-flatlined-in-2024-early-estimate-shows/ (Accessed: 12 February 2026).

REFERENCES (CONT.)

Shanghai Green Building Council (2025) “2025上海绿色建筑国际论坛”成功举办——创新推进四好建设，赋能城市绿色发展-协会动态. Available at: https://www.shgbc.org/xiehuidongtai/20250627095240176 4.html (Accessed: 18 February 2026).

Singapore, Building and Construction Authority (2025a) Mandatory Energy Improvement Regime, BCA Corp. Available at: https://www1.bca.gov.sg/buildsg/sustainability/regulatory-requirements-for-existing-buildings/mandatory-energy-improvement-regime (Accessed: 17 February 2026).

Singapore, Building and Construction Authority (2025b) Regulatory Requirements for Existing Buildings, BCA Corp. Available at: https://www1.bca.gov.sg/buildsg/sustainability/regulatory-requirements-for-existing-buildings (Accessed: 12 February 2026).

Singapore Green Building Council (2024) ‘Singapore Green Building Masterplan’, 1 April. Available at: https://www.sgbc.sg/sgbmp/ (Accessed: 19 February 2026).

Singapore, Ministry of Sustainability and the Environment (2023) NET ZERO ROADMAP For the Singapore Public Sector. Available at: https://www.greenplan.gov.sg/files/singapore_nzgi_roadmap_pdf_safe.pdf.

Sören Amelang (2026) German heating transition gathers pace as heat pump sales overtake gas boilers, Clean Energy Wire. Available at: https://www.cleanenergywire.org/news/german-heating-transition-gathers-pace-heat-pump-sales-overtake-gas-boilers-report (Accessed: 12 February 2026).

Sustainability Directory (2025) ‘Japan Mandates Strict Energy Efficiency Standards for All New Residential Construction’, News Sustainability Directory. Available at: https://news.sustainability-directory.com/policy/japan-mandates-strict-energy-efficiency-standards-for-all-new-residential-construction/ (Accessed: 17 February 2026).

Switzerland, Federal Office for the Environment (2025) The CO_2 levy. Available at: https://www.bafu.admin.ch/en/co2-levy (Accessed: 16 February 2026).

The Global Platform for Sustainable Cities (2025) The World Bank and the GEF launch next phase of Sustainable Cities Integrated Program. Available at: https://www.thegpsc.org/news/world-bank-and-gef-launch-next-phase-sustainable-cities-integrated-program (Accessed: 19 February 2026).

The World Business Council for Sustainable Development (2025a) Built Environment Market Transformation Action Agenda. Available at: https://www.wbcsd.org/built-environment-market-transformation-action-agenda/ (Accessed: 6 March 2026).

Thomolları, X. and Toğan, V. (2020) ‘Credit Success Rates of Certified Green Buildings in Turkey’. Available at: https://dergipark.org.tr/tr/download/article-file/1181715.

Tsinghua University, B.E.R.C. (2025) Decarbonizing Rural Buildings and Rural Energy System: China Building Energy and Emission Yearbook 2024. Singapore: Springer Nature Singapore. Available at: https://doi.org/10.1007/978-981-97-9120-0.

Turan, A.Z. (2024) TURKISH PERSPECTIVE ON «ENERGY EFFIENCY IN BUILDINGS» STUDIES. Available at: www.iwg5-buildings.eu/wp-content/uploads/2024/09/IWG5-Turkiye-perspectives-2024-09-11.pdf.

Turner and Townsend (2025) Global Construction Market Intelligence 2025. Available at: https://publications.turnerandtownsend.com/global-construction-market-intelligence-2025.

United Arab Emirates (2024) Federal Decree-Law on the Reduction of Climate Change Effects. Government of the United Arab Emirates. Available at: https://uaelegislation.gov.ae/en/legislations/2558 (Accessed: 19 February 2026).

United Kingdom, Department for Energy Security and Net Zero (2026) Warm Homes Plan. Department for Energy Security and Net Zero. Available at: https://www.gov.uk/government/publications/warm-homes-plan (Accessed: 12 February 2026).

United Kingdom, Ministry of Housing, Communities & Local Government (2026) January 2026 progress update: Delivering a decade of renewal for social and affordable housing. Government of the United Kingdom. Available at: https://www.gov.uk/government/publications/delivering-a-decade-of-renewal-for-social-and-affordable-housing/january-2026-progress-update-delivering-a-decade-of-renewal-for-social-and-affordable-housing (Accessed: 19 February 2026).

United Nations Environment Programme (2023) Building Materials and the Climate: Constructing a New Future. United Nations Environment Programme. Available at: https://doi.org/10.59117/20.500.11822/43293.

United Nations Environment Programme (2025a) Global Cooling Watch 2025: The Free Degrees. Available at: https://doi.org/10.59117/20.500.11822/48926.

United Nations Environment Programme (2025b) Global ministers launch Belém Call for Action to tackle the housing and climate crises. Available at: https://www.unep.org/technical-highlight/global-ministers-launch-belem-call-action-tackle-housing-and-climate-crises (Accessed: 19 February 2026).

United Nations Environment Programme (2026) ‘Built environment’, UNEP circularity platform. Available at: https://buildingcircularity.org/built-environment/ (Accessed: 28 April 2026).

United Nations Framework Convention on Climate Change (2025) Sectoral NAPs and Other Outputs (developing country Parties) | NAP Central. Available at: https://www.napcentral.org/sectoral-naps (Accessed: 19 February 2026).

United Nations Framework Convention on Climate Change (2026) Nationally Determined Contributions Registry. Available at: https://unfccc.int/NDCREG (Accessed: 24 February 2026).

United Nations Human Settlements Programme (2022) World Cities Report 2022: Envisaging the Future of Cities. HS/004/22E. Nairobi: UN-Habitat. Available at: https://digitallibrary.un.org/record/3984713 (Accessed: 7 April 2026).

United Nations Human Settlements Programme (2025) Urban Content in NDC 3.0: A Global Snapshot for COP30. Nairobi. Available at: https://unhabitat.org/sites/default/files/2025/11/urban_content_in_ndc_3.0._a_global_snapshot_for_cop30.pdf (Accessed: 10 March 2026).

United States, Census Bureau (2025) MONTHLY CONSTRUCTION SPENDING, DECEMBER 2024. Available at: https://www.census.gov/construction/c30/pdf/pr202412.pdf.

United States, Department of Energy (2024) ‘Energy Savings Analysis: 2024 IECC for Residential Buildings’. Available at: https://www.energycodes.gov/sites/default/files/2024-12/2024_IECC_Determination_TSD.pdf.

REFERENCES (CONT.)

United States, Department of Energy (2025) Performance Results from DOE Cold Climate Heat Pump Challenge Field Validation. PNNL--37127. Pacific Northwest National Laboratory (PNNL), Richland, WA (United States). Available at: https://doi.org/10.2172/2503488.

United States, Internal Revenue Service (2025) FAQs for Modification of Sections 25C, 25D, 25E, 30C, 30D, 45L, 45W, and 179D under Public Law 119-21 (One, Big, Beautiful Bill). Available at: https://www.irs.gov/newsroom/faqs-for-modification-of-sections-25c-25d-25e-30c-30d-45l-45w-and-179d-under-public-law-119-21-139-stat-72-july-4-2025-commonly-known-as-the-one-big-beautiful-bill-obbb (Accessed: 2 March 2026).

United States, National Association of Home Builders (2024) The 2024 Energy Code Features More Flexibility for Builders. Available at: https://www.nahb.org/blog/2024/08/2024-iecc-publication (Accessed: 17 February 2026).

Viet Nam, National Assembly (2025) Law No. 77/2025/QH15 amending the Law on Energy Efficiency and Conservation. National Assembly of Viet Nam. Available at: http://vanban.chinhphu.vn/?classid=1&docid=214600&orggroupid=1&pageid=27160 (Accessed: 19 February 2026).

Wehnemann, K. et al. (2025) Treibhausgas-Projektionen 2025 – Ergebnisse kompakt. Umweltbundesamt, p. 38. Available at: https://doi.org/10.60810/OPENUMWELT-7821.

World Bank Group (2025a) ACHIEVING ENERGY EFFICIENCY IN BUILDINGS, Pakistan Sustainable Energy Series.

World Bank Group (2025b) Annual report 2025 : Sustainable Finance and Capital Markets, World Bank. Available at: https://www.worldbank.org/en/about/annual-report/world-bank (Accessed: 19 February 2026).

World Business Council for Sustainable Development (2025b) Achieving net-zero buildings An action plan for market transformation. Available at: https://www.wbcsd.org/resources/achieving-net-zero-buildings/?submitted=true.

World Federation of Engineering Organizations (2025) WFEO Model Code of Practice: Climate Adaptation and Resilience for Engineers Summary. Available at: https://www.wfeo.org/wp-content/uploads/code-of-practice/WFEO_Code_of_Practice-Climate_Adaptation_and_Resilience-Guideline_Summary-Nov2025.pdf.

World Green Building Council (2022) Introduction to Green Building Standards of China. Available at: https://worldgbc.org/wp-content/uploads/2022/02/Introduction-to-China-Green-Building-Assessment-Standard-3rd-Edition.pdf.

World Green Building Council (2025a) 2024 / 2025 Annual Report. Available at: https://worldgbc.org/wp-content/uploads/2025/12/WorldGBC-Annual-Report-24-25.pdf.

World Green Building Council (2025b) 'Africa', World Green Building Council. Available at: https://worldgbc.org/africa/ (Accessed: 17 February 2026).

World Green Building Council (2025c) 'Green Building Councils across the Americas outline key policy priorities ahead of COP30 in Brazil'. Available at: https://worldgbc.org/article/americas-manifesto-cop30/ (Accessed: 27 February 2026).

World Green Building Council (2026) 'About #BuildingLife', World Green Building Council. Available at: https://worldgbc.org/buildinglife/ (Accessed: 27 February 2026).

World Resources Institute (2025) 'The Perfect Storm Fueling Pakistan's Solar Boom'. Available at: https://www.wri.org/insights/pakistan-solar-energy-boom (Accessed: 17 February 2026).

Yamina Saheb (2021) COP26: Sufficiency Should be First, Buildings and Cities. Available at: https://www.buildingsandcities.org/insights/commentaries/cop26-sufficiency.html (Accessed: 7 April 2026).

Annex: Global Buildings Climate Tracker methodology

The first edition of the Global buildings climate tracker was released in 2020 as part of the Global Status Report for Buildings and Construction that year. The tracker is a composite index comprising seven indicators, described as a decarbonisation index for buildings. The index monitors the progress towards the goal of totally decarbonizing the buildings sector by 2050.

As shown in Figure 33, to provide a comprehensive view of the sector's decarbonisation progress, the GBCT combines the buildings operational CO_2 emissions with six additional indicators: energy efficiency investments, growth of green building certifications, NDCs considering buildings, building energy codes aligned with ZEB principles, building stock energy intensity, and the share of renewable energy in final energy demand.

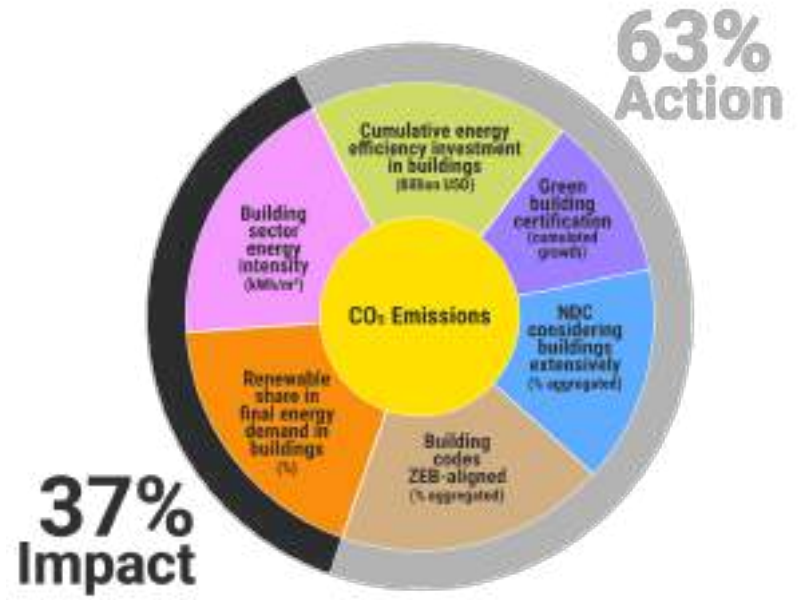

Figure 33. Global buildings climate tracker' indicators and weights

The process to calculate the final index involves four steps: 1) data collection and processing, 2) normalization, 3) weighting and aggregation and 4) composite index calculation and analysis. The most recent available data allows analysing the decarbonisation progress during the 2015–2024 period. During the normalization step, all the indicators are translated to a common scale by dividing the observations by the total range between their value at the starting point in 2015 and their goal value in 2050. Once the indicators are normalized, the CO_2 emissions indicator is used as a multiplier while the other six indicators are aggregated using a weighted sum. The weights, which were established in the first edition of the GBCT, are: impact indicators 37 per cent and action indicators 63 per cent. Then the final composite index is obtained and contrasted with the reference path towards the zero-carbon goal in 2050.

The Net Zero Emissions (NZE) scenario developed by the IEA is used as the reference scenario to define the 2030 and 2050 goals for the indicators. This scenario is consistent with limiting the global temperature rise to 1.5°C, in line with emissions reductions identified as necessary by the Intergovernmental Panel on Climate Change (IPCC) in its 2018 Special Report on Global Warming of 1.5°C. Specifically, it corresponds to scenarios that achieve net-zero CO_2 emissions globally around 2050 and require substantial reductions by 2030, as assessed in the report.

The goals for all the indicators, including 2030 milestones, are summarized in Table 2. The goals for the emissions, energy intensity, and renewables indicators are directly taken from the NZE scenario. For the cumulative investments and green certification growth the goals are derived from assumptions linked to the annual investments and floor area growth included in the NZE. The goals for NDCs and building codes are defined based on the regulations and policies that need to be in place by 2030 to ensure that all new buildings are zero-emission after 2030 and that the building sector is active part of the national climate actions. All the goals are described in detail below.

TABLE 2

Global buildings climate tracker' indicators goals

INDICATOR		2030 MILESTONE	2050 FINAL GOAL
Emissions	**Buildings sector energy related emissions ($GtCO_2$/year)***	4.4	**0**
Impact	**Buildings sector energy unit intensity (kWh/m²)**	96.2	**55.8**
	Renewable share in final energy demand in buildings (per cent)**	46.4	**84.4**
Action	**NDC considering buildings extensively (per cent aggregated)**	75	**100**
	Building codes ZEB-aligned (per cent aggregated)	75	**100**
	Green building certification (cumulative growth)	33.9	**96.5**
	Cumulative energy efficiency investment in buildings (US$trillion)	5.9	**23.8**

**While the tracker currently focuses on CO_2 emissions from building operations, it is important to consider the role of embodied carbon emissions in the buildings sector. However, these emissions are not included in the tracker due to the absence of a global dataset covering a complete scope of embodied carbon emissions during the full timespan of the tracker. For a recently developed estimation of embodied emissions of the new building stock worldwide please see Box 2.*

The NZE scenario considers that CO_2 emissions from the operation of buildings reduce from the current levels to reach 4.4 $GtCO_2$/year by 2030 and 0 $GtCO_2$/year by 2050, while the energy intensity in buildings needs to reduce to 96.2 kWh/m² by 2030, and to 55.8 kWh/m² by 2050.

The goal for the share of renewables in building energy supply is obtained by adding the share of renewables directly used in buildings and the share of grid-supplied renewable electricity. The NZE scenario expects that the share of renewable energy directly used in the buildings sector increases to 18.1 per cent

by 2030 and reaches 25 per cent by 2050. Furthermore, the scenario requires that, by 2030, 47.2 per cent of buildings' final energy demand is supplied by electricity, reaching 66 per cent by 2050.

These percentages are applied to the scenario projection that around 60 per cent of grid electricity in 2030 will be generated by renewable energy sources, resulting in a 28.3 per cent (47.2 per cent*60 per cent) share of indirect renewable electricity in buildings by 2030. For 2050, the scenario projects that 90 per cent of grid electricity will be generated by renewable energy sources, leading to a 59.4 per cent (66 per cent*90 per cent) share of indirect renewable electricity in buildings by 2050. The combined goals correspond therefore to 46.4 per cent (18.1 per cent renewable directly use in buildings + 28.3 per cent renewable indirectly use in buildings) and 84.4 per cent (25 per cent renewable directly use in buildings + 59.4 per cent renewable indirectly use in buildings), respectively for 2030 and 2050.

The indicator monitoring the number of countries with NDCs addressing the buildings sector in detail tracks the number of countries that have extensive coverage of buildings in their NDCs, including energy efficiency, adaptation, renewables and different forms of regulations and other building-related targets. The goal is for all G20 members and 50 per cent of other countries to include a detailed strategy for buildings in their NDCs by 2030, and for all countries to have done the same by 2050.

For the indicator tracking countries with building energy codes aligned with ZEB principles, it is expected that, by 2030, all new buildings are zero emission buildings. All G20 members and 50 per cent of other countries are, therefore, require to have ZEB-aligned building energy codes by this date. By 2050, all countries are expected to have these codes in place.

The cumulative growth of green building certification indicator is calculated based on the growth of the global building floor area. The building floor area is expected to grow (starting in 2015) 34 per cent by 2030, and 96.5 per cent by 2050. Hence, it is considered that the cumulative growth of building certifications should reach 33.9 points by 2030, and 96.5 points by 2050.

The energy efficiency investments in buildings indicator tracks cumulative investments starting from 2015. Based on the NZE scenario, annual investments in 2030 alone should grow to US$537.7 billion, leading to a cumulative total of US$5.9 trillion by 2030. After this, it was assumed that investments are projected to continue growing at the same rate, reaching the 2050 goal of a cumulative total of US$23.8 trillion.

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