

Achieving net-zero buildings

Key actions for market transformation



Foreword

The consensus is that there has to be drastic action to reduce carbon emissions by 2030 to stay within a 1.5°C global warming threshold. And yet, six years out, global built environment emissions are still rising and, in many markets around the world, the policies and incentives to drive the transition to net-zero emissions buildings are not yet in place. So how is it possible to urgently accelerate the large-scale transition to net-zero buildings in the next six years?

As identified in the Market Transformation Action Agenda, there must be an enabling environment. The market must recognize and reward net-zero buildings, governments must tax them at a lower rate and financing them must be cheaper. This will make them more valuable as assets and therefore unlock investments in the transition.

In this document, we identify four objectives that will help create this enabling environment – definition, transparency, minimum performance and incentives. While in most markets around the world these are not yet in place, there are national and local examples of policies, incentives and market mechanisms that have proven to be effective in driving change.

We propose a 12-Step Action Plan to achieve these objectives, with interdependent actions that reinforce each other and that any market can adopt to drive change.

We reference leading examples from around the world that – combined – illustrate what we believe to be the ideal route to creating the enabling environment that will drive the market transformation to a net-zero building stock.

Whether implemented at a local or national level, the 12-Step Action Plan will be most effective if executed through close cooperation between policymakers and industry. Driving consistency and transparency of performance and enabling the market to react to and, in turn, incentivize net-zero emissions outcomes through its transactions will require policy levers.

It's clear that actions in the built environment cannot continue at the current pace. We look forward to engaging in a discussion on this proposed 12-Step Action Plan and to supporting further collaborative efforts to drive change.



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Table *of contents*

01. Introduction *04*

02. Key actions for market transformation *06*

Steps 1-3 – Definition 08

Steps 4-6 – Transparency 09

Steps 7-8 – Performance floor 10

Steps 9-12 – Incentivized goal 11

03. Next steps *12*

01. Introduction

Context

In 2022, the building sector globally was responsible for 37% of energy-related carbon emissions (or 21% of total greenhouse gas emissions),¹ of which over two-thirds were from the energy consumption of buildings in operation.

In recognition of the importance of property sector decarbonization in the overall fight against climate change, at the 28th United Nations Climate Change Conference (COP28) 28 countries joined the Buildings Breakthrough,² aligning behind the shared goal to ensure

And in March 2024, over 60 countries backed the Declaration de Chaillot,³ committing to the implementation of long-term sector roadmaps, making building energy codes mandatory and leading public procurement, among other objectives, to accelerate and progress the decarbonization of buildings.

The intent is that these commitments lead to the development of local and national industry standards and legislation – the instruments that will drive transformation. But progress towards this is still very limited in most countries around the world. Globally, despite energy-efficiency improvements, overall property sector emissions continue to rise,⁴ so there is an urgent need to accelerate action to drive the transition to net-zero emissions and deliver meaningful decarbonization across the sector.

Near-zero emissions and resilient buildings are the new normal by 2030.

01. Introduction

Purpose of this document

Recognizing the urgent need for change, this document recommends a cohesive set of clear and specific steps to shift the market to deliver net-zero buildings at scale.

This is consistent with, and part of, the Built Environment Market Transformation Action Agenda.⁵ Its Intervention 5 in particular specifically speaks to this need. This is part of the broader industry objective to achieve net-zero whole life emissions and has its place alongside work by WBCSD and others to address full life-cycle decarbonization.

This document builds on evidence from our *2023 Net-zero operational carbon buildings: State of the art* publication,⁶ which points to a wide variation in net-zero emissions definitions in policies and certifications and a lack of national policies requiring buildings to be truly net-zero. However, it identifies several leading examples of local policies and industry initiatives that have effectively driven change in their markets. Since then, ongoing research has highlighted further examples.

In this document, we advocate for a fundamental shift from a standards and code compliance approach to a clear framework focused on the real performance of buildings in operation.



The role of government

Our intention is for collaboration between policymakers and industry to deliver the Action Plan. Experience from around the world highlights the key role that national and sub-national governments can play in driving the transition, specifically:

- Mandating the transparency of performance, which improves understanding and unlocks investment;
- Through procurement, testing new and innovative approaches in the public sector;
- Setting mandatory minimum energy performance standards, ensuring all buildings are at least on a journey to net-zero emissions.

02. Key actions for market transformation

ACHIEVING NET-ZERO BUILDINGS
KEY ACTIONS FOR MARKET TRANSFORMATION

Four objectives

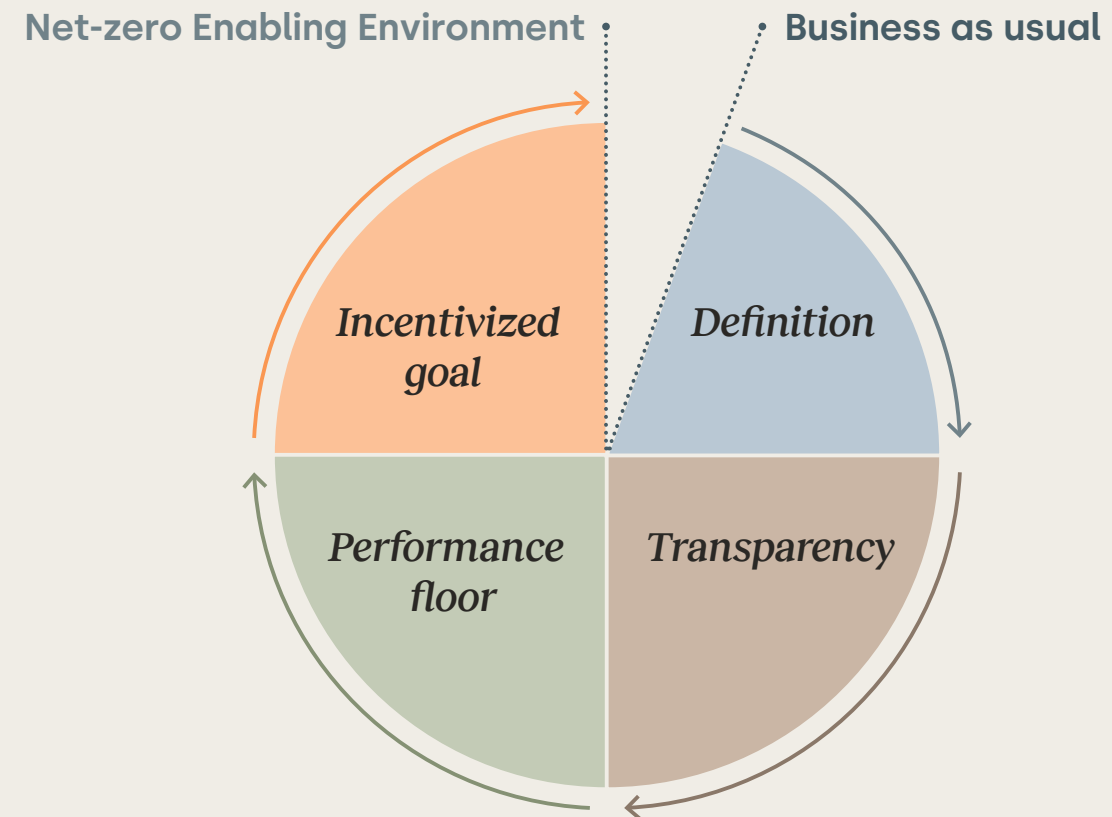
The 4 objectives aim to create an **enabling environment** to achieve the market transformation towards net-zero buildings based on the definition, measurement, transparency and performance of net-zero buildings in operation. The principle that *you can't change what you can't measure* is fundamental to this. Hence the first two objectives are about creating an understanding of building performance.

The first objective – **definition** – ensures a consistent understanding of what a net-zero building is, with performance thresholds covering both efficiency and energy procurement tailored to regions and building types.

Transparency, whether voluntary or **regulated** through local or regional policies, provides a market understanding of how individual buildings perform against a net-zero emissions threshold. Studies show that transparency in itself is a powerful driver of change. In some markets, that understanding will lead to a higher valuation of net-zero buildings, which will act as a catalyst for investment.

Driving change across all areas of a market will require a mandatory minimum level of operational energy performance or **performance floor**. This will ensure that all buildings are at least on a pathway to achieving net-zero emissions in operation.

A key part of the enabling environment we are seeking to create is making it possible to invest in net-zero operational buildings. Achieving this will require clear **incentives** that will contribute to a higher valuation of a net-zero building. To create effective incentives, leading sustainability certifications must adopt a clear, robust and internationally consistent definition that recognizes a fully net-zero building. The lack of clarity in the certification market is a significant constraint that is holding back market investment in the transition to net-zero emissions.



12-step action plan

To achieve the 4 objectives, we propose a 12-Step Action Plan that will support the creation of an enabling environment for net-zero operational emissions in buildings. Precedents – examples of existing policies or industry initiatives that demonstrate an existing partial application of the proposed solution – inform each step in the Action Plan. The Action Plan aims to demonstrate how these individual jigsaw pieces can come together in a completed puzzle, forming a comprehensive approach to driving real change.

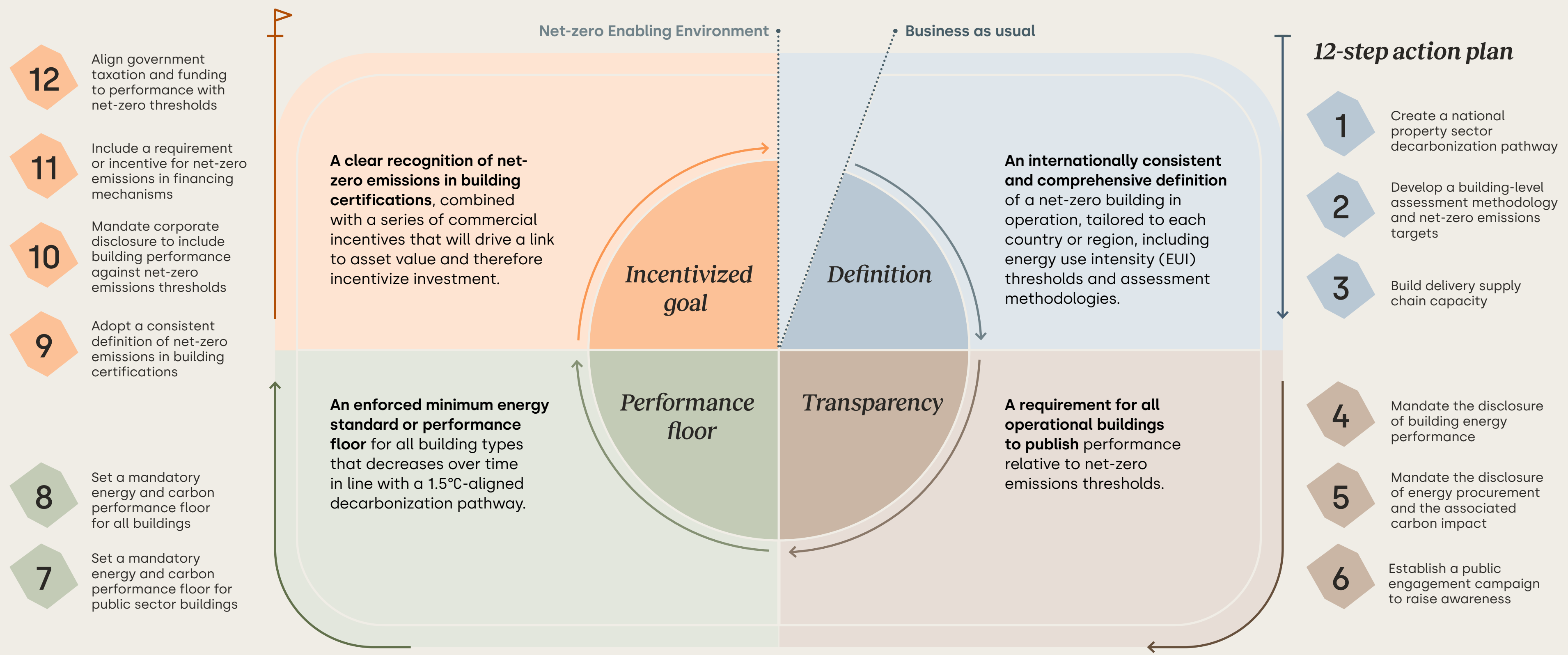
Key conclusions from our market analysis to support the Action Plan

1. The methodologies to define and assess net-zero buildings in operation already exist in some localities but their use is not yet widespread or consistent.
2. At least one country or region is partly implementing or has already implemented all the individual measures proposed as part of the 12-Step Action Plan.
3. The net-zero incentives are not yet consistently in place, with some localized examples, but a lack of global consistency on the definition of net-zero buildings remains a barrier to uptake.

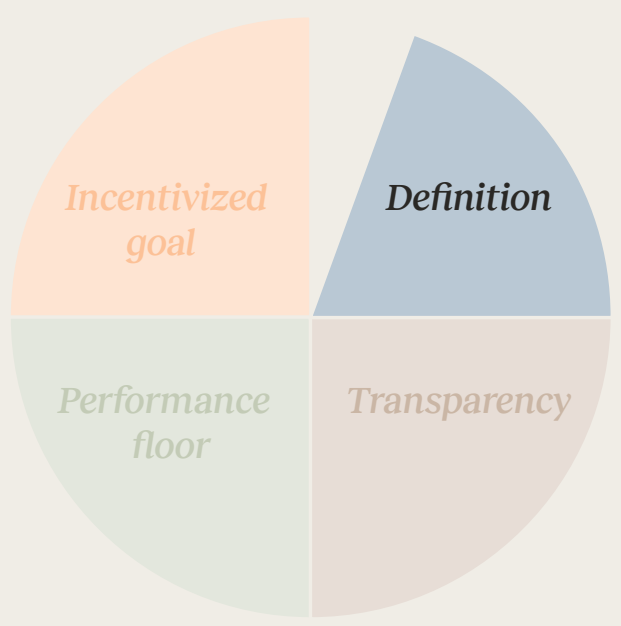
In Figure 1 we illustrate the four key objectives and the 12-Step Action Plan that will make those objectives a reality.

02. Key actions for market transformation

ACHIEVING NET-ZERO BUILDINGS
KEY ACTIONS FOR MARKET TRANSFORMATION



02. Steps 1-3 Definition

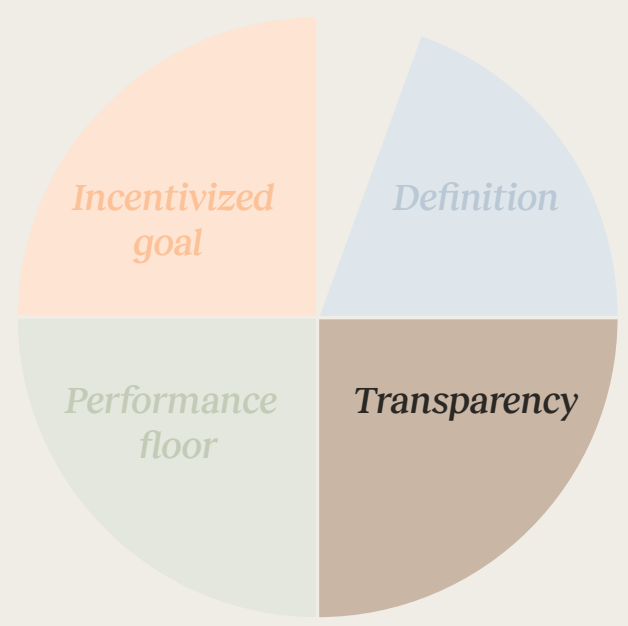


The key requirement in this section is the definition of a 1.5°C-aligned decarbonization pathway for the property sector in a country or region, consistent with the local context and planned energy system decarbonization. The second part defines a methodology for the evaluation of the performance of an individual building, including energy and carbon targets for individual buildings per typology and asset class.

At this stage it is important to start building up capacity, both in governing organizations (whether government or industry bodies) and across the sector to enable implementation of the Action Plan across the value chain.

Step	Detail	Value	Precedents
1	<p>Create a national property sector decarbonization pathway</p> <p>Sets a whole sector decarbonization pathway (differentiated by building type) that aligns with the 1.5°C pathway and is consistent with national/regional policies and context.</p> <p>Carbon Risk Real Estate Monitor (CRREM) v2 pathways provide a starting point where available but there will ultimately be a need for more detailed country-specific pathways.</p>	<p>Defines a clear objective for the national or regional property sector, demonstrating alignment with the Paris Agreement.</p>	<p>Jakarta, Indonesia, and Kuala Lumpur, Malaysia: Developing city-wide net-zero buildings roadmaps.</p> <p>Science Based Targets initiative (SBTi)-CRREM: National 1.5°C-aligned sectoral decarbonization pathways and EUI targets for the EU and leading global economies.⁷</p>
2	<p>Develop a building-level assessment methodology and net-zero emissions targets</p> <p>Develop a methodology to assess the real energy performance of a building, along with targets aligned with the sector pathway.</p> <p>Set targets based on an understanding of the performance of existing buildings, for which the availability and quality of building performance data is a key enabler.</p>	<p>Translates the sector pathway into targets for individual buildings by asset class.</p> <p>Provides a robust means for evaluating and communicating the performance of an individual building in relation to net-zero emissions.</p>	<p>UK: Comprehensive 1.5°C-aligned sectoral decarbonization pathway developed to support the Net Zero Carbon Building Standard.⁸</p> <p>The National Australian Built Environment Rating System (NABERS) (Australia, New Zealand, UK): Defines a robust methodology for evaluating building energy performance.⁹</p>
3	<p>Build delivery supply chain capacity</p> <p>Develop capacity and skills in governing organizations for oversight and in the sector supply chain to deliver the transition in practice.</p>	<p>Ensures that there is sufficient capacity in delivery and regulatory oversight to deliver the roadmap in practice and at the same time creates high-quality green jobs.</p>	<p>US: Buildings Technology Office (BTO) supporting the development of an "American building efficiency workforce" as part of the clean energy economy".¹⁰</p>

Steps 4-6 Transparency

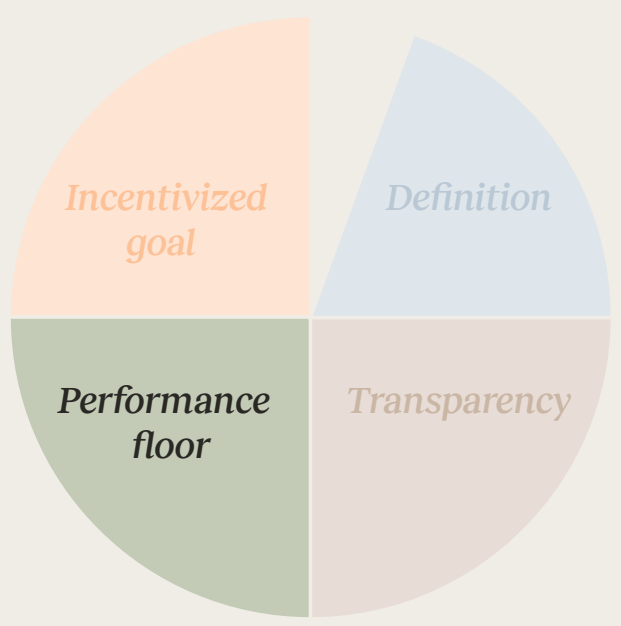


Transparency of performance can be a powerful agent for change. It is essential that transparency be based on a robust evaluation method consistently applied nationally and, ideally, internationally.

While mandatory building energy codes for construction are relatively commonplace, a performance framework for buildings in operation only exists in a few jurisdictions globally. The shift in focus to real energy performance is a big step and will require the support of a comprehensive public and industry engagement campaign.

Step	Detail	Value	Precedents	
4	Mandate disclosure of energy performance against net-zero thresholds	Require all operational buildings to calculate and disclose their energy performance relative to defined net-zero targets and publish the outcome.	Creates transparency in building energy efficiency, which allows the market to factor energy performance into commercial decisions.	<p>South Africa: Mandatory Energy Performance Certificates from 2025 for larger buildings, based on measured energy consumption.¹¹</p> <p>UK: Display Energy Certificates (DECs) – operational energy ratings for public buildings.</p> <p>Australia: Mandatory NABERS ratings for qualifying buildings.</p>
5	Mandate disclosure of the carbon impact of energy procurement	Require all operational buildings to disclose energy sourcing, including both on-site generation (fossil and renewable) and the carbon impact of the purchase.	Adding transparency about energy sources and procurement adds further clarity on building alignment with net-zero emissions.	<p>US: Mandatory energy emissions performance disclosure in place across a number of US cities, including New York City, Washington, DC and Seattle.</p>
6	Establish a public engagement campaign to raise awareness	Raises awareness and, in the longer term, helps in gaining the acceptance of a minimum energy performance floor approach.	Public awareness of and support for the action plan is critical for its success.	<p>New York City: Local Law 97 involves an extensive public engagement campaign to support the launch and subsequent expansion.</p>

02. Steps 7-8 Performance floor



Performance transparency can be an important driver of change but is not effective across all regions and sectors, in particular in markets where competition is less of a driver and the market is less mature. In these situations, only mandated requirements can drive widespread change.

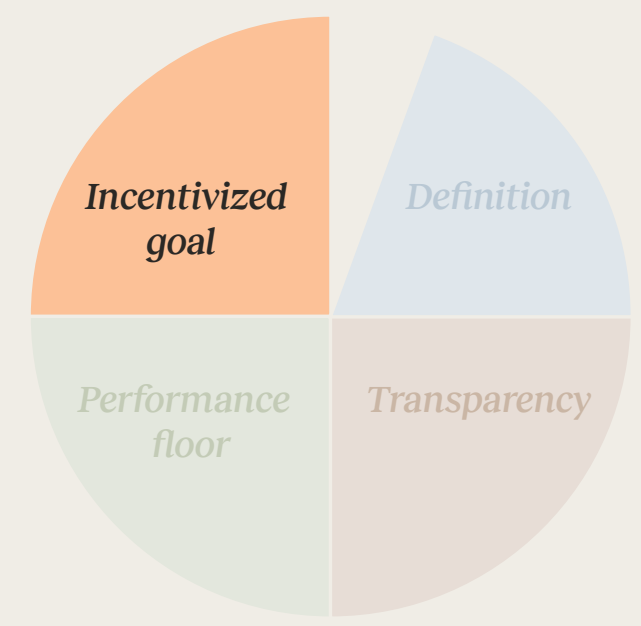
Action 7 proposes the introduction of an energy and carbon mandatory performance floor in the public sector as this offers an opportunity for a limited trial and for the government to raise both awareness and broader confidence in deliverability with the wider market before sector-wide roll out (Action 8).

Step	Detail	Value	Precedents
7	Set a mandatory energy and carbon performance floor for the public sector	Mandate a performance floor for both new and existing government buildings as a first step in driving market transformation.	Implementing a performance floor for the public sector allows for a smaller scale trial and additional opportunities to raise public and industry awareness prior to a full roll-out.
8	Set a mandatory energy and carbon performance floor for all buildings	Extend the performance floor to all buildings and sectors. Put appropriate support in place to avoid any adverse social equity impacts, particularly in the housing sector.	Implementing a performance floor will ensure that the least-efficient buildings achieve a minimum level of energy efficiency and are on a trajectory to achieving net-zero alignment. This will deliver economic benefits to building users through reductions in operating costs along with the carbon benefit.

Australia: Mandatory minimum NABERS rating of 4.5* for government buildings.
EU: Zero Energy Buildings (ZEB) standard comes into force for public buildings ahead of private assets (note that limits are still code-based and not performance-based).
New York City Local Law 97: Mandatory minimum energy performance from 2025 with increasing standards to 2040..
Johannesburg and Durban (eThekweni), South Africa: Implementing net-zero carbon building policies, including EUI limits for new buildings.

Steps 9-12

Incentivized goal



With a performance floor in place, the minimum level of performance of operational buildings in the market should start to improve. In parallel with this, however, it is important to have a strong set of incentives in place to achieve the long-term objective of full net-zero emissions alignment. The incentives proposed in Actions 9 to 12 all depend on Action 9. Without a clear and robust net-zero building badge or certification for buildings in operation, there is no clear basis for incentivization through disclosure, financing or taxation.

Step	Detail	Value	Precedents	
9	Adopt a consistent definition of net-zero emissions in building certifications	Adopt a clear, internationally consistent definition of net-zero emissions in building certifications at construction and operation stages. This will allow investors to differentiate and thus attribute value to assets aligned with net-zero emissions.	There is strong evidence that markets will respond to clear certifications and that this drives a value differential between buildings that do and do not meet the defined standard. ¹²	<p>UK: The Net Zero Carbon Building Standard is the first certification scheme globally incorporating a comprehensive definition of net-zero.</p> <p>Global: Edge Zero Carbon is an assessment and certification for developing markets. Developed by the World Bank.¹³</p> <p>Australia: Evidence of a value premium for NABERS-rated buildings, as well as the effectiveness in improving performance.</p>
10	Mandate corporate disclosure to include building performance against net-zero thresholds	Defining disclosure requirements to include the proportion of owned/leased buildings meeting a net-zero emissions target (voluntary or mandatory).	It is likely that corporations would respond to the risk of <i>naming and shaming</i> , taking action to avoid association with a portfolio that does not align with net-zero emissions.	UK: The first G20 country to introduce mandatory disclosure against Task Force on Climate-related Financial Disclosures (TCFD) standards. ¹⁴
11	Include a requirement or incentive for net-zero emissions in financing mechanisms	Setting net-zero alignment as a requirement, whether in an overall green finance taxonomy, government loan scheme or domestic mortgage.	The ability to access an improved finance rate for a building aligned with net-zero emissions would have a direct positive impact on a development's bottom line. This would provide a clear commercial incentive to achieve alignment.	EU: The Taxonomy for Sustainable Finance includes mandatory minimum energy performance, with public sector thresholds ahead of private assets (note that limits are generally code-based and not performance-based).
12	Align government taxation and funding with performance against net-zero thresholds	Offering differential building taxation rates for buildings aligned with net-zero emissions, whether commercial or domestic, or setting net-zero alignment requirements for government funding.	Provides a direct commercial benefit for buildings that achieve net-zero performance by reducing operating costs and providing access to lower cost finance.	London, UK: The Mayor's Energy Efficiency Fund includes threshold performance requirements to access funding (note that thresholds are code not performance based). ¹⁵

03. Next steps

Next steps

This publication is part of the Net-Zero Buildings series from WBCSD and its members, led by Arup.

Our next report, which we will publish in early 2025, will explore the key themes in more detail and set the 12-Step Action Plan against evidence of real progress on the ground, as demonstrated through a series of targeted case studies.

In addition to industry-wide application, we intend the 12 steps to be applicable to a corporate property portfolio either at a national or international scale. We will explore this aspect further in our future publication.

As we continue our research, we are committed to working with other key industry stakeholders to develop a consensus on the way forward in this crucial area of property decarbonization.

Market Transformation Action Agenda

This document focuses on achieving net-zero emissions in operation. It demonstrates a route to delivering a part of the Built Environment Market Transformation Action Agenda. In advocating for the implementation of a consistent definition of net-zero, it supports Intervention 1 (Unequivocal near-term common goals) and Intervention 5 (Standards alignment).

The recommendations on incentivization also relate to Intervention 9 (Advance market commitments) and Intervention 11 (Mobilizing tenant demand).

The proposals in this document will need to be set alongside a comprehensive approach to embodied carbon, which the WBCSD *Net-zero buildings – Halving Construction Emissions Today* publication explores.¹⁶

The opportunity and the risks

While responding to the climate crisis is a strong driver of action in itself, it is important to recognize that the implementation of the Action Plan will have broader social and economic benefits, especially if it is part of a comprehensive green transition. Key benefits include:

- Reducing operating costs for homeowners, commercial building operators and tenants;
- Driving an increase in investment in buildings through a value premium for net-zero alignment;
- Positively contributing to the reputation and attractiveness of countries or regions that adopt the Action Plan;
- Reducing demand on energy infrastructure and thus reducing the costs of infrastructure transition.

However, there are also risks associated with implementing the Action Plan that companies will need to understand and effectively mitigate through a program of targeted support.

These include:

- The risk that, in housing and some areas of social infrastructure, the costs of the net-zero transition will fall on those unable to pay, driving up housing/operating costs.
- The potential to increase the cost of red tape (bureaucratic procedures) associated with owning and operating buildings.
- The potential for brown discounting (building devaluation) in regions that are less able to attract investment for a net-zero emissions transition.

Set against these risks, however, is the risk of inaction. The ongoing lack of transparency in net-zero buildings risks driving away investors and occupiers in favor of other, more progressive, markets.

04. Endnotes

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05. Acknowledgements

Disclaimer

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Acknowledgements

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About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a global community of over 225 of the world's leading businesses driving systems transformation for a better world in which 9+ billion people can live well, within planetary boundaries, by mid-century. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality.

We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships, and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

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