CChange for Housing

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Accelerating decarbonisation of current and future affordable housing in Europe

The Urban Land Institute is a global, member driven organisation comprising more than 48,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide. ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics.

Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 80+ countries. The extraordinary impact that ULI makes on land use decision making is based on its members sharing expertise on a variety of factors affecting the built environment, including urbanisation, demographic and population changes, new economic drivers, technology advancements, and environmental concerns. Drawing on the work of its members, the Institute recognises and shares best practices in urban design and development for the benefit of communities around the globe.

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C Change for Housing

C Change for Housing is a ULI-led programme focused on mobilising the real estate industry to overcome barriers preventing decarbonisation of existing and future affordable housing in Europe.

Launched in 2025 with support from Laudes Foundation, the initiative builds on the success of ULI's flagship C Change programme, applying its systems-change approach to identify where the housing system is stuck and where targeted interventions can have the greatest impact.

By convening stakeholders across the private, public, and third sectors, C Change for Housing aims to co-create practical, scalable solutions that enable the transition to a low-carbon, affordable housing system across Europe.

More information is available at https://europe.uli.org/programmes/c-change-for-housing/

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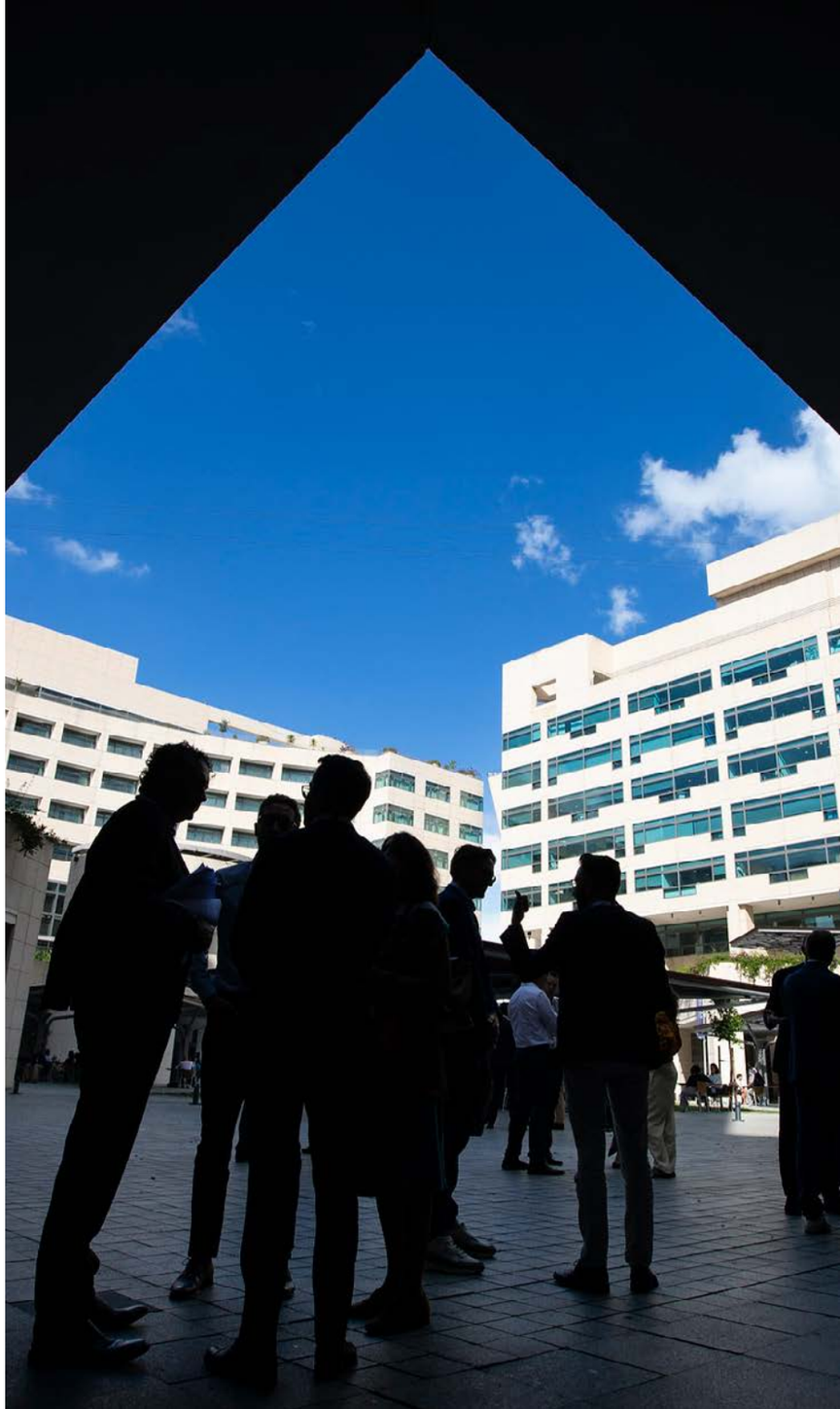

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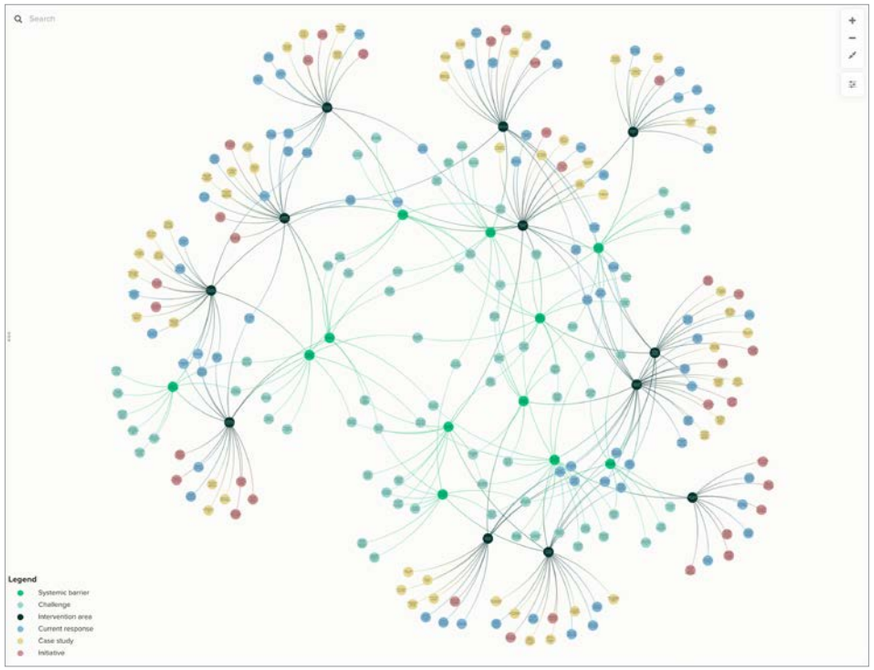
Explore the C Change for Housing Systems Map

Discover the interactive dashboard that visualises the systemic barriers, challenges, and high-impact interventions shaping affordable, low-carbon housing across Europe. Access the systems map here.



Introduction

Introduction

Europe faces two interconnected crises: the urgent need to decarbonise and worsening housing affordability.

Nearly 15 million people across Europe face housing unaffordability, and around one million experience homelessness[1]. Between 2015 and 2024, EU house prices rose by around 50%[2], while average rents have doubled in some major European cities over the last ten years[3]. In the UK, private rents have reached record highs, with new tenants spending on average around 44% of their gross earnings on rent, up from 40% five years earlier[4]. Together, these trends show that affordable homes are becoming increasingly out of reach for low- and middle-income households.

At the same time, the climate clock is ticking. Buildings account for around 36% of energy-related greenhouse gas emissions in the European Union, mostly from heating, cooling, and electricity use[5]. This is compounded by the age and inefficiency of Europe's building stock, with more than 75% of buildings considered energy-inefficient, and up to 85% of today's homes expected to still be in use by 2050[6]. While these figures apply to all buildings, the residential sector accounts for roughly three-quarters of the EU's total floor area[7], meaning homes represent a major share of the challenge. Without large-scale retrofitting, these dwellings will continue to lock in carbon emissions, and high energy costs, for decades to come.

But that's only part of the story. When emissions from construction materials such as concrete, cement and steel are included, the climate impact of buildings rises sharply. Embodied carbon can account for up to 50% of a building's total lifecycle emissions[8], and housing is responsible for around half of the EU's total material footprint[9]. This highlights that reducing Europe's material footprint, and achieving

real decarbonisation, depends on transforming how homes are built and renewed. Accelerating renovation and retrofit is a smarter, lower-carbon alternative to new build, and a long-term investment in Europe's affordability and resilience.

These crises – affordability and decarbonisation – are deeply intertwined. Across Europe, more than 10% of the population living in cities is overburdened by housing costs[10], while over 40 million are unable to keep their homes adequately warm[11]. Expanding housing supply without decarbonisation risks locking in future emissions, while pursuing net zero goals without addressing affordability risks leaving millions behind. The households living in the least efficient homes are often those facing the highest energy bills, poorest health outcomes, and greatest exposure to climate impacts. Therefore, a just transition in Europe's housing system depends on addressing these challenges together, ensuring that the low-carbon transition also delivers affordability, equity, and resilience for all.

A system under strain

Addressing these challenges is no small task. Europe's housing system is complex and marked by deep inefficiencies, fragmented responsibilities, and misaligned incentives that affect actors across the entire value chain.

Across Europe, homes are not being used as efficiently as they could be. While some areas face persistent shortages, others have high levels of vacancy or under-occupation. On average, 16% of European dwellings were not occupied in 2011 while 35% were underoccupied[12]. This represents 30 million empty dwellings, and yet 15 million new ones were built between 2011 and 2020[13]. Market dynamics often reward short-term gains and new development, and demolition remains cheaper and faster than retrofit in many cases. Escalating land, material and labour costs are further squeezing already thin margins[14], making affordable, low-carbon housing harder to deliver.

Compounding the inefficient use of the building stock, inefficient land use

remains an issue across the continent. Around 60% of Europeans live in low-density areas, while over 50% of Europeans live in single-family homes, which are much more material and energy intensive[15]. Additionally, there remains a significant amount of land that sits vacant in urban areas. Rising land prices and scarcity in urban areas are pushing new developments towards larger, peripheral greenfield sites. These locations often require costly new transport infrastructure, utilities, and energy networks. The limited availability of public transport in such areas reinforces car dependency, further increasing the lifecycle emissions of these developments.

Beyond economics, systemic barriers exist at every stage of the housing value chain. Planning and permitting processes can be slow and inconsistent, delaying projects and discouraging adaptive reuse. Land policy and fragmented governance often separate housing, infrastructure, climate, and social priorities into disconnected silos. Construction supply chains lack the capacity and skills needed to deliver low-carbon, affordable upgrades at scale, while data gaps and differing regulations between countries make it difficult to compare performance or replicate successful models. These factors collectively slow down progress and increase costs across the system.

At the same time, valuation and investment frameworks rarely capture the full social, environmental, and economic benefits of decarbonisation. Essential retrofit works are too often treated as costs rather than long-term value drivers, leaving affordable housing providers struggling to make a viable business case. As a result, capital continues to flow toward high-value, short-term opportunities rather than the long-term resilience of existing homes and communities.

Retrofitting costs are driven by the building not the location, which means it often costs just as much to decarbonise a low-value or affordable home as a high-value one. However, the ability to recover these costs varies significantly across market segments and tenures. In high-value or owner-occupied housing,

retrofit investments can potentially be recouped through higher rents, sale values, or lower operating costs. In contrast, in affordable housing, owners face limited returns and weaker investment incentives. This imbalance means that capital tends to flow towards prime markets, or drives up rents where upgrades occur, leaving lower-income and tenant-dominated areas at risk of being left behind. Without guardrails to protect tenants and leaseholders, post retrofit rents and service charges can make the homes unaffordable.

Achieving a just transition in housing therefore requires more than technical innovation or building-level improvements. It demands structural change across the full value chain, from how land is planned and financed, to how homes are built, maintained, and valued. Coordinated action between public, private and civic actors is needed to align incentives, scale up renovation, and ensure that the shift to low-carbon housing also delivers affordability, equity, and community benefit.

About C Change for Housing

In response to this challenge, ULI Europe established the C Change for Housing programme. It builds on the success of ULI's flagship C Change programme, applying the same systems-change approach to one of the built environment's toughest challenges: achieving affordable and low-carbon housing at scale.

Drawing on insights from research, interviews and workshops with more than 120 pan-European experts across investment, finance, development, policy, research and the third sector, this foundational phase maps the systemic barriers preventing progress and identifies high-impact interventions where collaborative action can make the greatest difference.

Recognising that there is no single definition of "affordable, low-carbon housing", the programme uses the following broad working definitions:

- **Affordable housing** refers to housing for rent or ownership that meets a suitable quality standard, is provided at below market prices, and is aimed at supporting citizens who are unable to secure housing at market conditions

- **Low-carbon housing** encompasses both new and existing homes built, retrofitted or reused to minimise operational and embodied emissions in line with Europe's 2050 net zero target.

Figure 1. Affordable housing on the housing continuum

Source: PATRIZIA, Urban Agenda for the EU

This report and its accompanying interactive systems-map dashboard present the first outcomes of that research. The dashboard enables anyone working across the housing ecosystem to explore the interconnected barriers preventing affordable, low-carbon housing and to see where high-impact intervention can be taken across the housing value chain. It also highlights case studies and initiatives already advancing solutions across Europe.

The dashboard is intended as a living resource. We invite you to explore the findings, share feedback, and contribute examples of innovative practice to help this collective evidence base continue to grow.

Through C Change for Housing, ULI will now take this work forward into its next phase, diving deeper into selected intervention areas and collaborating with partners across the industry to co-create practical, scalable solutions. If you are interested in contributing to this work or learning more, please contact the ULI Europe ESG Programmes team.

How to use this report

This report and its accompanying interactive dashboard map the complexity of decarbonising Europe's affordable housing system, linking key challenges and systemic barriers with intervention areas and current responses. Together, they offer a framework to understand where collaboration and targeted action can have the greatest impact.

Users can explore the system from multiple perspectives: to trace the root causes of barriers, identify leverage points for intervention, or learn from case studies and initiatives already advancing affordable, low-carbon housing across Europe.

Key definitions

To support a shared understanding, the following working definitions are used throughout the report and dashboard:

- **Systemic barriers:** Deep-rooted structural conditions that sustain dysfunction in the housing system and cut across multiple actors (for example, the lack of a compelling business case for low-carbon affordable housing).
- **Challenges:** Concrete and tangible obstacles that stem from systemic barriers and block progress in the housing system (for example, high upfront retrofit costs).
- **Intervention areas:** High-leverage points within the housing system where real estate and finance actors can take targeted action to transform "business as usual" and accelerate progress toward decarbonisation and affordability.
- **Current responses:** Specific actions, mechanisms or tools within each intervention area that are already addressing key challenges.
- **Case studies:** Real-world examples of projects, innovations, business models or strategies that demonstrate how affordable, low-carbon housing can be achieved in practice.
- **Initiatives:** System-level efforts – often in the form of coalitions, alliances or platforms – that convene diverse stakeholders to collaborate on shared challenges and coordinate action.

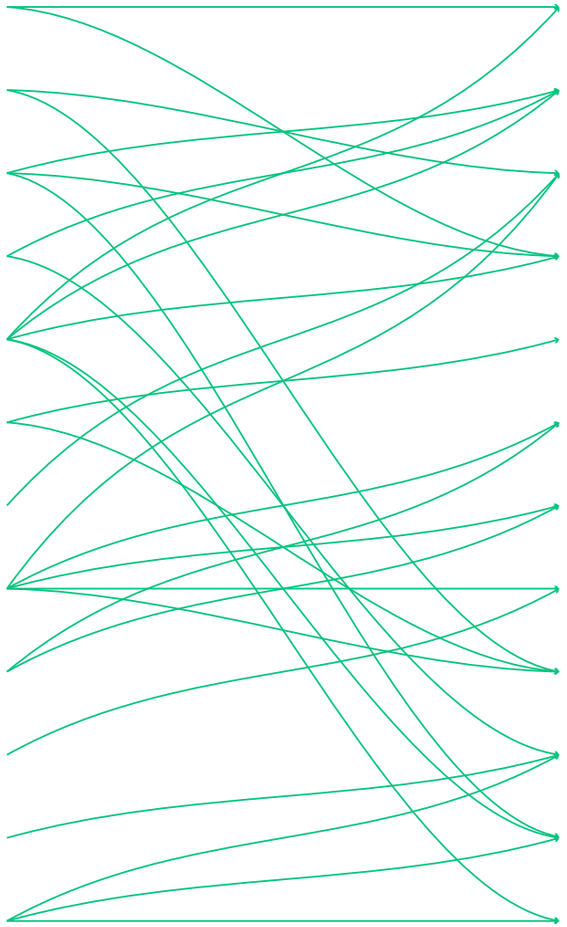
Use of the term housing provider

In this report, housing providers is used as an inclusive term for the range of organisations involved in developing and operating affordable housing. This includes investors, fund managers, developers, housing associations, and other players active across both the public and private sector. The term serves as a practical umbrella to capture this diversity without distinguishing between ownership or investment models.

Industry challenges

SYSTEMIC BARRIERS

- Inadequate land access and suitability
- Vacant and underused homes and buildings
- Disjointed approach to housing, retrofit and infrastructure planning
- Policy volatility and incentive inconsistency
- Limited public-private alignment and collaboration
- Public opposition and limited community ownership
- Poor understanding of housing affordability and performance
- Short-term business cases undermining long-term value
- Inadequate financial solutions and risk-sharing mechanisms
- Short-term investment horizons and relaxed stewardship
- Limited uptake of low-carbon materials and technologies
- Skills shortages and limited productivity in construction



INTERVENTION AREAS

- Optimising strategic land assembly
- Mainstreaming integrated planning
- Establishing universal definitions and measurements
- Enhancing public-private-civic collaboration
- Fostering community and resident collaboration
- Redefining the business case
- Unlocking financial solutions
- Aligning investment with long-term community needs
- Diversifying delivery, tenure and reuse models
- Leveraging low-carbon innovation
- Investing in value chain upskilling and reskilling
- Enabling system-wide knowledge sharing

Current responses

Systemic Barriers

Europe's housing system faces many deep and interlinked barriers that prevent progress in both improving affordability and achieving decarbonisation. These barriers shape how land is used, how housing is financed and built, and how existing stock is managed or reused. They are often not single obstacles but parts of a wider system that currently rewards short-term, high-carbon, high-cost approaches.

The following sections outline the most significant systemic barriers and illustrate how they affect the decarbonisation of affordable homes across Europe.

#1 Inadequate land access and suitability	**#2** Vacant and underused homes and buildings	**#3** Disjointed approach to housing, retrofit and infrastructure planning
#4 Policy volatility and incentive inconsistency	**#5** Limited public-private alignment and collaboration	**#6** Public opposition and limited community ownership
#7 Poor understanding of housing affordability and performance	**#8** Short-term business cases undermining long-term value	**#9** Inadequate financial solutions and risk-sharing mechanisms
#10 Short-term investment horizons and relaxed stewardship	**#11** Limited uptake of low-carbon materials and technologies	**#12** Skills shortages and limited productivity in construction

#01 Inadequate land access and suitability

Description

Rising land prices, valuation methods that overlook sustainability, and speculative holding of prime sites have made well-located and serviced land scarce and costly. Zoning frameworks often reinforce these pressures by limiting compact, mixed-use development and applying inconsistent density standards. Lacking tools and capacity to assemble land, many public authorities sell public plots at market value for short-term revenue, creating artificial scarcity and pushing new development to peripheral greenfield areas with high emissions and infrastructure costs.

Current situation

Land values in European cities have risen sharply over the past decade driven by strong demand and limited supply[16]. The main challenge is the availability of serviced sites and underutilised brownfield land of sufficient scale.

As land pricing continues to be based on maximising market returns rather than social or environmental value, sustainability criteria rarely influence land valuation practices. This locks prime plots in a cycle of vacancy or redevelopment for high-yield commercial uses rather than affordable housing projects.

As a result, new development is pushed towards peripheral greenfield sites where land is cheaper but infrastructure, energy and transport costs are higher. The lack of public transport reinforces car dependency, increasing the lifecycle emissions of these developments.

European cities still expand by approximately 450 km² of land per year[17], despite the EU's No Net Land Take objective for 2050[18], which is zero net loss of natural or agricultural land to urbanisation or infrastructure. This misalignment between land availability and housing delivery needs perpetuates a pattern of high-carbon, low-density housing.

Challenges

The following challenges contribute to the barrier of inadequate land access and suitability.

Escalating competition for serviced and infrastructure-ready urban land: Developers face intensifying competition for well-located land in high-demand urban areas with utilities and transport connections. Prime urban land is held vacant by some investors anticipating future gains[19] and governments rarely exercise compulsory purchase powers or vacancy penalties. This restricts supply, inflates land prices, and delays compact, low-carbon development. In many markets, fragmented ownership and weak land-pooling mechanisms prevent coordinated plot assembly which drives up acquisition costs and pushes housing projects to carbon intensive peripheral sites.

Residual land valuation models disconnected from sustainability goals: Land continues to be sold at prices that assume developers will achieve full market-rate returns, even when cities have policies requiring affordable or low-carbon homes. This "residual land valuation" model ignores sustainability criteria and prevents prices from adjusting to reflect carbon or affordability goals. Municipalities, central government, and rail companies often exacerbate the problem by selling public land at market rates to meet short-term fiscal targets, which inflates costs, blocks affordable and net zero projects, and delays housing delivery. In practice, developers often overpay for land and then face increasing construction costs and affordability constraints, putting projects in jeopardy and squeezing out low-carbon or affordable housing commitments.

Zoning frameworks that restrict compact and mixed-use growth: Zoning frameworks in many European cities still reflect short-term political priorities and outdated planning norms rather than sustainable development principles. Restrictions on infill, vertical extensions, and mixed-use schemes as well as high parking provision limit dense and efficient use of serviced land. Inconsistent or discretionary application of density standards makes it harder to align infrastructure costs with compact, low-carbon development. Weak zoning for step-down and later-living housing also traps larger homes under single ownership, reducing supply. As a result, viable sites in central areas remain underused, while new housing is pushed to less suitable peripheral locations.

Limited regeneration of brownfield and infill sites: Most of Europe's estimated 19,000 km² of brownfield land is undeveloped in addition to 300 km² of vacant or under-utilised office space, sufficient to deliver 15-20 million homes if properly regenerated[20]. This is a missed opportunity for efficient regeneration at scale in commercial, industrial or city centre areas, with existing infrastructure that can reduce development costs and timescales. These sites can benefit financially from lower acquisition costs compared to greenfield sites and are less carbon intensive[21]. However, few developers can manage the high costs and risks associated with brownfield site remediation and infrastructure upgrades, leaving well-connected urban land under-utilised.

Weak tools and public capacity for strategic land assembly: Public bodies lack the tools and capacity to assemble, manage, and release land in a coordinated way. Fragmented land ownership, complex transfer procedures, and weak cross-sector collaboration prevent sites from being aggregated or serviced efficiently[22]. In many cases, municipalities operate without dedicated land banks or regeneration vehicles that could prepare brownfield sites and pool land for the development of affordable, low-carbon housing. Municipalities often add to market inflation and lack of opportunities for affordable

neighbourhoods by selling public land at full market value, rather than retaining it for affordable housing.

Minimal land value capture and reinvestment mechanisms: In most countries, public sector landowners rely on one-off land sales and miss out on a share of rising land values for reinvestment. Increases in land value from zoning changes, new infrastructure, or regeneration projects often accrue entirely to private owners. Tools such as betterment levies, land readjustment, and long-leasehold models exist across Europe but are applied inconsistently or at too small a scale to make an impact[23]. Without structured mechanisms to reinvest these gains, public sector landowners lose the funding needed for infrastructure, brownfield remediation, and affordable housing delivery. This undermines fiscal stability and weakens incentives for compact development.

#2 Vacant and underused homes and buildings

Description

Large parts of Europe's housing stock remain vacant, under-occupied or underused even as housing shortages intensify. Older households often stay in large, energy-inefficient homes, while younger and lower-income residents are priced out of well-located options. Many properties stand idle due to inheritance disputes, speculative holding, or preference for short-term letting. Repurposing of vacant stock is often complex and costly, while limited fiscal incentives make demolition and rebuild easier, locking in embodied carbon and reinforcing resource-intensive growth patterns.

Current situation

Europe's housing crisis coexists with vast underutilised stock. Estimates suggest over 30 million EU homes are vacant or under-occupied[118]. In Spain and Portugal vacancy exceeds 10–12%[119], and rural regions across Europe are seeing growing empty stock amid urban shortages.

In high-tourism cities, expansion of short-term rentals has further reduced the stock available for long-term residents and pushed up prices[120]. Airbnb and its competitors have reshaped local housing dynamics, with landlords favouring short-term, high-yield lets over permanent tenancy.

Most underused buildings are structurally sound and well-located, but complex ownership, high renovation costs, restrictive zoning, and a lack of incentives can deter conversion or upgrading. In many cities, it is faster and cheaper to build on greenfield land than to retrofit or convert the existing stock, perpetuating urban sprawl.

Demolition and new construction is often favoured over renovation, while refurbishment if often financially unviable. Additionally, few countries maintain open access datasets on building stock conditions and utilisation, making it difficult to design targeted adaptive reuse interventions.

As a result, millions of viable homes remain locked out of the housing market, while new development continues to consume land and materials unnecessarily, delaying the shift towards compact, resource-efficient urban regeneration.

Challenges

The following challenges contribute to the barrier of vacant and underused homes and buildings.

Speculative ownership and short-term lettings reducing housing supply: In many cities, properties are deliberately held vacant for long periods. Weak property vacancy taxes, limited compulsory acquisition powers, and poor enforcement allow owners to sit on assets while awaiting price increases or redevelopment opportunities. Some vacant properties are inherited or owned by overseas entities, making ownership difficult to trace. Meanwhile, the expansion of short-term letting platforms has reduced the availability of affordable, long-term rental homes in many tourist destinations. Since short-

term rentals are often more profitable than traditional leases, landlords are encouraged to withdraw properties from the regular market. This fuels price inflation and weakens community cohesion, leaving homes empty even as affordability crises intensify.

Demographic shifts and spatial mismatches in housing demand: Europe's ageing population and the rapid rise of single-person households are reshaping housing demand, yet supply has not kept pace[121]. Many older residents continue to live in large, energy-inefficient homes, with insufficient incentives for "right-sizing" or age-friendly housing options in existing neighbourhoods[122]. As a result, one-third of Europeans live in under-occupied dwellings, while younger and lower-income households face severe shortages[123]. At the same time, vacant homes are often located in rural or declining regions, while demand is concentrated in urban centres. In rural France and southern Italy, for instance, large numbers of empty houses are

disconnected from housing demand and public transport. This locks underused housing out of circulation and undermines affordability and low-carbon goals.

Fragmented ownership and opaque property rights blocking reuse: Repurposing is constrained by complex ownership structures, opaque property rights, and inconsistent vacancy definitions. Resolving title issues can take years, preventing local authorities and developers from acquiring or redeveloping properties. Fragmented ownership is particularly problematic for multi-unit or mixed-use buildings, where unanimous consent is required for renovation. Few countries maintain reliable registers of empty or underused buildings, meaning housing providers and financiers cannot benchmark refurbishment potential or costs with confidence. This leaves viable homes empty and limits the use of the existing stock to provide affordable homes.

Weak embodied carbon standards undervaluing building reuse: Few countries require disclosure or reward avoided emissions from reuse. The recast EPBD introduces life-cycle carbon rules but lacks explicit requirements to assess or address vacancy, under-occupation, or total floor space demand[124]. Without consistent carbon accounting or regulatory incentives, the avoided emissions from reuse are rarely valued. For housing providers, the absence of binding carbon limits and consistent accounting makes it difficult to monetise avoided emissions. This policy gap reinforces the preference for new builds, slowing the transition to circular, low-carbon housing and leaving opportunities to link carbon, social, and urban value through coordinated metrics and incentives untapped.

Insufficient regulatory and fiscal incentives for refurbishment and reuse: Adaptive reuse of existing buildings and mixed-use redevelopments are frequently viewed as more expensive and complex than new builds. Vacant buildings may require deep structural renovation to meet modern energy, safety, or accessibility standards, with heritage or conservation rules adding cost and delay. Rigid building codes and permitting rules require full compliance with new-build standards, ignoring size, location and age and other relevant site-specific conditions. Fiscal systems in most countries still favour demolition and rebuild over refurbishment, while depreciation rules, property-transfer taxes, and limited incentives discourage reuse. As a result, potentially viable assets remain idle or demolished instead of reused.

Limited institutional capacity and consumer awareness for sufficiency: Municipalities and public agencies often lack expertise, staff, or sustained funding to design and implement effective building and neighbourhood regeneration strategies which require long-term investment. Advisory services, data-sharing platforms, and “one-stop shops” for residents remain inconsistent and localised. EU or national channels supporting coordinated upscaling, technical exchange, or performance benchmarking do not systematically focus on right-sizing or vacancy as core strategic imperatives. These gaps stall collaboration opportunities and slow project pipelines. At the same time, systemically low public engagement and institutional capacity gaps hinder reuse and constrain the shift to efficient, affordable, low-carbon housing.

#03 Disjointed approach to housing, retrofit and infrastructure planning

Description

Housing and retrofit are planned largely in isolation from essential services and infrastructure, leading to higher costs, delays, and car-dependent, low-density neighbourhoods. Weak planning requirements for system-wide coordination mean grid upgrades, heat networks, public transport, and wider infrastructure are developed separately from housing needs. This fragmented approach directs investment to peripheral areas with higher infrastructure costs, locking communities into inefficient, carbon-intensive infrastructure that is costly to retrofit later.

Current situation

Despite growing policy ambitions and practical interdependencies between housing, energy systems, transport networks, essential services, the public realm and social infrastructure, planning across these sectors is largely disconnected and poorly coordinated. Housing decisions are rarely aligned with spatial, infrastructure or supply chain strategies, nor with wider national goals.[24]

This means housing is often developed in locations with poor connectivity, far from jobs and services where it could help improve affordability or unlock productivity. This has reinforced car dependency rather than unlocking the benefits of active travel and public transport infrastructure.

At the same time, too many new homes also lack the essential infrastructure required to serve them, especially energy and water. Utility companies' planning cycles are misaligned with local planning processes. Developers face difficulties securing timely grid[25] or water[26] connections, as utilities struggle to upgrade their infrastructure at the pace required.

When infrastructure upgrades are not coordinated with housing delivery, costs are passed through as higher tariffs, rent increases, or service charges, which discourage retrofits in affordable homes. This disjointed approach perpetuates unequal access to low-carbon, affordable homes and undermines progress toward decarbonisation targets.

Challenges

The following challenges contribute to the barrier of disjointed approaches to housing, retrofit and infrastructure planning.

Fragmented governance and limited capacity for integrated planning: Municipalities and utilities often work in isolation, each using separate datasets and timelines. Few cities have structured, long-term energy, transport, water, wastewater, green-blue and social infrastructure strategies embedded in urban plans. This results in a lack of integration of decarbonisation and resilience measures within urban planning and housing programmes. Developers and contractors struggle to access data on grid capacity or energy readiness, delaying electrification and

retrofit projects. Misalignment between energy providers, public bodies and private developers leads to missed opportunities to coordinate grid development and investment.

Regulatory and pricing barriers to grid and heat-network expansion: Public budgets for network reinforcement are limited so public bodies rely on energy suppliers to fund network expansion[27], which, in turn, face weak incentives to invest ahead of demand. Uncertainty over network readiness and connection costs discourages housing provider investment in grid reinforcement, heat pumps, and electric vehicle charging infrastructure. Connection fees and grid access charges remain unpredictable while mandated connections to high-carbon heat networks undermine decarbonisation efforts. Without regulatory alignment or carbon-adjusted pricing, affordable homes will be tied to fossil-fuel systems, slowing emissions reductions.

Few mechanisms for joint infrastructure investment and risk-sharing: Infrastructure investments operate on decades-long cycles while housing and retrofit projects are funded on short-term horizons. This misalignment prevents the coordination of finance or cost-sharing between sectors. Developers face high upfront costs for district-scale upgrades to energy, mobility, water, wastewater, green-blue and social infrastructure. Without blended finance or co-investment models, these projects struggle to reach financial viability. Developers often scale back ambitions or recover the high upfront costs through rents or sales. This undermines the viability of district-scale solutions for affordable homes.

Infrastructure cost pass-throughs undermining affordability and retrofit viability: Current development models often place the financial burden of decarbonisation on households. In the absence of coordinated funding mechanisms and fair cost allocation, housing providers and utilities pass the cost of decarbonisation onto residents. Rising service charges and connection costs reduce tenant buy-in and limit the ability of housing providers to retrofit affordable homes[28]. Without new cost-sharing models, existing affordable home residents cannot subsidise grid upgrades and low-carbon heat, weakening the retrofit business case. This reinforces inequality and keeps affordable housing dependent on outdated, high-carbon infrastructure.

Lack of digital and data-driven tools for integrated planning: Planning decisions for low-carbon and climate-resilient housing and infrastructure are often based on outdated or siloed systems, with little visibility of local grids or climate vulnerabilities. This is especially problematic for retrofit projects, which may be approved without confirming whether local energy systems can support low-carbon upgrades. Outside major cities, it is rare to have access to advanced decision-support tools that combine multiple data layers to assess cost, capacity, and decarbonisation pathways, and create spatially explicit energy transition plans[29]. Without these there is often a lack of alignment between housing retrofit pipelines and infrastructure capacity.

Limited integration of climate adaptation in a housing and retrofit planning: New affordable homes are often still being built in flood-prone or heat-exposed areas without adaptation measures[30]. Only one in five people have taken steps to adapt their homes to reduce the damage of future floods[31]. Few planning frameworks link mitigation and resilience at project and neighbourhood level, leaving assets vulnerable to future risks, preventing coordinated investment in flood management, green-blue infrastructure, and climate-smart retrofits. For investors and financiers, this reduces more attractive market opportunities in favour of developments with increasing long-term maintenance costs, default risk, and potential stranded assets and reduced property values[32].

#04 Policy volatility and incentive inconsistency

Description

Fragmented and unstable housing, energy, climate and social policies undermine the conditions for low-carbon, affordable homes. Inconsistent and short-lived policy measures, including abrupt funding cuts, stalled reforms, and missing long-term strategies, create uncertainty that disrupts investment cycles and supply chains. Without stable standards and predictable incentives, housing providers, manufacturers and investors face higher costs and lower confidence, slowing innovation, retrofit delivery, and progress toward decarbonisation targets.

Current situation

Europe's low-carbon affordable housing market operates under overlapping EU, national, regional, and local policy frameworks. In particular, the revised Energy Performance of Buildings Directive (EPBD)[33] marks a turning point by requiring improvements to the existing building stock, which will stimulate retrofitting and innovation.

However, frequent changes and inconsistencies in national policy, including abrupt cuts, stalled reforms, or missing strategies[34], have created uncertainty that undermines the long-term investment needed to scale low-carbon retrofit and development.

The stop-start approach to incentives has created unstable markets, discouraging manufacturers and contractors from expanding production or training staff. Funding windows of one to three years are misaligned with project lifespans that span decades.

This instability perpetuates inequality, as affordable housing providers and low-income households lose access to retrofit support when incentives end, remaining locked into inefficient homes and high energy costs.

Challenges

The following challenges contribute to the barrier of policy volatility and incentive inconsistency.

Short-term policy cycles leading to rule changes mid-cycle: Housing providers face elevated financing costs when rules change mid-cycle. Across Europe, changes in rent caps[35], withdrawal of incentives[36], changes in efficiency standard requirements[37], as well as dismantling of longstanding institutions[38] have disrupted supply chains and financing models. Unpredictable rules weaken investor confidence and increase the perceived risk of long-term, low-carbon housing projects. Lenders price this risk into higher borrowing costs, reducing margins and delaying projects. The result is a higher cost of capital for low-carbon housing and slower progress toward the retrofit of affordable homes and new low-carbon development.

Withdrawal of incentives eroding market confidence: Frequent changes to subsidy schemes for retrofits, heat pumps, or renewables have created a pattern of boom-and-bust demand. When funding is suddenly exhausted,

households lose trust in future support and supply chains contract. This reduces action and creates unstable supply chains, which increases the cost of appliances such as heat pumps. Market volatility discourages manufacturers from scaling production and delays decarbonisation of the existing housing stock. Training programmes halt, people are not upskilled, and skilled workers leave the sector. The most vulnerable households remain locked in energy poverty.

Fragmented and conflicting regulations increasing complexity: Inconsistent building codes, leasehold laws, and subsidy regimes between and within European countries create a patchwork of obligations[39]. At the same time, requirements often conflict in practice, for example, heritage façade preservation versus deep retrofit. The lack of shared definitions for “net zero” and “affordable” housing also adds confusion and complicates cross-border investment. Housing providers face longer permitting times and planning risks, slowing retrofit and low-carbon new build. This fragmentation creates uncertainty for investors and developers navigating multiple jurisdictions and adds compliance costs and legal uncertainty in each country.

Unsupportive building codes and carbon regulations: Reducing construction-related carbon and adopting resource-efficient practices is often not mandatory[40]. Low-carbon and circular buildings, and adaptive reuse of existing buildings face long approval processes while embodied carbon remains largely unregulated. The recast EPBD[41] introduces lifecycle carbon requirements but lacks explicit requirements to address under-occupation or total floor space demand. The absence of binding carbon limits and consistent accounting makes it difficult to account for the value of avoided emissions. Without recognition of whole-life carbon, policy continues to reward short-term compliance, discouraging low-carbon and circular homes.

Lack of stable and long-term incentives stifling innovation and scaling: Manufacturers, contractors, and housing providers cannot invest in new technologies or industrialised retrofit methods without predictable demand. Pilot funding and innovation grants often last less than two years and lack alignment with tax or credit schemes. This instability prevents the scaling of circular material production and modern retrofit and construction methods to efficiently scale retrofit and low-carbon new build. The absence of coordinated, long-term incentives limits productivity gains and slows the cost reduction needed for low-carbon, affordable homes.

Limited institutional capacity creating delivery bottlenecks: Local governments vary widely in their technical, regulatory, financial and administrative capacities, especially in terms of finance and digitalisation[42]. The lack of access to engineering, technical, environment and climate skills among municipal staff is among the top challenges to the delivery of municipal housing and retrofit programmes[43]. These capacity gaps lead to delays in planning approvals, insufficient oversight of building codes and energy standards, and lower absorption of available grants or programmes.

#05 Limited public-private alignment and collaboration

Description

Fragmented governance and limited trust between public, private, and civic actors continue to hinder the delivery of low-carbon, affordable homes. National, regional, and local policies often operate in isolation, with overlapping mandates and short political cycles that are out of sync with long investment timelines. Local authorities often lack the autonomy and resources to lead large-scale retrofits or new affordable home programmes, while narrow public–private partnerships limit risk-sharing and coordinated investment in neighbourhood-scale decarbonisation and urban regeneration.

Current situation

Leadership on low-carbon affordable housing is fragmented across levels of government. Policy set nationally delegates delivery to local authorities but without the required resources or powers, leading to patchy progress and regional disparities. It is rare for governments to have a unified net zero vision or a strategy setting out where housing and retrofit should be delivered and why[44].

Predictably, public and private sectors respond by operating in silos. Housing providers navigate multiple disconnected approval processes while ministries and agencies try to progress without coordinated systems for joint decision-making or accountability. This fragmentation weakens the confidence needed to plan the long-term decarbonisation of the housing stock.

Public procurement and funding models further reinforce short-termism. Rigid, cost-based tendering discourages innovation and early collaboration. Local governments, bound by annual budgets and complex approval cycles, struggle to form multi-year partnerships needed to deliver scale that attracts private capital.

Public and private actors also lack a shared business case. Investment incentives, risk profiles, and return expectations often diverge; municipalities focus on social outcomes within short budget cycles, while private housing providers require predictable returns and long-term certainty.

Without adequate financial frameworks that balance affordability, carbon targets, and commercial viability, neither side can justify the sustained partnerships needed, resulting in stalled investment[45].

Challenges

The following challenges contribute to the barrier of limited public-private alignment and collaboration.

Lack of a long-term, coordinated vision for housing and climate goals: National, regional, and municipal bodies often pursue housing, energy, climate and social goals in isolation, with changing priorities across electoral cycles[46]. Without a shared national-to-local roadmap with clear support mechanisms, stakeholders pursue

competing objectives. The forthcoming EU Affordable Housing Plan[47] aims to address this gap by aligning housing policy with climate and social objectives, promoting greater policy coherence and coordination across European countries. However, its success will depend on consistent national implementation, integration with local plans, and long-term funding commitments to ensure stable progress toward affordability and decarbonisation goals.

Centralised and siloed public funding and weak delivery capacity: Over the past three decades, many national governments have devolved responsibilities for housing policy to local authorities. However, this shift has not been matched by sufficient fiscal autonomy or access to stable financing[48]. Most local authorities remain dependent on central government transfers, and the long-term decline in public investment in housing has left them unable to meet local housing needs[49]. This leaves municipalities accountable but under-resourced, forcing them to compete rather than collaborate[50]. Furthermore, public budgets for housing, energy, transport and essential infrastructure remain fragmented, with each department assessing value in isolation. This limits the ability to channel public funds into place-based, low-carbon regeneration that could transform the affordable housing sector.

Fragmented and inefficient planning and permitting systems: Planning delays are a major barrier to housing and infrastructure delivery. Local authority planning teams are often under-resourced, rely on outdated processes, and face high administrative costs, creating long and unpredictable approval timelines. Separate transport,

environmental and community impact assessments increase complexity and extend approval timelines. Major cities with stronger institutions and utilities are better equipped to coordinate the current complexity of housing and infrastructure, whereas smaller municipalities lack the capacity, tools, and finance to align planning across sectors[51]. Limited capacity further delays project approvals, increasing costs and reducing pipeline certainty for housing providers.

Weak coordination across the housing value chain: The fragmented delivery of low-carbon, affordable homes across housing providers, suppliers, and operators persists with limited mechanisms for early collaboration or shared accountability[52]. Traditionally, developers prioritise minimising construction costs, often neglecting long-term operational expenses[53]. This approach has resulted in buildings that may be cheaper to develop but are more costly to maintain. Investors often join projects only after planning approval, when affordability and decarbonisation targets are already locked in. Similarly, contractors and suppliers are rarely involved in early design stages, missing opportunities to optimise carbon and affordability outcomes.

Limited risk-sharing and collaboration in public-private partnerships: Public-private partnerships often stop at compliance-based contracts rather than true joint delivery models. Financial incentives are poorly aligned; public authorities are expected to achieve social outcomes without clear return mechanisms, while private partners face uncertainty over payback periods and cost recovery. Project approvals typically involve multiple ministries, utility companies, and local bodies, leading to lengthy negotiations on contract design and risk allocation. As a result, the public sector carries most delivery risk while private partners limit exposure. This undermines trust, discourages cooperation, and limits innovation and investment.

Procurement systems focused on lowest upfront cost: Public tenders typically reward the cheapest upfront price instead of long-term performance[54]. When innovation is not built into procurement, the most agile and forward-looking firms simply do not participate, leaving contracts dominated by larger incumbents using conventional methods. Contractors often “value engineer” by removing design elements or using cheaper materials to recover margins. This approach locks out high-performing small and medium enterprises (SMEs), limits design quality, and raises future maintenance and retrofit costs, undermining both affordability and the decarbonisation of housing.

#06 Public opposition and limited community ownership

Description

Limited engagement with residents continues to delay the decarbonisation of affordable homes. Public resistance to densification, infill and retrofit projects, fuelled by mistrust, inaccessible information, or a lack of visible local benefits, leads to lengthy appeals, delays, and cancelled developments. Consultations are frequently viewed as tokenistic or overly technical, with lower-income and vulnerable groups and their interests under-represented in decision-making. This exclusion deepens mistrust, reinforces inequities, and undermines support for the inclusive, net zero neighbourhoods Europe needs.

Current situation

Despite the overwhelming proportion of energy inefficient buildings[55], renovation rates are less than 1% per year[56], well below the 3% needed to align with decarbonisation goals. Most upgrades are partial or aesthetic rather than comprehensive, whole-building retrofits.

At the same time, poor housing conditions and energy poverty persist. Around 17% of the EU population lived in overcrowded households[57], while 11% lacked the ability to heat their homes sufficiently in 2023.[58]

Delivering large-scale renovation and new housing programmes is complicated by public resistance, which adds time and cost through appeals, redesigns and re-consultation cycles.

Residents frequently associate retrofit with disruption and hidden costs, while densification is opposed when local benefits such as amenities or green space are unclear.

Community and civic organisations that could help bridge these divides often lack the resources or platforms to participate meaningfully. Impenetrable planning data and language, and complex appeals procedures exclude many groups from shaping outcomes.

The result is a widening gap between the technical ambition of the housing transition and the social consent needed to achieve it.

Challenges

The following challenges contribute to the barrier of public opposition and limited community engagement.

Late, top-down and compliance-driven consultations: Housing providers and public authorities often engage communities too late in the planning cycle after major decisions have already been made. Consultation is often compliance-driven rather than collaborative, focusing on statutory requirement instead of dialogue[59]. Outreach rarely covers all social, ethnic, and generational groups, leaving plans misaligned with actual community needs[60]. This reactive approach fuels mistrust and leads to feedback that fails to capture full local needs or risks.

Housing design misaligned with community needs and lifestyles: Current planning and design frameworks reflect outdated assumptions about household types and lifestyles. Many policies are geared toward a particular family model, overlooking the rise in single-person households, as well as multi-generational and non-traditional households which can lead to a more efficient use of the housing stock. Limited inclusion of community-led organisations, cooperatives and civic organisations has produced homes that are often too large, too expensive, or poorly located for the people who need them most.

Low resident trust and scepticism toward retrofit: Retrofit and regeneration projects often lack practical tools to demonstrate the benefits to residents. Many tenants resist renovations due to fear of eviction or rent hikes. Public confidence in retrofit is undermined by misinformation and media coverage of poor-quality projects[61]. Highly publicised cases of "renovictions" where rent increases for tenants following retrofits have deepened mistrust, particularly among lower-income groups and marginalised populations[62]. Many residents view retrofit as disruptive and costly[63], with limited access to impartial advice or effective dispute-resolution mechanisms. As a result, households often delay or reject upgrades, slowing delivery and weakening the credibility of retrofit programmes.

Stigma and resistance to mixed-tenure and higher-density development: Negative perceptions of affordable housing in some parts of Europe continue to drive "not-in-my-backyard (NIMBY)" resistance to new or denser development. Residents often associate these projects with declining property values, overcrowding, or strain on local public services. Negative media portrayals reinforce these fears, while limited transparency and tokenistic consultation deepen mistrust[64]. Without clear communication of benefits and meaningful participation, community opposition can escalate, leading to appeals, redesigns, and prolonged approvals. As a result, dense or mixed-use projects face high development risk, delaying the delivery of compact, low-carbon urban regeneration.

Limited access to trusted retrofit advice and information: Most homeowners lack clear, trusted guidance on retrofit options, costs, and benefits[65]. Advisory services remain unevenly available despite efforts to scale one-stop-shops for renovation across Europe under the EPBD[66]. This leaves many households unaware of practical steps or eligible funding. In the absence of transparent accessible information, households often prioritise cosmetic improvements over energy upgrades. For lenders and public authorities, this weak demand undermines aggregation and slows the flow of capital into retrofit programmes, limiting the scale of affordable decarbonisation.

Access barriers for smaller and community actors: Civil society groups, cooperatives, and community-led housing providers often lack resources, skills, or sustained funding to participate effectively in retrofit and new-build low-carbon homes[67]. Without intermediaries, communication gaps arise, driving up risk, slowing consensus, and compounding opposition to this approach. Community-led and non-market actors also face barriers in accessing land and finance, as current procurement systems favour highest-price bids over social or environmental value. As a result, community-led and non-profit housing models remain marginal, missing an opportunity to build local trust, mobilise participation, and accelerate the inclusive delivery of low-carbon affordable homes.

#07 Poor understanding of housing affordability and performance

Description

Europe's affordable housing sector lacks consistent, reliable data on how buildings perform in practice. Information on housing condition, energy use, and carbon performance of its existing stock tend to rely on modelled rather than measured data, while embodied carbon is rarely assessed. Data on housing condition, affordability, underuse, vacancy, and retrofit potential is fragmented across public and private systems. Without reliable data, it is difficult to benchmark performance or plan, fund and monitor decarbonisation programmes effectively.

Current situation

There is no unified European definition to consistently assess and benchmark the affordability of housing stock. No more than 30% of income spent on housing is a marker used by some, but Eurostat sets this level at 40% whereas tenant organisations are increasingly targeting 25%.

The picture is similarly inconsistent when it comes to energy performance. Europe's housing stock is ageing and performs poorly, with around 75% of homes energy inefficient[68] and 35% rated D to G on Energy Performance Certificates (EPCs), the lowest two categories[69]. Yet, reliable data on actual performance is scarce.

EPCs rely on modelled rather than measured performance. In many countries, EPCs are only issued at sale or lease, leaving large portions of housing unassessed. Without real-world monitoring, energy use and retrofit needs are poorly understood.

Whole-life carbon is largely invisible in housing policy and valuation. Operational energy is regulated, but emissions from materials and construction are rarely accounted for. Surveys of building condition and fabric performance are sporadic, and few countries require lifecycle assessments for new homes.

Finally, condition, affordability and carbon data sit in incompatible systems across utilities, municipalities, and housing providers. Housing providers lack access to shared datasets for portfolio-level planning and monitoring. Without reliable and interoperable data and benchmarks, investors cannot verify savings, and governments cannot measure progress.

Challenges

The following challenges contribute to the barrier of poor understanding of housing stock performance and quality.

Inconsistent definitions and benchmarks for affordability: Assessing the affordability of housing projects proves challenging. This is largely due to the absence of objective criteria that would allow a project to be unequivocally defined as affordable, particularly when it comes to determining how affordability itself should be measured[70]. Furthermore, progress on the social taxonomy proposed by the Platform on

Sustainable Finance[71] has stalled. Housing is one of the topics that could have been covered by the social taxonomy.

Limited data on construction quality and in-use performance: Reliable data on how homes are built and perform in practice is scarce. Construction quality is often undocumented once homes are completed, with limited post-occupancy evaluation. Most housing efficiency assessments rely on modelled data rather measured consumption[72]. In retrofit projects, the absence of detailed pre-works surveys leads to cost overruns and disappointing energy outcomes. Many countries experience performance gaps of 20-30% between predicted and actual results[73]. Without accurate data, investors cannot benchmark progress, policymakers cannot design incentives, and occupants cannot trust projected savings.

Weak retrofit quality assurance and verification: Retrofit delivery is often undermined by poor workmanship, weak oversight, and uneven standards. Independent quality assurance and post-occupancy verification are rare. These gaps lead to issues such as inadequate insulation, incorrect system sizing, and missing commissioning dates, which, as a consequence, erode expected efficiency gains. The result is diminished investor confidence and heightened reputational and operational risk. Without robust verification of actual performance, retrofit will continue to be perceived as unreliable, undermining consumer confidence and investor appetite.

Slow adoption of digital and smart building tools: The housing sector still relies heavily on manual record-keeping and disconnected IT systems. Digital Building Logbooks (DBLs) and Building Renovation Passports (BRPs) are rarely integrated into housing renovation or maintenance processes[74] although their use is expected to expand under the recast EPBD[75]. Data on condition, maintenance, and energy use is fragmented across property managers, utilities, and public databases, making comparison difficult. As a result, data coverage is uneven, especially across older and social housing stock, and housing providers struggle to build the business case for efficiency investments, while governments cannot target funding where it is most needed.

Limited capacity for data sharing and data-driven decision-making: The skills to interpret building quality and performance data are limited across the construction and finance sectors. Smaller housing providers, local authorities, and lenders lack staff trained in digital tools, data analytics, and whole-life carbon accounting. Over 90% of construction industry data currently go unprocessed, and advanced 3D site models are frequently reduced to simplified 2D submissions for regulatory review, wasting valuable information that could improve design and compliance decisions[76]. Poor data management further constraints data sharing, leaving many organisations reliant on outdated benchmarks or external consultants, perpetuating inaccurate understanding, ineffective investment and inconsistent quality.

Lack of whole-life carbon measurement and disclosure: Whole-life carbon accounting is largely absent from Europe's housing sector. While energy use during occupation is increasingly measured, the embodied carbon emissions from constructing, renovating, and maintaining homes is mostly invisible[77]. Few national frameworks require developers, housing associations, or retrofit contractors to calculate or disclose embodied carbon in materials and components. Most tools and data are designed for commercial real estate rather than homes, leaving social and affordable housing providers without practical benchmarks. Without clear standards or reporting obligations, design choices that could cut embodied emissions are rarely valued in procurement or finance decisions.

#08 Short-term business cases undermining long-term value

Description

Investment decisions across Europe's housing sector remain driven by short-term returns and valuation models that overlook the full lifetime costs and benefits of low-carbon, affordable homes. Projects are typically assessed on upfront capital costs rather than long-term value, with benefits such as reduced energy poverty, improved wellbeing, and avoided carbon liabilities undervalued. Transition risks are inconsistently reflected in valuations, while split incentives between landlords and tenants further deter investment. This short-term logic continues to lock the market into inefficient, high-emission assets.

Current situation

Escalating construction costs, rising interest rates, constrained financing, and geopolitical uncertainty have made affordable housing a difficult asset class to finance. Many housing providers favour short-term, low-risk projects, leaving homes underfunded.

Rental income caps and limited margins tied to affordable homes reduce the ability to absorb higher upfront costs of low-carbon materials or technologies, even when lifetime costs are lower due to lower operating and maintenance costs.

For retrofit, rental income caps and weak mechanisms for landlords to recover costs undermine the business case for energy upgrades. Split incentives where owners bear upgrade costs while tenants benefit from lower bills further deter investments.

Traditional valuation models based on short-term comparisons overlook lower lifetime energy bills, avoided carbon costs, and wider social benefits. As a result, low-carbon homes appear overvalued relative to conventional builds, deterring investors despite their longer-term stability and reduced exposure to transition risk.

Housing is increasingly at risk of obsolescence, depreciation, and tenant voids under tightening minimum energy performance standards and greater scrutiny of embodied carbon. Such mispricing risks widespread asset stranding and lost capital.

Challenges

The following challenges contribute to the barrier of short-term business cases undermining long-term value.

Short-term valuation horizons undervaluing whole-life performance: Investment appraisals typically consider the upfront capital costs and short payback periods, overlooking the full lifetime performance of buildings. Whole-life benefits such as reduced energy bills, lower maintenance, avoided carbon costs, improved health outcomes, and long-term asset quality are rarely integrated into valuations[78]. Affordable housing providers, operating under tight rental income caps, find it even harder to justify the higher upfront cost. Consequently, retrofit and low-carbon new homes appear lower-return,

while new, high-emission developments remain attractive because their true lifetime costs and benefits are not calculated.

Split incentives between tenants and landlords weaking the business case for retrofit: Retrofit costs are typically borne by housing providers while tenants benefit from lower bills and improved comfort, creating a "split incentive" problem[79]. Rental income caps in the affordable housing segment prevent cost recovery, leaving little motivation for housing providers to invest. The problem is most acute in the private rented sector, where retrofit rates are among the lowest in Europe[80]. Mechanisms to remedy this problem exist in some countries but remain limited throughout Europe[81]. As a result, housing providers defer upgrades and tenants remain in inefficient, high-cost homes.

Weak business case for place-based decarbonisation and placemaking: Developers often underestimate the medium-term returns associated with high-quality design, mixed-use development, and well-managed neighbourhoods, which could generate earlier pre-leases, lower vacancy rates, and sales or rental premiums. Housing providers or fund managers rarely pursue long-term asset-holding strategies that sustain this value through ongoing stewardship and community amenities[82]. Limited investor confidence in non-revenue-generating expenditure, coupled with soaring construction costs, discourages meaningful investment in placemaking. This leads housing providers to allocate suboptimal levels of a project's capital and operational expenditure to placemaking, inadvertently lowering its return on investment.

Poor integration of transition and physical risks in housing valuations: Housing valuations continue to assume static market conditions and do not integrate policy tightening, carbon pricing, or changing tenant expectations[83]. As a result, high-emission and flood-prone buildings appear stable and profitable, while low-carbon, well-located affordable homes seem costly. With the expansion of carbon pricing under the EU Emissions Trading Scheme (ETS) II and UK ETS II to include buildings[84] and other climate regulation, inefficient assets will face rising operational and compliance costs. As standards tighten, properties lacking energy efficient or climate resilience risk devaluation and regulatory non-compliance, constraining housing providers' ability to reinvest.

Lack of robust metrics undermining the business case for low-carbon and affordable homes: Housing providers and investors lack consistent, credible metrics and benchmarks for lifetime carbon, resilience, affordability and social value. Without credible quantification tools, the long-term financial benefits of low-carbon and affordable homes cannot demonstrate improved financial performance or reduced long-term risk. This makes retrofit and low-carbon homes appear weak in investment appraisals, underwriting models, and credit assessments. The lack of metrics and benchmarks diverts capital investment away from retrofit and from net zero homes that would cost less to operate over time.

Limited capacity for climate transition planning and risk management: The real estate sector faces major capacity gaps in planning for the climate transition. Many housing providers lack the data, expertise and tools to assess and manage transition and physical climate risks across their portfolios. There is a knowledge gap of this specific risk landscape at large, but also a lack of knowledge of ways of transferring these risks into financial materiality, meaning how to account for expected future policy changes, customer net zero demands or unknown cost inflation of construction and materials[85]. As a result, real estate actors have been slow to internalise transition risks and adopt internal carbon pricing compared to high-emitting industries, limiting their ability to align investment decisions with net zero goals.

#09 Inadequate financial solutions and risk-sharing mechanisms

Description

Finance for low-carbon, affordable housing is fragmented, risk-averse and far below the scale of need. Most projects rely on standard bank lending, while innovative financing mechanisms are not available at scale. Limited access to long-term, low-cost capital, especially for public, cooperative and social providers, combined with high transaction costs and short loan terms, excludes smaller retrofits and community-led projects. Public agencies and housing associations also lack the financial expertise and data to structure investment-ready projects, while the failure to align public and private returns continues to limit funding for low-carbon, affordable housing.

Current situation

The European Investment Bank's housing plan aims to mobilise €35 billion of public and private capital for low-carbon, affordable homes over the next two years[86], a fraction of the €270 billion investment needed per year[87]. This leaves a substantial investment gap across Europe.

Across Europe, housing providers and occupiers struggle to access affordable capital for deep retrofit or net zero-ready construction. Most projects still depend on conventional bank lending, and few accessible instruments combine public and private capital at scale.

Retrofit and adaptive-reuse projects are often small, complex, and challenging to complete, making them less attractive to institutional capital. Without aggregation platforms or guarantees, lenders demand higher risk premiums.

Many governments offer retrofit or energy-efficiency schemes, but these are short-lived and poorly aligned with long-term housing goals. Frequent policy shifts in tax relief, rent regulation, and subsidy frameworks create uncertainty for borrowers and lenders alike.

Local authorities, housing associations, and small housing providers often lack the financial expertise to structure investment-ready projects or engage with private investors. Missing data, fragmented ownership, and limited internal capacity reduce the bankability of affordable housing portfolios.

Challenges

The following challenges contribute to the barrier of inadequate financial solutions and risk-sharing mechanisms.

Scarce and poorly targeted risk-sharing mechanisms: Across Europe, there are few mechanisms that allow public or private investors to share risk in affordable, low-carbon home retrofit and new development. Most available guarantees, insurance schemes, or first-loss structures are designed for large corporate borrowers rather than small or early-stage projects. Therefore, local authorities, cooperatives, and smaller housing providers face higher borrowing costs and longer due-diligence processes. Without credit enhancement or loss-mitigation tools, lenders treat small retrofits as high-risk and require

higher margins, raising the cost of capital for affordable homes.

Fragmented project pipelines and limited aggregation capacity: Affordable housing investment is scattered across small, bespoke projects with limited standardisation. Without common data, consistent documentation, or portfolio-level vehicles, it is difficult to pool retrofits and affordable housing developments into investment-grade portfolios[88]. Institutional capital, which relies on diversification and scale, cannot efficiently deploy funds across hundreds of local projects. As a result, transaction costs for these projects are high and liquidity is low. In the absence of aggregation, promising pilot schemes tend to be one-offs rather than scalable programmes.

Limited capacity to structure blended finance solutions: Across the housing sector, both public and private actors lack familiarity with the full range of instruments that could finance decarbonisation. Knowledge gaps in financial structuring, risk-sharing mechanisms, and performance monitoring make it difficult to match concessional and commercial capital[89]. Even where blended-finance funds exist, they are often under-used because projects fail to meet eligibility or bankability thresholds. Technical assistance facilities are limited, particularly for municipalities and social housing providers with constrained resources.

Low uptake of innovative sustainable finance solutions: Across Europe, housing finance is dominated by conventional bank debt. There is a lack of innovative financial products and services for retrofit, including property-linked finance, green leases, on-bill repayment, or “energy-as-a-service” models[90]. Similarly, for low-carbon new-build homes, conservative underwriting criteria and high insurance premiums, often stemming from the lack of verified historical performance data on building safety and quality, make lenders reluctant to back projects using circular or bio-based materials[91]. As a result, low-carbon homes are often deemed ineligible for standard mortgage products.

Underdeveloped performance-based and outcome-linked finance: Although green and social financial products are expanding, most rely on predicted energy ratings or self-reported data rather than measured performance. Few instruments link loan pricing or bond proceeds to verified reductions in energy use or carbon emissions. Yet in practice, most lending and investment decisions still hinge on design-stage ratings rather than measured results. Without transparent metrics and reliable monitoring, lenders cannot reward proven outcomes, and housing providers receive little incentive to exceed compliance standards. When budgets tighten, low-carbon solutions are often cut first because their financial value is not recognised.

Persistent financial access barriers for smaller and community actors: Smaller housing providers, cooperatives, and community-led initiatives face the steepest barriers to accessing affordable capital. High minimum investment sizes, collateral requirements, and lengthy application processes discourage participation, even where social and environmental impact is strong[92]. Few financial institutions offer products tailored to the scale and governance of local actors, leaving many reliant on short-term or high-interest borrowing. These structural barriers reduce diversity in housing delivery and exclude the very organisations best positioned to deliver people-centred, affordable, low-carbon projects.

#10 Short-term investment horizons and relaxed stewardship

Description

Europe's financial governance frameworks have not kept pace with the long-term, place-based nature of low-carbon, affordable housing. Institutional investors control vast pools of capital shaping the built environment, yet the rules shaping their conduct still focuses on disclosure rather than active stewardship. Major private housing providers must report sustainability risks but are not required to align investment horizons with housing lifespans or verify carbon and affordability outcomes. Without stronger stewardship and accountability mechanisms, short-term capital continues to dominate, and sustainability claims often rest on self-reporting rather than verified impact.

Current situation

Institutional investors hold vast influence over the built environment, yet most housing finance remains short-term. Real estate and private-equity funds typically operate on 5- to 10-year cycles, while the benefits of housing emerge over 30- to 60-year periods[93].

Capital allocation focused on the real estate sector continues to favour higher-yield, lower-risk asset classes such as logistics or data centres, leaving affordable housing and retrofit investments marginal. Limited long-term housing vehicles and integration of transition risk into property valuation perpetuate the perception that affordable, low-carbon housing is a niche or higher-risk asset.

Investor stewardship frameworks have strengthened through the EU Shareholder Rights Directive II[94] and national stewardship codes in countries such as the UK and Netherlands[95], but their adoption across Europe remains uneven. As a result, institutional investors have limited levers to engage with other players in the value chain or municipalities on occupier affordability or retrofit planning.

Data transparency and verification also remain weak. Reporting on carbon emissions, affordability metrics, and occupier outcomes is often inconsistent, self-reported, and rarely subject to independent audit. This opacity allows speculative or extractive investments without demonstrating measurable carbon or social value.

The result is that while capital is abundant, the stewardship mechanisms that could direct it towards longer-term public benefit remain weak, leaving significant potential for long-term, impact-driven investment in low-carbon, affordable housing untapped.

Challenges

The following challenges contribute to the barrier of short-term investment horizons and weak relaxed stewardship.

Short-term investment horizons misaligned with housing lifespans: Many real estate and equity funds operate on investment cycles of 5 to 10-years, while affordable housing assets (including deep retrofits) deliver returns over several decades. This temporal mismatch encourages

short-term profit-crystallisation and speculative trading over longer-term stewardship and maintenance. To balance risk, housing developers optimise for rapid sales rather than whole-life performance, while private housing providers prioritise quick exits over building resilience or occupier stability[96]. This short-termism supresses the deployment of patient capital and discourages deep retrofit or longer-term decarbonisation strategies.

Fund structures and incentives reinforcing short-term investment behaviour: Investment fund structures and performance metrics are typically based on short holding periods, internal rate of return, and exit yield, rather than long-term asset value or social impact[97]. Managers are rewarded for near-term gains, while fiduciary obligations discourage long-term risk-taking. This disconnect between fund incentives and the lifespan of housing assets limits stewardship, reduces reinvestment in asset quality, and channels capital away from affordable, low-carbon housing.

Structural financing gap between development and institutional capital: Long-term institutional investors such as pension funds and insurers manage patient, low-risk capital that is well suited to owning stabilised, income-generating housing assets. However, their fiduciary obligations prohibit them from taking on development risk directly[98]. This creates a structural financing gap between the short-term, higher-risk capital needed for construction and the long-term, lower-risk capital available once projects are completed. Most institutional investors cannot expose underlying savers to development-stage risk, while housebuilders and private developers typically rely on short-term equity or debt, constraining the delivery of low-carbon, affordable homes.

Late investor involvement and weak accountability across delivery cycles: Investors often enter projects only after key decisions of design standards, affordability targets, and carbon performance have been determined.

This limits their ability to influence early-stage decision that impact long-term sustainability. Whether new-build or retrofit, as housing moves through the delivery cycle, social, commercial, and environmental performance metrics are not always maintained throughout. Limited early and sustained investor engagement prevents their ability to embed affordability and carbon criteria from the outset, ensuring long-term accountability and measurable outcomes.

Limited investor stewardship and engagement on climate and social outcomes: While a growing number of institutional investors commit to ESG principles, most have not embedded long-term stewardship principles or responsibilities for housing assets. Institutional investors rarely engage directly with municipalities or other players in the value chain on retrofit targets, rent policy, or community outcomes. As a result, large volumes of housing capital flow through structures that prioritise compliance over proactive engagement. Without stronger mandates for stewardship and accountability, private housing providers are less motivated to influence project design or ensure that capital contributes to sustainable, inclusive outcomes.

Weak transparency and verification of climate and social performance: Carbon, affordability, and social-impact data remain fragmented, unverified, and non-comparable across the market. Many private housing providers self-report ESG outcomes without third-party audit, while others use inconsistent definitions of “affordable” or “green.” This opacity enables speculative or extractive investment models to persist under an ESG label. Inconsistent and weak verification and validation undermines investor confidence, deters genuine sustainability-linked capital, and erodes public trust. In the affordable housing segment, it also limits access to sustainable finance products because verified data on performance improvements are often missing.

#11 Limited uptake of low-carbon materials and technologies

Description

Europe's housing sector relies on carbon-intensive, fragmented supply chains that constrain the scaling of low-carbon materials and technologies. Manufacturers face unstable demand, inconsistent certification, and limited access to finance, discouraging investment in innovation. Valuation methods treat materials as disposable rather than recoverable assets, masking the economic and carbon value of reuse. Procurement frameworks that prioritise lowest upfront cost over lifecycle value reinforce short-termism and further inhibit market transformation. As a result, low-carbon and circular materials remain niche, slowing progress towards decarbonised affordable homes.

Current situation

Europe's housing sector is carbon-intensive and deeply dependent on steel, cement, and plastics. Buildings accounts for roughly half of all extracted materials and about one third of Europe's total waste[99], while circular materials represent less than 1% of inputs[100].

Public tenders prioritise lowest upfront cost over lifecycle performance, leaving little incentive to invest in durable, low-carbon components. Material recovery and reuse infrastructure also remain scarce. This keeps circular construction marginal.

Sudden changes to subsidies and funding create "boom-and-bust" cycles for innovative materials or technologies[101]. When incentives are introduced abruptly and then withdrawn or redesigned, manufacturers hesitate to scale production, invest in new facilities, or build domestic supply chains.

The absence of accurate carbon benchmarks and historical performance data prevents transparent comparison between products or projects. As a result, lenders and insurers continue to treat circular and bio-based construction as risky, inflating costs further.

Fragmented standards and inconsistent regulation for reuse further add to the challenge. Rules governing safety, testing, and end-of-waste status vary widely across European countries, making it costly to certify or reuse materials across borders.

Challenges

The following challenges contribute to the barrier of limited uptake of circular and low-carbon materials and components.

High costs and unstable demand constraining competitiveness: Low-carbon and circular materials typically cost 30–50% more than conventional ones due to low production volumes and immature supply chains[102]. Unpredictable public incentives (frequently capped or withdrawn mid-cycle) make forward planning impossible. Manufacturers face volatile demand and restricted access to finance for scaling production, while housing providers in the affordable housing sector cannot absorb the pricing gap under regulated rental

income ceilings. This market instability limits investment in innovation, and the resulting caution slows industrialisation of low-carbon housing.

Inadequate carbon accounting and regulatory requirements: There is a lack of a common definition and calculation approach to embodied carbon and a lack of policy guidance to support material reuse. Most cities still lack pre-demolition audits or policies that require them[103], leading to loss of reusable steel, timber, and façades. Recoverable components are frequently sent to landfill or downcycled. Market-wide measurement confusion and fragmented guidance create ongoing uncertainty for material and component manufacturers, suppliers and buyers. Developers lose potential resale income that could offset deconstruction costs, while investors see lost residual asset value and missed opportunities tied to material recovery.

Inconsistent certification and testing requirements delaying market adoption: Bio-based and reclaimed materials face diverging national certification schemes and testing requirements across Europe, slowing their entry into the market. This regulatory fragmentation increases cost and delay for manufacturers, who must navigate different standards, and in some cases may face duplicated testing in multiple jurisdictions. The uncertainty around liability and conformity adds uncertainty for developers, insurers, and contractors, inflating insurance premiums and limiting investment in scaling low-carbon and circular material supply chains. As a result, low-carbon and circular materials remain niche and commercially disadvantaged.

Linear design and procurement models constraining reuse: Procurement frameworks continue to prioritise lowest upfront cost over lifecycle performance. Early design decisions rarely consider disassembly, reuse, or embodied carbon limits, locking in inefficiencies and stranded emissions. Developers lack incentives to preserve materials or design for future adaptability. As a result, buildings are demolished rather than refurbished, and valuable materials are downcycled or sent to landfill. This linear design thinking wastes embodied carbon and increases the future cost of deep retrofit, undermining long-term affordability and climate goals.

Limited material performance data hindering valuation and finance: Limited data on material performance and reuse continues to constrain investment in circular and bio-based construction. Environmental product declarations (EPDs) are underused, and information on material provenance and reuse potential is rarely integrated into building models, making it difficult to measure avoided emissions or value material recovery. Financiers and insurers remain cautious about circular, bio-based materials due to limited reliable performance data on the safety and quality of homes built from these materials[104]. Without robust and standardised data, lenders and valuers cannot accurately assess the value or quantify the benefits of low-carbon homes.

Weak supply chains and insufficient local manufacturing capacity: Europe is heavily dependent on imported materials including steel, copper, and mechanical components. This exposes projects to global price shocks and long lead times. Domestic producers face skill shortages, insolvencies, and limited infrastructure for bio-based or recycled materials. Domestic low-carbon manufacturing is limited, while mid-sized firms face insolvency risk and skill shortages. The absence of local or regional material banks, closed-loop producers, and robust logistics amplifies these risks at both project and sector-level. This can lead to delivery delays, cost overruns, and increasing exposure to concentrated supply risks that threaten affordability and reliability.

#12 Skills shortages and limited productivity in construction

Description

Europe's construction and real estate sector faces fragmentation, low productivity, severe skills shortages, and slow adoption of modern methods. Labour gaps in retrofit, off-site construction, and circular design drive up costs and delay delivery. Jobs in construction are often seen as low-status, insecure and physically demanding, making it difficult to attract and retain skilled workers. Planners, architects, designers and housing providers also lack expertise to plan, commission and deliver large-scale retrofit and low-carbon projects. These weaknesses constrain innovation and efficiency, limiting the sector's ability to deliver affordable, low-carbon homes at the required speed and quality.

Current situation

Europe's construction sector faces a structural productivity challenge. The industry is highly fragmented, with 3.5 million firms employing an average of just four people each[105]. Labour-intensive, project-by-project delivery remains the norm, keeping costs high and timelines long .

Over one-third of workers are now over 50[106], while younger generations are turning away from the sector due to low pay, job insecurity, and poor perceptions of career progression. By 2035, an estimated 4 million new workers will be needed to replace retirees[107]. This requires a local workforce who understand local materials and remain available to retrofit the existing stock.

Vocational education and training systems have not kept pace with this transformation. Curricula still prioritise masonry, mechanical, and traditional on-site skills rather than retrofit, off-site manufacturing, or the use of low-carbon and bio-based materials.

Fewer than one in five workers are trained in digital construction tools such as Building Information Modelling (BIM) and digital twins. Meanwhile, small firms operating on thin margins lack the capacity to invest in continuous learning, innovation, or staff development.

Modern methods of construction (MMC), including modular and prefabricated systems, have proven potential to cut costs and emissions but remain marginal. Factory capacity is limited, regulation inconsistent, and demand too volatile to justify large-scale investment.

The absence of stable, long-term project pipelines undermines business confidence, while fragmented procurement and planning systems prevent MMC from achieving the scale necessary to transform productivity in the sector.

Challenges

The following challenges contribute to the barrier of skills shortages and limited productivity in construction.

Fragmented industry structure undermining productivity: Europe's construction and real estate sector

remains highly fragmented, with 3.5 millions of small firms and limited vertical integration. Most projects are delivered through short-term contracts and subcontracting chains that discourage innovation and shared data systems. Productivity has grown by less than 1% annually over two decades[108], far below other industrial sectors. Fragmentation keeps costs high, increases delivery risk, and prevents economies of scale needed to industrialise low-carbon housing.

Low attractiveness and diversity in construction and real estate careers: The construction workforce is shrinking and ageing, with one in three workers nearing retirement. Low pay, insecure contracts, and physically demanding conditions deter younger entrants[109]. The sector is heavily male-dominated, with women representing less than 10% of the sector[110]. Migrant and subcontracted workers fill many gaps but often face poor training and limited career pathways. Few attractive pathways are in place for women,

younger workers, or underrepresented groups. This reliance on temporary, low-skilled labour weakens quality control, increases turnover, and undermines the development of high-skilled "green jobs." Labour shortages inflate labour costs and make large-scale retrofit and affordable housing delivery unviable in many regions.

Widespread skills shortages and mismatched training systems: The construction and real estate sector faces widespread skills shortages and mismatches. Around 25% of the construction workforce needs upskilling or reskilling between 2022 and 2027 to reach the target of 3 million skilled workers[111]. At the same time low-carbon and circular design skills remain underdeveloped amongst architects and designers[112]. Many higher education and vocational programmes still focus on traditional, carbon-intensive materials and methods[113]. Coordination between education providers, employers, and policymakers continues to be weak. Without national frameworks that integrate training curricula with industrial strategy, the sector cannot build the capabilities it needs.

Limited uptake of modern and industrialised construction methods: Off-site manufacturing, prefabrication, and modular design can reduce build times by up to 50% and costs by 20% under stable demand, yet uptake across Europe is still limited[114]. High upfront investment in factories, logistics, and software, coupled with inconsistent national standards and risk-averse procurement, keeps MMC underused[115]. There is also a limited use of digital tools in the construction and real estate sector, such as Building Information Modelling (BIM), which could both boost productivity and attract more skilled workers, especially younger professionals, to the sector. Many lenders and insurers still view modular or bio-based construction as riskier, while public tenders rarely reward innovation.

Insufficient infrastructure and coordination for retrofit supply chains: The retrofit market lacks the infrastructure and coordination to support deep renovation at scale. Current supply chains are highly localised and dominated by small contractors operating independently. Coordination between surveyors, manufacturers, and installers is limited, and few large-scale retrofit hubs or logistics networks exist. Without aggregated procurement and pooled investment, economies of scale are lost. Initiatives such as Energiesprong show that industrialised retrofit can transform productivity, but replication is still rare due to limited data integration, pipeline stability, and shared delivery models.

Chronic underinvestment in digitalisation and innovation: Construction and real estate sector research and development (R&D) spending averages less than 2% of sector value added, five times lower than manufacturing[116]. Data standards remain inconsistent, interoperability poor, and uptake of Building Information Modelling (BIM) or digital twins is limited to major projects[117]. Small and medium-sized enterprises (SMEs) which make up 90% of the industry often lack the digital infrastructure or training to adopt advanced design and tracking tools. This hinders carbon accounting and productivity improvements. The resulting fragmentation prevents the scaling of circular construction and quality assurance, keeping projects slow, costly, and carbon intensive.

Intervention Areas

Transforming Europe's housing system requires coordinated interventions across the entire value chain. These interventions must address structural inefficiencies, align incentives for long-term affordability and decarbonisation, and enable collaboration between public, private, and civic actors.

The following sections outline possible intervention areas and illustrate how they enable the decarbonisation of affordable homes across Europe.

#1 Optimising strategic land assembly	**#2** Mainstreaming integrated planning	**#3** Establishing universal definitions and measurement
#4 Enhancing public-private-civic collaboration	**#5** Fostering community and resident collaboration	**#6** Redefining the business case
#7 Unlocking innovative financial solutions	**#8** Aligning investment with long-term community needs	**#9** Diversifying delivery, tenure and reuse models
#10 Leveraging low-carbon innovation	**#11** Investing in value chain upskilling and reskilling	**#12** Enabling system-wide knowledge sharing

#01 Optimising strategic land assembly

Barriers addressed

01 Inadequate land access and suitability
05 Limited public-private alignment and collaboration

Description

Housing providers and public authorities can improve access to affordable, well-located and low-carbon homes by collaborating on the strategic assembly of land on brownfield and infill sites. Integrated land-use planning and zoning that links land value with affordability and carbon targets can unlock strategically assembled portfolios of brownfield and infill sites for redevelopment. Coordinated delivery across multiple plots through public–private partnerships spreads risk, accelerates acquisitions, and ensures that land value uplift is reinvested to maintain long-term affordability and project viability. The result is housing development redirected towards better-suited locations.

Current situation

Competition from higher value land uses is a major constraint on the viability of low-carbon, affordable housing in cities across Europe.

Land is typically priced using a residual valuation approach, where the amount a housing provider can pay reflects the estimated sales or rental value of the completed project minus construction costs and profit.

When affordability or low-carbon standards reduce potential returns or raise costs, the residual land value falls. If landowners continue to seek higher market prices, schemes become financially unviable without subsidy or value-capture mechanisms to bridge the gap.

CASE STUDY:

Piano Straordinario della Casa – affordable homes plan: Milan faces affordability pressures from high land and housing costs, squeezing middle-income renters. The city allocates 300,000 sq m of municipal land under free rights for 10,000 regulated rent homes, blending renovation with new construction near transit hubs and other services. Twenty-one such sites have been identified based on connectivity, environmental and positive neighbourhood impact. The coordinated public-private delivery lower rents by reducing land cost, ensures accessibility, and expands affordable housing supply[135].

Fragmented land ownership and slow or inconsistent land release further restrict access to suitable, well-located sites. Weak coordination between land use, housing and infrastructure planning limit opportunities to achieve net-zero-ready homes further still.

The result sees affordable homes pushed to larger greenfield sites. Development on these sites often fails to account for the full cost of transport infrastructure, utilities, and energy networks. The reduced access to suitable public transport typical with these sites reinforces car dependency and raises lifecycle emissions.

Without proactive land assembly and value-capture mechanisms linked to infrastructure upgrades, housing providers struggle to secure sites that balance cost, connectivity, and carbon-reduction goals.

Current responses

The market has started addressing issues related to strategic land assembly.

CASE STUDY:

Homes England – public land assembly: To catalyse economic growth in deprived parts of the country, Homes England, the UK Government housing and regeneration agency, is using its public land, land assembly powers and funding, to deliver low-carbon and affordable homes and supporting infrastructure. This approach coordinates private and public sector partners to unlock development land through infrastructure investment. The agency includes the English Cities Fund, a regeneration company comprising Homes England, institutional investment manager Legal & General Investment Management (LGIM) and place-making company MUSE[136].

Leveraging public land leases to align returns with affordability and carbon outcomes: Public authorities are reasserting long-term control over urban land by granting long-term leases to housing providers with conditions specifying rent levels, tenure mix, and whole-life-carbon performance targets. By linking these outcomes to land price, cities improve development viability, curb speculation, and lock in social and environmental value. For instance, Madrid's El Plan VIVE demonstrates this approach, enabling partnerships to deliver affordable rentals on leased land under performance-based contracts, quadrupling capacity[125]. (See case study: Piano Straordinario della Casa).

Partnering in land assembly and readjustment to create serviced plots: In collaboration with local authorities, different landowners can partner to pool and organise land into collective "parcels". Once infrastructure is installed and zoning is updated, the land is redistributed so each owner receives a smaller but more valuable serviced plot, while part of the land is retained by the local authority for housing, open space, or low-carbon infrastructure[126]. In Germany and the Netherlands, Umlegung (redjustment) and Herverkaveling (re-parcelling) allow multiple landowners to pool their land and share costs and benefits of redevelopment[127]. In Vienna, the Wohnfonds Wien, the public housing agency, purchases and releases land on the open market for development[128]. (See case study: Homes England)

Investing in brownfield and infill regeneration partnerships to unlock underused sites: Housing providers and lenders are creating remediation funds and consortium vehicles to de-risk contaminated or underused land. As these sites need less additional infrastructure, they can be developed more quickly, with lower developer costs[129]. Shared due diligence, insurance, and upfront funding shorten timelines and make central brownfield and infill plots financeable, opening up more sites for affordable, low-carbon

CASE STUDY:

Ginkgo – urban regeneration fund: Much under-used brownfield land and vacant offices across Europe remain locked by contamination, fragmented ownership, and lack of an investor class willing to absorb risk. The Ginkgo 3 fund pools institutional capital to remediate, aggregate and reposition brownfield sites, treating urban regeneration as an investable asset class with risk mitigation, place-based partnering and phasing. Funds from institutional investors including Banque de Territoires and Allianz France avoid the need for public grants or subsidies. The fund has committed €365 million to projects in France, Italy, Portugal and Netherlands[137].

housing. In Copenhagen's Jernbanebyen district, the public development consortium Baneby Konsortiet is transforming former rail yards into 4,500 homes, 25% of them social housing guided by a masterplan by architecture firm Cobe[130]. (See case study: Gingko, Lyon Confluence).

Co-funding local land release programmes for brownfield and infill regeneration: Housing providers and impact investors are partnering with local authorities to co-fund local land release and site preparation programmes. By providing bridge finance, design or remediation expertise, they help public authorities aggregate, decontaminate, and ready surplus land for development. This reduces transaction costs and accelerates access to investable brownfield sites. Such collaboration creates a predictable pipeline of regeneration projects that can attract long-term capital and scale affordable housing delivery. In the UK, the government introduced a £68m Brownfield Land Release Fund, for

CASE STUDY:

Lyon Confluence – low-carbon regeneration: The Lyon Confluence project, led by the City of Lyon, transformed a 150-hectare former industrial zone between the Rhône and Saône rivers into a mixed-use eco-district combining housing, offices, cultural spaces, active mobility infrastructure and extensive green areas. The project follows a phased approach using strong governance, public land control, and innovative financing, to set strict environmental and architectural standards, prioritising low-carbon construction, renewable energy, bio-climatic design and delivering up to 60% affordable units in later phases[138].

over 50 councils to remediate empty buildings, car parks and industrial land for the development of affordable homes[131].

Redistributing land value uplift to reinvest in low-carbon homes and infrastructure: When rezoning or new infrastructure and commercial development raises nearby land values, private partners are sharing a portion of that uplift to fund affordable units or infrastructure. This requires developers to provide a fixed share of affordable units or community facilities within new developments, either on-site, off-site, or via in-lieu contributions[132]. This stabilises local markets and supports investor reputation. In Belgium, developer Revive secured higher density rights for the Ekla Tower in exchange for providing 90 affordable housing units, a school, and a kindergarten[133]. (See case study: By & Havn).

Forming pooled delivery platforms to reach investment scale: Financing and procurement platforms are bringing together developers, financiers, and housing operators to bundle smaller or riskier sites, standardising design, contracts, and reporting. Aggregating sites spreads risk, achieves economies of scale, and attracts institutional capital. Spain's Social Housing Promotion Facility Plan is scaling public-private delivery of affordable housing with €6 billion in loans and guarantees for the construction or refurbishment of 43,000 affordable rental homes[134]. (See case study InnovationCity Ruhr).

CASE STUDY:

By & Havn – land value capture: In the late 1980s, Copenhagen faced economic stagnation and pressure to revitalise its underused industrial harbour. The city and national government created By & Havn, a hybrid publicly owned but privately operated development corporation, to regenerate under-utilised harbour and former military land. The city transferred land assets to the corporation, which strategically planned development, invested in infrastructure, and reinvested rising land values to fund further improvements. Flagship projects such as the Ørestad and Nordhavn neighbourhoods demonstrate how this model also supported the creation of mixed-use development with 25% affordable housing[139].

Initiative: C40 Reinventing Cities – competition for urban regeneration: Reinventing Cities is C40's global competition that turns under-utilised urban sites into zero-carbon, resilient and inclusive projects. Cities invite multidisciplinary teams to propose developments that cut whole-life emissions, boost energy efficiency and deliver social value, with winning schemes becoming models for equitable regeneration. Now in its fourth edition, the programme helps align public land and private capital to scale climate-positive urbanism across world cities[140].

#02 Mainstreaming integrated planning

Barriers addressed

03 Disjointed approach to housing, retrofit and infrastructure planning
04 Policy volatility and incentive inconsistency
05 Limited public-private alignment and collaboration

Description

Public authorities can mainstream integrated planning and zoning frameworks that align land use, housing, retrofit and infrastructure decisions to deliver compact, mixed-use, low-carbon neighbourhoods. Prioritising retrofit-first and infill development supports higher-density, accessible, and vibrant communities. Coordinated spatial plans can better connect housing and retrofit investment with essential services and infrastructure. By collaborating with housing providers, utility companies, transport agencies and infrastructure operators, cities can send clear demand signals, accelerating retrofit and infrastructure improvements.

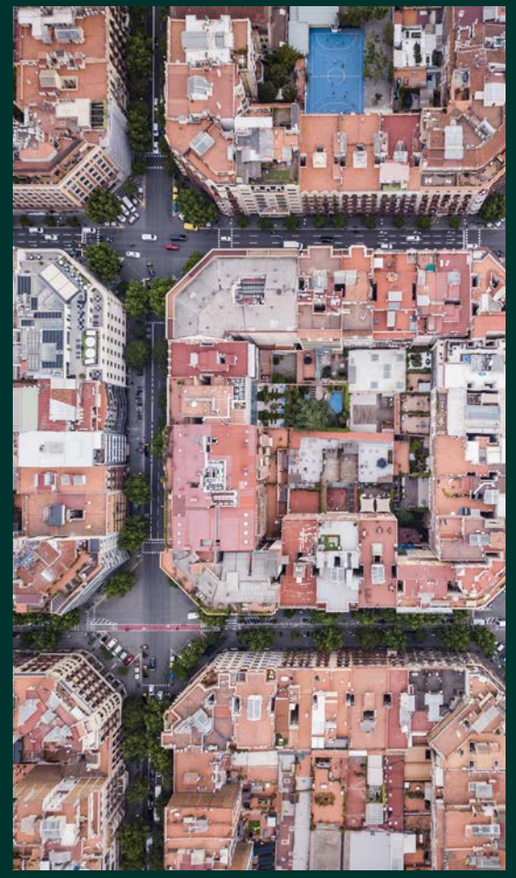
Current situation

Planning and decision-making for housing, retrofit and infrastructure development is often fragmented, weakening the ability to deliver high-quality low-carbon, affordable housing.

Currently, housing and retrofit planning is disconnected from essential services, infrastructure provision, the public realm and wider social needs, which places a strain on existing infrastructure and restricts the potential to densify well-located urban areas. Integrated planning policies to promote development in compact areas provide opportunities for district-scale infrastructure, helping to meet net zero targets and EU No Net Land Take goals[141].

CASE STUDY:

Barcelona Superblocks – compact urban development: Barcelona's dense urban neighbourhoods faced challenges of traffic, pollution and lack of affordable space, with new developments often undermining liveability. The city pioneered the "Superblock" model, redeveloping mid-rise 6-8 storey urban blocks to prioritise pedestrians, community amenities, and mixed-use, compact housing[154]. The city also regulates for market-based new housing construction and large-scale housing renovation to allocate 30% of apartments for affordable housing[155]. The model became recognised for balancing density, affordability, and liveability with more compact living eventually reducing the need to build new homes on greenfield sites.



The private sector and other critical stakeholders are not always involved in the co-creation of strategies and plans that they will be essential to delivering. Building these partnerships at planning stage would enable planners to set and deliver against more ambitious targets and implement sustainable, systemic change.

This lack of integration is particularly evident in the preference for new development over retrofit or reuse of existing buildings. Net zero neighbourhoods and retrofit-first approaches are emerging as pilot projects but integrated planning is required at a local and regional scale to realise the full decarbonisation potential.

The challenge remains of optimising the liveability, density and sustainability of neighbourhoods with low-quality housing and energy conditions, socio-economic challenges and mixed ownership, while ensuring affordability.

CASE STUDY:

InnovationCity Ruhr – integrated masterplanning in Bottrop: Bottrop in Germany faced energy inefficient buildings and industrial decline that required more than just piecemeal retrofit projects. The municipality created a masterplan bundling over 300 projects, including deep energy retrofits, renewables, wastewater heat recovery and pilot industrial systems. An outreach programme involved thousands of consultations with households and SMEs. Between 2010 and 2020, residential emissions fell by 47% and more than 3,600 homes were renovated, at an annual rate of 3.3%. Energy bills were lowered and 300 local jobs created, supporting wider investment and civic participation[152].

CASE STUDY:

Clichy-Batignolles, Paris – ecoquartier: This Paris eco-district focused on transforming a 54-hectare former railroad zone into a dense, inner-city renewal area home to 7,500 residents and supporting 12,000 jobs. Environmental outcomes were maximised through neighbourhood-wide infrastructure, including the city's first smart energy grid distributing solar generated energy, and a geothermal neighbourhood heating system. With 50% affordable housing and generous provision of community infrastructure and open space, including a 10-hectare park at its heart, the neighbourhood remains highly inclusive in an increasingly expensive city[153].

Current responses

The market has started addressing issues related to integrated planning.

Coordinating infrastructure investment and integrated neighbourhood planning: Local authorities are synchronising housing, retrofit and infrastructure planning to create efficient, resilient and affordable neighbourhoods. Mixed-use zoning, density bonuses, green building codes, connection subsidies, regulated tariffs, expedited approvals and similar measures are used by planners to coordinate housing and retrofit delivery around energy, transport, water, wastewater, green-blue and social infrastructure. In Copenhagen, zoning and land-use policies have enabled the heat network business case[142]. In Malmö, the Bo01 district integrated energy, water, and mobility planning for creating accessible low-carbon neighbourhoods[143]. (See case study: InnovationCity Ruhr; Clichy-Batignolles)

Adopting land-use plans and zoning frameworks for compact, mixed-use and low-carbon development: Cities are implementing spatial plans and zoning codes to curb urban sprawl, preserve green and open space, and promote dense, mixed-use and well-connected neighbourhoods. Effective land-use planning allocates land for public and private uses to balance energy demand, reduce infrastructure costs, and revitalise underused areas. Cities with coherent densification strategies, efficient planning procedures, and clear land-use regulation provide stronger conditions for urban regeneration and private investment. In the Netherlands, the "ladder for sustainable urbanisation" requires proof that greenfield development is preferable to infill before approval[144]. (See case study: Barcelona's Superblocks)

Embedding retrofit-first principles to prevent unnecessary demolition and new build: Planners are working with the private sector to implement retrofit-first principles before permitting demolition. Developers are required

CASE STUDY:

Oslo heat network – targeted support programmes: To meet its 2030 emissions-reduction target, Oslo needed to phase out fossil fuels for heating. The city introduced a "connect unless" policy requiring municipal buildings – and encouraging private ones – to link to district heating unless lower-carbon options were demonstrated. To ensure that end users are not disadvantaged, tariffs are regulated to be lower than those for similar technologies. Streamlined rezoning and permitting prioritised district-energy-ready developments while exclusive local franchise licences and a revolving climate and energy fund de-risked private investment. Together, these measures expanded the district heating network to supply 20% of city demand 60% from renewable or recovered heat[156].

to demonstrate refurbishment and repurposing is not feasible and prepare material resource and disassembly plans to recover materials if demolition proceeds. In Brussels, any large projects facing demolition must carry out life-cycle assessments comparing renovation and demolition and if deconstruction is justified, produce an urban mining plan to recover materials if demolition proceeds[145]. Paris now requires reversible building designs in regeneration zones to extend asset life[146]. (See initiative: HouseEurope!)

Enforcing regulated electricity and heat tariffs to protect consumers from cost increases: Utilities and regulators are introducing cost-based tariffs, phased pricing, and affordability safeguards that prevent sharp increases in housing or energy costs as electrification, digitalisation, and service modernisation progress.

CASE STUDY:

L'Innesto – Italy's first zero-carbon affordable housing district: The L'Innesto project transforms the former freight-terminal site at Scalo Greco-Breda in Milan into Italy's first zero-carbon, affordable-housing district. Led by investment manager Redo Sgr alongside multiple partners, the plan will deliver 400 apartments with 60% affordable rental and 40% subsidised sale, as well as a 300-bed student residence, set within 45,000 m² of green space. Emissions are minimised through low-temperature district heating and the integration of onsite renewables. The development also supports social inclusion, providing shared multifunctional spaces, a circular economy district, a zero-waste store, community workshops and co-housing options. This project reconnects the long-divided Precotto and Bicocca neighbourhoods and provide a new, shared identity[158].

CASE STUDY:

Wiltshire's LAEP+ – local area energy planning: Local authorities across the UK struggle to prioritise retrofits and funding due to fragmented data on housing, poverty, and energy demand. Wiltshire Council deployed LAEP+, a digital tool for local area energy planning, integrating datasets on fuel poverty, building stock and heat demand to target retrofit need and support funding bids. The platform's portfolio and scenario planning functions enabled data-driven decisions about decarbonising heat, transport, and energy generation. The initiative improved cross-departmental planning and funding success, embedding data-driven strategy into local climate policy[157].

Consumer protection schemes now ensure tenants and housing providers benefit from electricity over gas without facing sudden cost increases. In Denmark, a lower tax rate is applied to electricity used for heating, while taxes on other electricity consumption remains the same[147]. Estonia's nationally regulated heat prices and Sweden's softly regulated market model illustrate how clear rules can balance investor certainty with public trust[148]. (See case study: Oslo heat network).

Establishing data-driven planning tools to coordinate housing and retrofit planning: Digital twins and AI-enabled platforms are transforming how cities coordinate housing, retrofit and supporting infrastructure. Better use of technology, including existing datasets, satellite imagery, and AI tools, can accelerate strategic planning and optimise site selection by combining data on housing need, transport, public services, and environmental factors. Digital integration from design through to operation allows faster approvals,

carbon monitoring and predictive maintenance. AI tools can also identify retrofit clusters and optimise site selection, cutting pre-development time and cost. In Helsinki, the city is linking building energy data, material flows, and flood risk through a digital twin to accelerate coordination between planners, utilities, and developers[149]. (See case study: Wiltshire's LAEP+).

Integrating mitigation and adaptation priorities into housing and retrofit plans: Local authorities and housing providers are embedding climate change mitigation and adaptation within housing and retrofit plans to protect long-term asset value and social resilience. Integrating flood prevention, green infrastructure, and cooling measures reduces future retrofit costs and ensures affordable homes remain safe, insurable, and comfortable. In Vienna, the City of Vienna's WieNeu+ programme combines refurbishment, greening, and super-block concepts to reduce heat stress and energy use in historic districts[150]. In London, the Affordable Homes Programme introduced six new sustainability requirements setting minimum standards for sustainability, including the management of heat risk[151]. (see case study: L'Innesto)

Initiative: **Net Zero Cities – innovation hub for net zero cities.** As part of Horizon Europe, the EU's research and innovation programme, the EU has launched the "100 Climate-Neutral and Smart Cities by 2030" mission. The objective is to achieve 100 climate-neutral and smart European cities by 2030, which will serve as experimentation and innovation hubs for all European cities to follow by 2050[159]. Housing and infrastructure are a focus of emission reduction, alongside affordability. NetZeroCities assists cities to overcome the current structural, institutional and cultural barriers they face in achieving climate neutrality by 2030, by supporting in the drafting and implementation of action and investment plans.

Initiative: **HouseEurope! – advocacy for low-carbon and affordable housing:** HouseEurope! is a proposal submitted under the European Citizens' Initiative, the EU mechanism that allows citizens to propose legislation directly to the European Commission. It calls for housing renovation, rather than demolition, to become the norm across the EU. Registered by the European Commission in January 2025, it seeks VAT cuts for renovations and reused materials, fair rules to assess existing buildings, life-cycle carbon accounting and increased renovation subsidies. The aim is to preserve homes and heritage, cut emissions, and scale a fair, local renovation market. The campaign must collect 1 million signatures by January 2026[160].

#03 Establishing universal definitions and measurement

Barriers addressed

02 Vacant and underused homes and buildings
07 Poor understanding of housing affordability and performance
10 Short-term investment horizons and relaxed stewardship

Description

Housing providers, investors and public authorities can improve decision-making by developing consistent, open, and verifiable data on building stock and performance. Integrating construction, performance and utilisation data into shared registries enables accurate benchmarking. This allows investors to link investment to outcomes, improves cost certainty for retrofit and reuse, and helps cities identify underused assets for low-carbon housing. Transparent reporting on carbon, affordability and social value enhances accountability, informs public funding, and builds resident trust.

Current situation

Across the housing sector, carbon performance is increasingly measured and disclosed, whereas affordability remains more politically sensitive, with inconsistent reporting and definitions.

Reliable information on housing condition, performance and use is still limited. Data on construction type, energy efficiency, renovation and occupancy is often incomplete, making it difficult to plan retrofits, estimate costs or prioritise investment.

CASE STUDY:

Grand Bequest – place-based platform for empty buildings, Glasgow: Many vacant buildings in Glasgow fail to attract coordinated finance for reuse because community engagement, planning and investor exit routes are not joined up, leaving social and environmental value unrealised. Grand Bequest is piloting the an AI-driven platform for vacant buildings to be redeveloped and put back into use. The approach is designed to convert empty stock into mixed-use assets, reduce risk for investors through clearer processes, and deliver social value validated by community participation. If successful, it could offer a template to scale to accelerate adaptive reuse of empty buildings into affordable homes[177].

While EU and national observatories are improving datasets on building age, typology and energy class, coverage for smaller municipalities and private housing is uneven, and few countries maintain comprehensive digital registries linking stock, renovation and energy data. Operational performance mostly relies on modelled ratings such as EPCs rather than verified in-use data.

Embodied carbon is even less consistently measured, despite its increasing share of total lifecycle emissions as homes are constructed or renovated to higher standards[161]. Few frameworks combine embodied and operational data, limiting the ability to verify carbon savings or link finance to actual outcomes.

Data on utilisation and vacancy is also underdeveloped, obscuring opportunities for adaptive reuse or conversion to affordable, low-carbon homes. Better occupancy and spatial data could reveal significant underused capacity and reduce pressure for new construction.

Affordability remains difficult to measure consistently, as definitions vary across income thresholds, rent-to-income ratios and subsidy models, limiting comparability and long-term assessment. While UN-Habitat[162], Eurostat[163] and the OECD[164] are advancing definitions that can underpin investment, a unified European definition has yet to emerge.

Current responses

The market has started addressing issues related to establishing universal definitions and measurement.

Improving transparency in affordability data through common definitions and datasets: Initiatives are emerging to harmonise affordability measures across countries and tenures. Most European Housing Alliance members use the 30% housing cost benchmark[165], while Eurostat classifies households spending over 40% as overburdened[166]. Tenant groups often target 25% as an affordability limit[167]. Shared definitions can align measurement approaches – whether based on income share, residual income, or broader cost-of-living – and clarify which housing expenses and tenure types are included when identifying cost-burdened households. (See initiative: HOUSE4ALL; ULI Affordable Living Product Council).

Integrating sustainability metrics to generate long-term social value in affordable homes: Housing providers and lenders are starting to report indicators such as fuel-poverty reduction, indoor air quality, well-being, and access to services alongside cost and carbon data. The UK's voluntary Sustainability Reporting Standard for Social Housing covers affordability, emissions, safety, inclusion and resident voice[168]. Real ESG brings together 30 Danish financial institutions to embed sustainability metrics into mortgage and property lending practices[169]. IIGCC's Aligning Real Estate Sustainability

CASE STUDY:

CBRE Investment Management (CBRE IM) impact methodology: CBRE IM developed a dedicated strategy to invest in affordable, sustainable homes for middle-income households in major European cities. Working with external advisor The Good Economy, it created an ESG impact framework that measures and demonstrates social and environmental outcomes alongside financial performance. The framework links investment decisions to resident needs, rent affordability, inclusive communities and sustainability factors, using clear metrics such as rent-to-income ratios and wellbeing indicators. Independently reviewed and reported annually to investors, the approach has shown that prioritising secure, affordable homes strengthens community stability while supporting resilient long-term income performance.[175].

Indicators (ARESI) is developing harmonised definitions, calculation hierarchies[170]. (See case study: CBRE IM impact methodology; see initiative: IRIS+ Catalog of Metrics)

Measuring real-time performance through smart meters and energy data protocols: Many landlords and retrofit providers are installing smart meters to monitor energy use and verify savings. Sharing this data with tenants can support occupant awareness, billing transparency and energy reductions. Metering energy savings could allow providers of flexibility and demand response services to offer load shaping services, effectively combining efficiency (demand reduction) and flexibility (demand shifting) services. France's Linky smart meter rollout enabled consumers to monitor their electricity use through retailer-provided apps, while allowing suppliers to introduce innovative pricing options such as smart time-of-use tariffs[171]. In the UK, Coalition for the Energy Efficiency of Buildings (CEEB) pilots

CASE STUDY:

Myrspoven – AI-driven optimisation of existing stock: As with many ageing office buildings, Nattvakterna – a 16,000 m² office complex in Stockholm – experienced high energy consumption and inefficiency. In response, Swedish real estate company Revelop applied a refurbishment-first plan to minimise environmental impact. The works added a new plant room and upgraded ventilation with integrated cooling, paired with Myrspoven's myCoreAI. The AI tool combines indoor sensor data with usage patterns and weather to learn the building profile, detect consumption trends, and forecasts 48-hour demand. It also automates heating, cooling and ventilation to maintain comfort while minimising energy use[176].

have created a national protocol for metered energy savings, standardising how retrofit outcomes are measured[172]. (See case study: Myrspoven)

Using occupancy and utilisation data to unlock low-carbon housing supply: Public authorities and property managers are using spatial data, sensors and registries to identify underused or vacant buildings suitable for retrofit or reuse. Real-time monitoring helps track seasonal vacancy and reveal where existing stock could meet affordable housing needs before new construction. In France, taxation data has been used to identify unused buildings, while in Poland, water consumption data has been used to estimate vacancy levels and uncover potential housing supply for renewal[173]. (See case study: Grand Bequest)

Using digital building and product passports to track lifecycle performance: Developers and property managers are increasingly adopting digital passports to capture

and disclose lifecycle performance data. Investors can request Building Information Modelling (BIM)-based building passports and Environmental Product Declaration (EPD)-based product passports with construction and operational performance data to assess carbon and circularity impacts as a requirement for assessing investment potential. Platforms such as Madaster help document data on products, incorporating material provenance, embodied carbon and disassembly options, facilitating refurbishment and reuse in affordable homes[174].

Harmonising whole-life carbon accounting and reporting across housing portfolios: Whole-life-carbon (WLC) accounting and reporting methodologies are increasingly being adopted to create consistent approaches for measuring and reporting of operational and embodied carbon in line with emerging EU reporting frameworks such as the EU Taxonomy, EPBD, and Level(s). However, the uptake of these methods is lower in affordable housing due to regulatory exemptions, fragmented data systems, insufficient technical capacity, and the higher upfront costs associated with detailed carbon assessments. Expanding the use of harmonised WLC frameworks to this sector would enable consistent benchmarking and strengthen the investment case for low-carbon homes. (See initiative: COLA).

Initiative: **HOUSE4ALL – mapping of housing affordability and quality:** HOUSE4ALL is a European Spatial Planning Observation Network (ESPON) research project mapping and analysing affordable, quality housing across Europe. It has developed a pan-European map of housing affordability and quality which combines rental listings within regional income data to produce comparative affordability indicators across markets[178]. This is still at an early research-focused stage but shows the potential to prevent inconsistencies between local definitions and ensure affordability is measured on a comparable basis. HOUSE4ALL aims to generate actionable tools and guides for policymakers and the private sector on financing, governance, and innovative solutions.

Initiative: **ULI Europe's Affordable Living Council – best practices on affordable living:** The Affordable Living Council's mission is to share best practices, lessons learned, and innovative solutions from a diverse group committed to the creation, expansion, and retention of high-quality, sustainable housing that is affordable and meets the living needs of people in European cities. Recognising the importance of a shared understanding, the Council identified the need to develop a standard definition of "affordable living" across Europe and has begun work to develop this[179].

Initiative: **IRIS+ Catalog of Metrics – impact metrics for impact investors:** IRIS+ is a framework by the Global Impact Investing Network, which provides a common, evidence-based set of metrics for affordable, quality housing in real estate. It organises goals such as increasing affordability, residential stability and access to services, then links them to standardised indicators investors can report consistently and compare. The framework aligns with the Impact Management Project's five dimensions and the UN Sustainable Development Goals, enabling clearer impact theses, comparable data and transparent performance across portfolios[180].

Initiative: **Fondazione Impact Housing – impact measurement to scale impact housing:** Public and private capital is often cautious to invest in affordable, sustainable housing due to fragmented data and weak links between impact and financial performance. Italian non-profit Fondazione Impact Housing, which is active in Genoa, Turin and Milan, addresses this by developing rigorous assessment tools to track affordability, community wellbeing, and ecological performance, while testing replicable delivery models. Through research and dissemination, it builds a shared language for measuring value, strengthening investor confidence[181].

Initiative: **COLA - whole life carbon assessment for collaborative housing:** The COLA initiative will establish the first quantitative baseline for whole-life carbon performance, and the potential climate benefits, of collaborative housing across Europe. It is asking organisations working on collaborative housing to compile comparable data on embodied and operational emissions from co-housing and community-led schemes. This will create benchmarks that inform design choices, guide funders and policymakers, and highlight where these projects outperform conventional delivery.

#04 Enhancing public-private-civic collaboration

Barriers addressed

01 Inadequate land access and suitability
03 Disjointed approach to housing, retrofit and infrastructure planning
05 Limited public-private alignment and collaboration

Description

Housing providers and public authorities can build durable partnerships grounded in transparency, mutual trust, and shared accountability to scale the delivery of low-carbon, affordable housing. Establishing clear frameworks that balance risk and reward can align public and private interests, unlocking collaboration at scale while ensuring financial returns reflect social and environmental value. Beyond individual projects, sustained partnership models foster institutional trust, reduce investment risk, and create the governance foundations for inclusive, resilient, and future-ready housing systems.

Current situation

Despite public–private partnerships being a well-established mechanism for delivering affordable housing and regeneration, they have struggled to balance public interest and private incentive.

Misaligned objectives, information gaps, and complex procurement processes often leave the public sector exposed to higher risks while offering the private sector limited predictability, narrow margins, and uncertain long-term returns.

Yet, partnerships remain indispensable because they unlock access to capital, land, and delivery capacity that the public or private sector cannot mobilise alone. The criticality of partnerships is demonstrated by their intersections with several interventions, from land value capture to infrastructure delivery.

The housing sector still lacks proven frameworks and shared capabilities to structure partnerships that balance risk, reward, and long-term outcomes. Evolving these mechanisms into transparent, outcome-based collaborations that align affordability, decarbonisation, and investment goals is critical to unlocking their full potential.

Current responses

The market has started addressing issues related to enhancing public-private-civic collaboration.

Establishing multi-level housing compacts with shared accountability: Housing providers and public authorities are forming long-term housing agreements that embed affordability and carbon targets with transparent annual reporting. By linking land, finance, and infrastructure pipelines, such compacts provide the predictability investors need to commit to retrofit and low-carbon construction. In the UK, Homes for Bristol set clear delivery targets, partnership frameworks and actions on land, funding and pipeline management to accelerate affordable housing support[182]. The EU Affordable Housing Initiative's "lighthouse districts" integrates retrofit,

affordability and circularity targets into local net zero strategies to create stable market conditions for affordable, energy-efficient housing. (See initiative: New European Bauhaus)

Creating structured PPP models with clear risk and return frameworks: Housing providers and public authorities are developing structured public-private partnerships (PPPs) with transparent allocation of risk, returns, and accountability. Frameworks use transparent performance indicators such as rent caps, carbon limits, or lifecycle cost savings to align public benefit with investor reward. This enables the private sector to invest in affordable, low-carbon housing with confidence while ensuring public sector objectives are met. Vienna's Property Developers' Competition requires winning consortia to develop projects with public, private, and civic partners that deliver economic, social and ecology objectives[183]. (See case study: Seda-Papelera, Habiko).

Building tripartite coalitions with shared targets and joint accountability: Housing operators, municipalities, and non-profits are forming tripartite partnerships with jointly defined affordability and decarbonisation goals. Civil society organisations contribute social management, tenant engagement, and long-term stewardship, complementing private sector delivery capacity. Shared governance and transparent metrics strengthen trust and align community priorities with project outcomes to ensure housing remains affordable, low-carbon, and community-led. (See case study: Distrito Natural and Provivienda).

Aggregating projects and finance to reach institutional scale: Municipalities and housing providers are pooling multiple small or mid-scale retrofit and reuse projects into aggregated portfolios with standardised contracts and monitoring frameworks. This aggregation creates predictable returns and reduced transaction costs through a unified financing and delivery structure,

CASE STUDY:

Habiko – partnership for institutional investment in low-carbon, affordable homes: Attracting long-term institutional investment into the housing sector is critical for providing the low-carbon, affordable homes the UK needs. A long-term partnership between Pension Insurance Corporation (PIC), UK regeneration company Muse and UK government agency Homes England, will deliver 3,000 low-carbon, low-energy affordable rentals across England. Structured as a 12-year, self-funding joint venture, it unlocks institutional capital, diversifies the supply chain and targets up to 100% affordable homes at 20% below local market rent. PIC will build-out and retain long-term ownership and stewardship and well-connected sites will cut residents' bills and carbon[187].

CASE STUDY:

Seda-Papelera – industrial lands reused for a mixed, affordable neighbourhood: The Seda-Papelera regeneration scheme in El Prat de Llobregat, Barcelona, addresses the challenge of transforming a 41.9 hectare derelict industrial area and delivering inclusive, sustainable housing and neighbourhood infrastructure aligned with climate and mobility goals. It is being developed through a public private partnership between Metrovacesa and the City Council of El Prat de Llobregat to create over 5,700 homes, of which 40% will be social housing and 20% publicly owned affordable rental. A central green spine prioritises sustainable mobility and public transport, alongside energy self-sufficiency, low-impact materials, and water-reuse systems[186].

attracting institutional investors to portfolio scale opportunities in markets that were previously too fragmented. In France, Action Logement coordinates financing, procurement and operations across multiple providers to accelerate construction and management at scale[184]. (See initiative: Cities Commission for Climate Investment (3Ci)).

Embedding joint investment vehicles for housing and infrastructure delivery: Public authorities, utilities, and housing providers are co-financing shared infrastructure such as district heat networks and grid upgrades through joint ventures and pooled funds. These vehicles distribute upfront costs, align incentives, and lower risk by ensuring coordinated investment. They help align timelines and reduce the cost burden on affordable housing providers, unlocking decarbonisation pathways that depend on shared infrastructure. Amsterdam's 50-year co-investment framework with Swedish energy company Vattenfall for district heating supports affordable, low-carbon housing expansion[185]. (See case study: Aalborg East)

Standardising procurement guidelines to streamline affordable homes delivery: Governments and developers are adopting standardised guidelines for planning, design, and delivery to reduce costs and increase predictability in public private collaboration. These templates accelerate project approvals, cut transaction costs, and provide clear performance expectations across partners. For housing providers, they reduce uncertainty and facilitate replication of proven low-carbon models across markets. This improves private-sector confidence and speeds up decarbonisation of both new and existing affordable housing stock. (See case study: Hamburg Standard)

Initiative: New European Bauhaus – sustainable, inclusive and beautiful design: The New European Bauhaus (NEB) is an EU initiative, launched in

CASE STUDY:

Distrito Natural and Provivienda – a pact for ecological, affordable homes: Throughout Spain, housing delivery models have struggled to align ecological standards with social affordability and public-sector pipelines. Spanish residential developer Distrito Natural and non-profit housing association Provivienda, agreed a collaboration where the housing provider leads technical delivery and site origination with authorities, while the non-profit manages homes for social or affordable rent using ecological design and measurement. The partnership creates a replicable pathway for sustainable, affordable homes with clear roles, robust metrics and stronger access to well-located sites[188].

CASE STUDY:

The Hamburg Standard – accelerating construction without compromising quality: High construction costs are preventing the development of affordable homes in Germany. The Hamburg Standard was developed by a coalition of over 200 experts across politics, construction and real estate to cut development costs by up to €2,000 per sq m and accelerate building without compromising quality. A practical set of tools includes streamlined guidelines for planning, materials and delivery, alongside digital tools and procedural templates for architects, developers and municipalities. A residential development of 1,900 apartments in Wilhelmsburg is the first pilot, with ongoing workshops and evaluation processes to refine the model[190].

2020, linking the European Green Deal with cultural and social transformation. It champions housing and urban projects that are sustainable, inclusive and beautiful, using design to drive systemic change. Through awards, pilots and networks, NEB convenes citizens, designers, cities and industry to prototype circular materials, low-carbon buildings and equitable public spaces – turning climate goals into tangible place-based improvements that enhance everyday life[191].

Initiative: Housing Europe – new paradigm for affordable and sustainable homes: Housing Europe is the European Federation of Public, Cooperative & Social Housing, representing around 25 million homes across 31 countries (about 11 % of Europe's stock). Since 1988, Housing Europe has advocated for a new housing paradigm that combines affordability, sustainability and social value. Through research, policy briefings and its "20 Actions" agenda, it influences EU-level housing policy, promotes energy-efficient renovation and decent housing for all[192].

Initiative: Cities Commission for Climate Investment (3Ci) – long-term finance for net zero: 3Ci is a UK collaboration of Connected Places Catapult, Core Cities UK, London Councils, Key Cities and the Scottish Cities Alliance. Its mission is to help local authorities secure long-term finance for net zero by building investable, place-based pipelines. 3Ci convenes cities and investors, and publishes guidance, case studies and training to turn plans into investable projects[193].

CASE STUDY:

Aalborg East – public-private-civic partnership for urban renewal: Large social housing estates in Aalborg East, Denmark, required modernisation and social reinvestment, but there was a risk of top-down renewal that could alienate tenants and raise rents. The regeneration embedded co-creation, with tenants shaping the process through committees and continuous dialogue, aligning physical upgrades with community priorities. Financing combined the revolving Danish National Building Fund (sourced from sector-wide tenant contributions), Himmerland's resources and low-interest loans, enabling substantial improvements without sharp rent rises[189].

#05 Fostering community and resident collaboration

Barriers addressed

06 Public opposition and limited community ownership

Description

Housing providers and public authorities can embed meaningful resident collaboration and co-creation across the housing lifecycle, from planning and design to retrofit or new-build delivery, and ongoing management. Continuous collaboration ensures homes deliver comfort, affordability and carbon savings in use. Transparent data, participatory design tools, and shared stewardship gives residents an active role in how homes are lived in, managed and upgraded. Meaningful collaboration builds trust, which improves the uptake of retrofitting, ensures technologies perform in practice, prevents displacement of residents and results in housing that reflects the needs of the people who live in it.

Current situation

Decarbonisation and retrofit projects in affordable housing remain largely top-down, with residents positioned as passive participants rather than partners in shaping comfort, performance, and long-term quality. This limits trust and the adoption and durability of decarbonisation measures, often producing outcomes that miss community needs or exacerbate inequities.

Community engagement across the real-estate sector has improved at early design and development stages, as

CASE STUDY:

ComActivate – local resource centres for energy-poor communities: Large, diverse homeowners' associations in Central and Eastern Europe often struggle to agree on and manage energy renovations, leaving many residents in energy poverty and buildings in disrepair. ComActivate, an EU-funded project, sets up municipal resource centres that convenes owners, answers technical questions, supports financing applications and mediates conflicts to create a trusted, platform to implement projects. Pilots in Burgas in Bulgaria, Józsefváros in Hungary and Kaišiadorys in Lithuania aim to unlock renovation decisions and accelerate investment in 1,179 multifamily buildings with almost 90,000 residents[210].

CASE STUDY:

Hammarkullen – renovation without rent increases: Hammarkullen – like many of Sweden's Million Homes Programme estates – has a stigma of large-scale blocks and social issues. Since standard rents do not cover full renovation costs, any upgrades risk "renovictions" if charges are passed on to tenants. A pilot scheme let tenants choose renovation levels with a basic package and optional kitchen and bathroom refits at modest extra rent. Of 57 homes, 34 chose the cheapest option and avoided displacement, while others selected affordable upgrades[208].

surface and create buy-in to low-carbon choices. In-person demonstration of controls and measures helps secure the energy savings that models predict. In Austria, einszueins architektur developed ten co-housing projects co-designed with their residents[194]. In Estonia, multi-ownership challenges in the renovation of multi-apartment blocks in Mustamäe in Tallinn were overcome through informative meetings and visits to best practices in the neighbourhood[195]. (See initiative: Family Voices; Bevar Mere)

Establishing long-term community stewardship for facility governance and management: Housing providers are funding long-term community roles that leverage local networks to support affordability, sustainability and wellbeing beyond project delivery. Strong stewardship enhances tenant retention, reduces turnover risk and generates long-term communal value. In Spain, Vibio, which develops housing in rural communities built around principles of co-governance and regeneration, embeds collective stewardship alongside community renewable energy systems and nature-based design[196]. At London Community Land Trust's St Clements mixed-tenure residential development in Tower Hamlets, a resident-led management company ensures long-term community stewardship, while a community foundation reinvests into local community projects[197].

Protecting residents during retrofits through renoviction safeguards and affordability commitments: Housing providers are phasing retrofit works with minimal disruption or offering relocation support and guaranteed right of return, to maintain trust and stable occupancy. Clear and fair post-retrofit service-charge frameworks link costs to actual, measured efficiency gains[198], include landlord accountability frameworks and cap post-retrofit rent increases[199]. Agar Grove was redeveloped by the London Borough of Camden as the UK's first large-scale Passivhaus social housing project, minimising disruption by rehousing tenants nearby and maintaining community ties[200]. In Bordeaux, a social housing block was renovated by adding gardens and rehabilitating public facilities, improving liveability without demolition or displacement[201]. (See case study: Hammarkullen, see initiative: SHAPE-EU)

Partnering in one-stop-shops and local intermediaries for providing advice to tenants: Landlords, retrofit providers and lenders can partner with one-stop-shops and resource centres that offer tailored technical advice and financing support for each neighbourhood, dispute mediation and contractor vetting to de-risk complex, multi-owner retrofit. This can lead to faster and fairer advice for multi-owner apartments and mixed-tenure blocks, with better targeting of financial support[202]. In Bulgaria, MultiHome, led by the Energy Agency of Plovdiv, offers a dedicated one-stop-shop in collaboration with renovation businesses and lenders[203]. Similarly in Spain, OPENGELA, led by the Basque Government, established one-stop-shops providing advice and loans refundable in 15 years to help low-income households cover the cost

of renovating their homes[204]. (See case study: AlmenNet, ComActivate).

Providing transparent performance feedback through resident-facing monitoring tools: Retrofit and housing providers are adopting dynamic, data-driven energy certificates to enable continuous building performance monitoring. Personalised comfort guidance is offered by next-generation Energy Performance Certificates (EPCs) based on smart meters, thermostats and demand-response systems with accessible interfaces and assisted controls displaying indoor temperature, air quality, and energy data. In Bordeaux, the Elithis residential tower, built by French engineering and real estate company Elithis Groupe, was designed to generate more energy than it consumes, with surplus exported to the grid and tenants refunded[205]. In the UK, government-backed retrofit advisor RISE provides resident engagement toolkits to support behavioural change post-retrofit[206]. (See case study: Progetto Energheia).

CASE STUDY:

AlmenNet – knowledge hub for future-proofing social housing: Danish social housing providers are facing the pressure of an ageing stock, social exclusion and climate-related challenges, with limited cross-sector knowledge exchange. AlmenNet acts as a knowledge hub and seed fund, supporting 59 housing associations representing 490,000 homes with projects to improve residential areas, integrate sustainability and increase social value. Projects support energy efficiency, comfort-focussed retrofits, resident health, connection and participation[209].

Small and innovative providers support stewardship for operational performance improvement: Smaller technology firms, cooperatives, and social enterprises are increasingly

CASE STUDY:

Progetto Energheia – community energy, co-ownership and digitised services: Multi-owner apartments from the 1950s–1970s in Pinerolo, Italy, suffered from poor energy performance and high heating costs. Sustainable housing energy service provider Progetto Energheia retrofitted the apartments and supported resident energy communities to cut bills and reduce emissions. This was funded jointly by fiscal incentives and a resident financing scheme paid back through savings in their energy bills. Gamified dashboards were installed to collectively nudge behaviour. Buildings were improved from EPC D, F or G to A or B, energy use fell by 68% and heating costs dropped from €1,600 to €370 per year[211].

providing tailored energy management and tenant engagement services that large contractors often overlook. Their agility allows for hands-on support, iterative improvements, and co-created digital tools suited to diverse resident needs. By integrating user training, maintenance, and community outreach, these providers act as long-term stewards of building and energy systems performance, bridging the gap between retrofit delivery and lived experience. In the UK, Carbon Coop offers demand-response systems that use data and low threshold tools to steer energy insight and consumption patterns at household and neighbourhood level[207].

Initiative: **Family Voices – co-design tools for early-years housing**: Housing and neighbourhoods rarely reflect the needs of parents and caregivers of under-5s, creating places that underperform on safety, health and convenience. The Family Voices toolkit was developed by UK architects ZCD with the support of the Van Leer Foundation and has been tested in cities globally. It equips investors, developers and city leaders with practical methods to involve families in planning, design and management, ensuring homes and neighbourhoods work for young children and caregivers. Projects using it can surface hidden needs early, improve decisions and deliver places that support healthy development and connection[212].

Initiative: **Bevar Mere – changing attitudes towards redevelopment of existing buildings:** Bevar Mere is a four-year initiative in partnership with the construction industry with a clear goal: to support a change in attitudes and practices in Denmark, so that transformation and redevelopment of the existing building stock becomes a real, attractive and qualified alternative to newly built housing. With a focus on community, quality of life, sharing economy, housing quality and health, Bevar Mere will work to promote new concepts and use the existing building stock to create a mixed and more varied housing supply in Denmark[213].

Initiative: **SHAPE-EU – district-level affordable homes and retrofits:** The SHAPE-EU (Affordable Housing Initiative European Partnership) is a Europe-wide programme supporting affordable and social housing providers, SMEs and public authorities to deliver district-level renovations and new build housing for social and environmental impact. From 2022–2024 the programme developed blueprints for a just energy transition centred on affordability and liveability, mentored 22 districts and launched a funding simulator for inclusive, low-carbon neighbourhoods. In its second phase from 2024–2026, it will expand to include a focus on resilience, liveability and circular economy[214].

#06 Redefining the business case

Barriers addressed

08 Short-term business cases undermining long-term value
09 Inadequate financial solutions and risk-sharing mechanisms

Description

Redefining the business case for low-carbon affordable housing requires shifting from short-term financial metrics to a whole-life value approach. Housing providers and public authorities can align investment appraisals with long-term performance, resilience, and social outcomes, recognising retrofit and reuse as a value-preserving strategy rather than a cost. Integrating whole-life costing, carbon liabilities, and co-benefits into valuation frameworks strengthens investment confidence, reduces risk, and prevents asset stranding. Transition-adjusted and whole-life valuation tools can capture the real financial and societal returns of decarbonisation, helping to balance affordability, sustainability, and long-term stability across housing portfolios.

Current situation

Current valuation and investment frameworks fail to capture the long term economic, environmental and social returns of decarbonisation, framing essential decarbonisation work as a cost for affordable housing rather than enhancing its value. Consideration of retrofit of homes over demolition is also difficult to justify with narrow business case appraisals.

Valuations often exclude the long-term environmental improvements needed to meet Paris Agreement goals, limiting business cases to assets showing short-term financial gains rather than considering long-term risk, resilience, or sustainability.

CASE STUDY:

Octopus Energy – Zero bills neighbourhood: With rising energy bills having an increasing impact on housing affordability across Europe, the Octopus Energy “Zero Bills” community in Schramberg, Germany, demonstrates an innovative model to help reduce costs. The scheme includes twenty-four timber-framed homes fitted with solar panels, heat-pumps and batteries, which guarantee residents zero energy bills for at least six years. Led by Octopus, in partnership with partner housebuilder KAMPA and alongside other local partners, construction of the homes began in 2025 and provides a pilot case for future developments, with Octopus aiming for 100,000 “Zero Bills” homes by 2030[225].

CASE STUDY:

Net zero neighbourhoods – investment case for retrofits: The Net Zero Neighbourhoods model as applied by the West Midlands Combined Authority in the UK delivers community-led decarbonisation across mixed-tenure areas through four pillars: home retrofit, low-carbon travel, green space enhancements and local clean energy generation. Neighbourhoods co-design improvements with local partners, ensuring interventions match community priorities. Delivery is funded through a blended stack of public investment, private finance and outcome-based funding, with no upfront cost or debt to residents. It involves seven local authorities from across the area that are delivering a range of projects that improve home energy efficiency and air quality and support active, low-carbon travel, and enhance local green spaces[224].

For new build housing, higher upfront costs for low-carbon design and materials are less recognised in valuation models, which discourages owners and developers from adopting ambitious standards for decarbonisation.

Without stronger business cases, affordable housing owners will struggle to retrofit properties as benefits aren't captured in current metrics. This reinforces the view that decarbonisation conflicts with affordability and delays work, increasing maintenance costs and stranding risk.

This delays necessary stock improvements, increasing housing inequity by keeping tenants in poorer-quality homes longer and postponing access to lower costs, greater financial stability, housing security, and related health benefits.

Current responses

The market has started addressing issues related to redefining the business case. We outline them here as useful entry points to deeper structural change by building evidence, testing new models or having systemic-change potential when scaled.

Reframing retrofit as an integrated investment opportunity: Leading housing providers are expanding return on investment (ROI) frameworks to capture modernisation, affordability, and sustainability as sources of long-term value. Best practice examples integrate co-benefits such as avoiding fuel poverty, improved wellbeing, productivity gains, and increased financial resilience, alongside energy and carbon metrics[215]. By internalising these wider returns, decarbonisation shifts from an expense to an investment that enhances long-term value. The Energy Efficiency Financial Institutions Group (EEFIG) is piloting with Allianz Germany, OP Financial Group Finland and Nationwide UK the use of arrears and health data to quantify the co-benefits of retrofit investments[216]. (See case study: Net zero neighbourhoods, and initiative: ULI C Change)

Promoting performance-based "energy-as-a-service" and shared-savings models. Housing providers and retrofit providers are testing alternative financing models such as heat-as-a-service and comfort-as-a-service models to tie financial returns to operational outcomes[217]. These can lower upfront capital, improve cashflow alignment and help overcome landlord-tenant split incentives by distributing savings equitably. Emerging variants include warm-rent and insurance-backed comfort plans that link rent levels to verified energy performance. Clarion Housing Group partnered with energy provider Octopus Energy and housebuilder The Hill Group to develop the UK's largest "Zero Bills" scheme, pairing highly efficient homes with on-site renewables and smart tariffs[218]. (See case study: Octopus Energy)

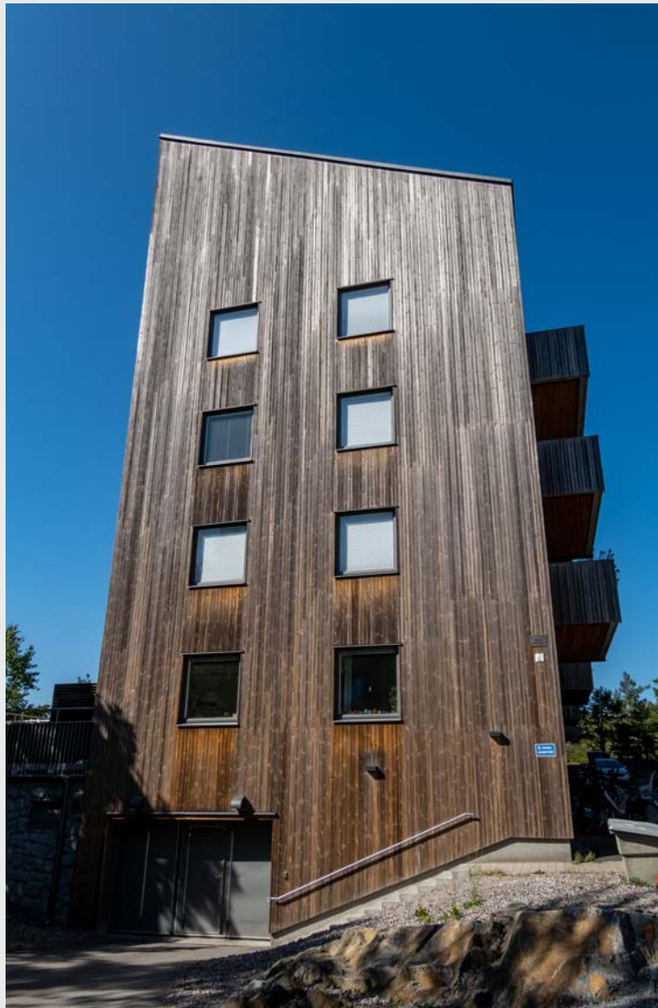
Adopt retrofit-first investment frameworks to redirect capital from new-build to reuse: Housing providers are increasingly recognising retrofit as a strategy for value creation and risk mitigation rather than a compliance cost. Whole-life performance frameworks capture operational savings, lower maintenance and reduced carbon liabilities across the asset lifecycle, strengthening the business case for reuse beyond upfront costs to capture operational, maintenance, and end-of-life impacts. Retrofit-first portfolios demonstrate greater resilience to tightening carbon and land-use regulations, protect asset value against obsolescence, and tap into growing demand for compact, mixed-use neighbourhoods. (See case study: PATRIZIA and Revive joint venture)

Bundling mixed-tenure, mixed-use and place-making projects to diversify income and strengthen viability: Housing providers are reframing risk–return profiles by developing diversified portfolios where mixed uses and tenures generate diversified, stable income streams. Combining social, cost-rental, intermediate, and market-rate housing with commercial or community uses diversifies income streams. Integrated placemaking through high-quality public spaces, connectivity, and local amenities supports early lease commitments, high tenant retention, and steady absorption rates[219]. In London, the Kings Cross development transformed a large and polluted area of disused railways, warehouses, and gasyards into a mixed-use community with ample greenspace and two schools, including almost 40% affordable homes[220]. (See case study: Rhapsody Neighbourhood)

Framing urban regeneration as a strategy for revitalising underused land and obsolete buildings: Urban regeneration is emerging as a strategic investment class that turns underused land and obsolete buildings into compact, high-performing urban assets. By integrating housing, commercial, and community functions within well-connected, nature-positive neighbourhoods, regeneration projects create destinations that diversify revenues, mitigate planning risk, and

CASE STUDY:

PATRIZIA and Revive joint venture – office to affordable home conversion: Many centrally located office assets are underused in the Benelux region while cities struggle to provide sufficient affordable housing stock. PATRIZIA and Revive have launched a €75 million joint venture to support the conversion of depleted and obsolete office buildings into energy-efficient, build-to-sell multi-family homes in well-served locations[226]. The JV designates 50% of units as affordable, based on a target of keeping housing costs below 35% of the municipality's median disposable household income, demonstrating a replicable route to expand affordable supply through adaptive reuse while maintaining long-term affordability standards.



CASE STUDY:

Rhapsody Neighbourhood – mixed-income living that performs: Amsterdam's Kolenkit district looked to repurpose an undeveloped site to deliver mixed-income housing with strong place-making while maintaining investment performance. Architects Urban Sync and TANGRAM, together with cultural partner Cascoland, delivered a high-amenity, transit-connected and energy-positive scheme with a deliberate mix of income levels and robust public realm was developed to institutional standards. Currently, the neighbourhood is reported to outperform new-build benchmarks through diverse tenures and quality place-making[227].

enhance portfolio resilience[221]. In Brussels, the Tour & Taxis development embraced a model of urban regeneration that enabled adaptive reuse of buildings, the preservation of industrial heritage and the delivery of mixed-use development and affordable housing[222]. (See case study: Easy San Siro)

Integrating transition and physical risks to futureproof portfolio value and guide capital allocation: Investors and lenders are quantifying how transition risks such as carbon pricing, regulatory tightening, and shifting tenant demand affect long-term property value. Risk-adjusted portfolios integrate these factors into discounted cashflow analyses, positioning retrofit as a hedge against asset depreciation and market exposure during the low-carbon transition. As the EU Emissions Trading Scheme (ETS II) and UK ETS II expand to buildings, incorporating the cost of carbon associated with buildings will become increasingly vital for investment decisions. Various investors such as investment managers NREP and PATRIZIA are embedding transition planning ahead of regulation[223]. (See initiative: ULI C Change).

Initiative: ULI C Change – embedding transition risk into investment models: ULI C Change's initial programme addresses the issue of factoring sustainability into valuation through its work to embed transition risks into investment models with its Preserve tool[229]. This helps build the business case for a wider range of properties by more accurately making the risks visible, quantifying them and demonstrating the cost of inaction. Guidance like the *ULI Universal Principles for Carbon Pricing in the Real Estate Sector*[230] offers support by promoting consistent, transparent internal carbon pricing within investment decision-making, which in turn enables carbon costs and benefits to be reflected in valuation, asset management, and development appraisal.

CASE STUDY:

Easy San Siro – affordable rentals within a wider regeneration: Milan's inner-city area faces tight affordable rental supply and rising costs, limiting access for key workers and young households. As part of a large-scale urban regeneration propelled by infrastructure works for the 2026 winter Olympics, fund manager AXA Investment Management Alts has begun leasing 142 affordable homes at Easy San Siro within a 30,000 sq m mixed-tenure scheme on Via dei Rospigliosi, alongside 117 market units that enables project viability. The scheme was granted planning permission and a density bonus on the condition of delivering affordable rental homes alongside public benefits. The project pairs institutional capital with a tenure mix to secure affordability and sustainability[228].

#07 Unlocking innovative financial solutions

Barriers addressed

08 Short-term business cases undermining long-term value
09 Inadequate financial solutions and risk-sharing mechanisms

Description

Innovative financing models are needed to channel capital efficiently into retrofit, reuse and new-build affordable homes. Today, public funding programmes are often process heavy while private investors face mandates and return expectations that limit participation in projects with longer paybacks or social outcomes. Coordinating these tools through blended-finance instruments and portfolios enables lower-risk investment, optimises institutional investment, and supports delivery of retrofit, reuse and new-build housing that maintains affordability and meets carbon goals over the long term.

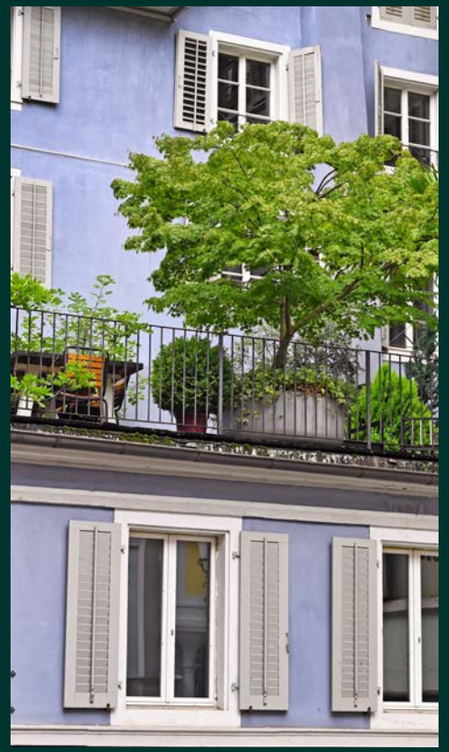
Current situation

The financial ecosystem for affordable and low-carbon housing remains fragmented, with few mechanisms to channel capital efficiently or align risk and return across housing providers and lenders, and asset buyers.

Public authorities hold levers to de-risk investment including grant funding, guarantees, low-interest lending, and access to public land. Private housing providers and lenders, meanwhile, are showing growing interest in the affordable and sustainable housing market but face challenges in structuring returns that balance affordability and decarbonisation.

CASE STUDY:

ABZ sustainability bonds – housing cooperative: Zurich faces high demand for non-profit housing, but housing cooperatives need sizable, predictable capital to build at scale without compromising affordability or sustainability. Local housing cooperative ABZ issued a sustainability bond to mobilise private capital for 660 low-carbon, non-profit homes. By ring-fencing proceeds for certified sustainable projects, ABZ accessed low-cost finance while embedding transparency on environmental performance. The bond refinanced new developments such as Glattpark and Entlisberg 2, proving that mission-driven housing providers can use capital markets to fund affordable, climate-aligned housing at scale[251].



Traditional risk and return models often overlook the long-term social and environmental benefits that strengthen the resilience and stability of affordable, low-carbon housing and total cost of living. At the same time, many housing providers lack clear pipelines of investable projects and reliable data to assess impact and performance.

Momentum is growing as impact funds, development banks, and institutional investors pilot new financial instruments including property-linked repayment models, shared-savings agreements, and aggregated portfolio vehicles that capture both financial and decarbonisation value.

Housing associations, developers, and intermediaries, however, often lack the technical capacity, data, or upfront capital to navigate complex funding mechanisms, or assemble blended-finance packages. Unlocking systemic change will therefore require more predictable and coordinated public-private financing frameworks that align incentives, risk appetite, and time horizons.

CASE STUDY:

Homes England as a future National Housing Bank: To address the persistent gap between the scale of affordable, low-carbon housing required and the fragmented, stop-start finance to deliver it, the UK government has launched a new Homes England-backed National Housing Bank (NHB). It holds £16 billion in new public investment plus an additional £6 billion already committed, aiming to deliver over 500,000 new homes and unlock more than £53 billion in private capital. The NHB will act as a government investment arm, de-risking complex sites, aggregating demand, and blending grants, low-cost loans and guarantees to stimulate large-scale housing delivery[247].

Current responses

The market has started addressing issues related to unlocking innovative financial solutions.

Blending public concessional and private capital to de-risk investment: Development banks, public investors, and housing providers are combining concessional capital, interest-rate discounts, guarantees, and first-loss tranches with private debt or equity to improve risk-adjusted returns. Public finance vehicles such as local green banks or municipal funds can provide favourable terms and co-investment. In Denmark and Finland, housing associations can access discounted finance rates through conduits managed by a state-controlled entity[231]. In Belgium, the ICCARus revolving renovation fund provides up to €30,000 per home plus integrated technical, financial and social support[232]. In Prague, a partnership provides up to €60 million from the European Investment Bank (EIB) channelled via national bank Česká spořitelna to deliver over 700 affordable apartments for key workers[233]. (See case study: Homes England, SustainSolutions).

Aggregating small housing and retrofit projects into investable portfolios. Small or multiple-function projects become investable when bundled into portfolios that deliver predictable cashflows and standardised outcomes. Property managers and real estate funds are pooling multiple small retrofit and reuse projects into unified vehicles with shared due diligence, contracts, and monitoring frameworks. These aggregate and source large amounts of capital from the bond market[234], enabling the provision of loans with the terms but not the scale of a public bond, reducing transaction costs and creating scale for institutional investment[235]. In the UK, the Green Finance Institute piloted demand aggregation, demonstrating how bulk procurement and mass installation lower costs and

CASE STUDY:

SustainSolutions – de-risked energy retrofit finance: Housing association FOB Kalundborg partnered with energy-efficiency investment company SustainSolutions, co-owned by pension fund PKA and energy utility Andel, to deliver deep retrofits. An ESCO 2.0 model combines design, delivery, external financing, and guaranteed energy savings. SustainSolutions and PKA's Green Energy Fund, working alongside Denmark's Green Investment Fund, provided blended financing that doubled expected CO_2 savings by linking concessional capital to verified performance[248].

attract long-term investors[236]. (See case study: Homes England)

Increasing the financial product offering for low-carbon affordable homes. Lenders are expanding their range of financial products for accelerating retrofit and new build, with green mortgages and leaseholder finance featuring reduced interest rates and longer loan duration[237]. Such products lower the borrowing costs for affordable homes retrofit and new build, and reward decarbonisation progress[238]. Banks such as ING offer eco-renovation loans and green mortgages across Europe[239]. As standardisation improves, these products can channel capital into low-carbon affordable homes. (See case study: Triodos; Romania Green Building Council)

Mainstreaming property-linked and alternative repayment models: Lenders, utilities, and housing providers are piloting new repayment mechanisms that link retrofit financing directly to the property, or to measured energy performance, rather than to the individual borrower. These models lower credit risk, improve repayment security, and open access to low-income households or borrowers that might otherwise be excluded from conventional lending[240]. The EuroPACE pilot in Spain tested municipal-level property-tied repayment schemes, scalable pathways for residential retrofits across Europe[241]. In the UK, the Housing Associations' Charitable Trust (HACT) and carbon finance company PNZ Carbon developed a carbon credit scheme to allow companies to fund home retrofits in their local area[242]. (See initiative: Global Property Linked Finance Initiative)

Issuing outcome-linked green, social and sustainability bonds: Cities, developers, housing associations, lenders and real estate funds are issuing green or social bonds using third-party labels and certifications where coupons are tied to measurable outcomes such as carbon intensity reduction or rent affordability. In the Netherlands, NWB Bank uses the proceeds from its social bonds to offer affordable, sustainable loans to social housing associations. The bank issued €2.9 billion in 2024 to support housing providers to build new homes, retrofit and decarbonise their existing stock and improve neighbourhood liveability[243]. Clarion Housing Group used the pan-European Sustainable Housing Label developed by Ritterwald for all of three of its sustainable bond issuances[244]. (See case study: ABZ Sustainability Bonds).

CASE STUDY:

Romania Green Building Council – green mortgages: Romania's housing sector lacked a market mechanism to reward energy-efficient homes and lower credit risk, with lenders needing standardised criteria and data to adjust pricing. The Romania Green Building Council's Green Homes certification enables housing providers and banks to integrate energy and health performance into mortgage valuation. Financial institutions offer preferential rates for certified homes, supported by evidence of 32% lower default risk and higher asset resilience, strengthening business cases for sustainable construction and empowering lenders to scale low-carbon housing portfolios[250].

Scaling housing finance and expanding access using digital tools: Housing providers and lenders are adopting financial technology platforms to mobilise mixed capital, blending institutional, private, and impact sources into scalable funds for housing and retrofit. Automated transaction management, smart contracts and AI-powered underwriting improve efficiency, transparency and liquidity[245]. These tools can enable innovative financial models tied property data, expanding access to credit for lower-income households and reducing risk through better energy and property analytics[246].

Initiative: **CEEB – multi-stakeholder coalition for retrofit finance:** The Green Finance Institute's (GFI) Coalition for the Energy Efficiency of Buildings (CEEB) is bringing together leaders in finance, real estate and energy sectors, and across policy, academia and non-profit organisations in order to co-develop the innovative financing solutions that can close the investment gap presented by the retrofit challenge[252].

Initiative: **Global Property Linked Finance Initiative – scaling property-linked finance:** The Green Finance Institute and Climate Bonds Initiative launched the Global Property Linked Finance Initiative to establish property-linked finance as a recognised global asset class. The initiative standardises legal and financial frameworks so investors can directly tie capital to building-level decarbonisation outcomes. By unlocking stable, asset-backed returns, it aims to mobilise billions in private investment for net-zero and climate-resilient buildings across global property markets[253].

Initiative: **EEEFC – multi-stakeholder coalition for retrofit finance:** The European Energy Efficiency Financing Coalition (EEEFC) brings together banks, investors, and EU institutions to accelerate private capital into energy-efficient housing and building upgrades. The coalition identifies market barriers, develops risk-sharing solutions, and supports the creation of scalable financial instruments. By linking investor confidence with verified performance outcomes, it strengthens the business case for retrofits[254].

CASE STUDY:

Triodos Bank – bio-based mortgages: Triodos Bank Netherlands has introduced the first bio-based mortgage, offering lower interest rates for homes built with bio-based materials such as wood, hemp and flax. The mortgage rewards buildings that score high on energy efficiency and have low environmental impact based on material performance, using the Dutch Environmental Performance of Buildings (MPG) framework to assess materials used. Triodos is addressing the large share of embodied emissions in modern homes and encourages the construction sector to adopt more sustainable and regenerative practices[249].

#08 Aligning investment with long-term community needs

Barriers addressed

10 Short-term investment horizons and relaxed stewardship

Description

As capital flows into the decarbonisation of affordable housing, the sector needs to ensure that financial models ensure equitable access to funding for diverse housing providers and communities, while keeping value rooted locally rather than extracted. Embedding safeguards for local ownership, fair value sharing, and transparency can build trust, attract patient capital, and sustain long-term affordability. Integrating these principles broadens participation, empowers underserved groups, and aligns investors, housing providers and public authorities around shared goals of equity, resilience and community stability.

Current situation

While an increase of private capital into affordable housing presents opportunities to address housing shortages and fund decarbonisation, it also introduces new risks compared to the traditional public-sector-led affordable housing model.

Many investment strategies are structured for short to medium-term returns, prioritising exit yield or asset appreciation over long-term affordability, reinvestment, or community benefit. This erodes public trust and fuels perceptions that private investment in decarbonised affordable housing is incompatible with social purpose.

Some investors and housing associations, aiming for clear carbon

CASE STUDY:

ABP–Greystar venture – essential housing in the Netherlands: To address the shortage of mid-market rental options global real estate company Greystar and pension fund ABP launched a dedicated investment venture to develop quality rental homes for middle-income earners and essential workers, thereby stabilising the intermediate segment while raising building performance standards. The fund aims for at least two-thirds of the portfolio to be in regulated and mid-market segments with capped rents, making them accessible to the target demographic. With a strong focus on high energy-efficiency rating their approach provides stable, long-term, inflation-linked returns for participants while addressing societal need[268].

CASE STUDY:

Home.Earth – doughnut-inspired affordable housing: In Denmark, real estate company Home.Earth applies the doughnut economics framework, targeting patient returns (approximately 10% over 10 years) while embedding affordability and equity. Tenants share 15% of profits, deposits are replaced by credit, and units are designed to cut costs. At its flagship project, Nærheden, 158 homes have achieved emissions reductions of 60% compared to Danish limits at no cost premium[266].

and affordability outcomes, are experimenting with impact-linked finance, profit caps, and community ownership mechanisms that reinvest surpluses locally. However, these approaches remain the exception rather than the norm.

Broader adoption is hindered by an understanding of what long-term stewardship of affordable housing in a place-based context could look like, by limited data on long-term impact, and by the challenge of aligning fiduciary duty with social outcomes.

Current responses

The market has started addressing issues related to aligning investment with long-term community needs.

Supporting patient capital and long-term financing structures to support affordability: Lenders and housing providers are extending maturities to match asset lifespans, reducing annual repayment pressures and improving viability of deep retrofit. Instruments such as 40–50-year fixed and indexed loans and public ground lease models align debt with lifecycle savings and rent ceilings. In France, the Caisse des Dépôts et Consignations provides 40- to 50-year low-interest loans supporting 100,000 new social units and 125,000 renovations annually[255]. Similarly in Germany, investment manager PIMCO structured a portfolio of over 300 social housing units using long-tenor public loans[256]. (See case study: Home.Earth; Inclusio)

CASE STUDY:

Inclusio – scaling social impact through a listed social property company: Inclusio addresses the shortage of affordable, high-quality and inclusive housing in Belgium, ensuring vulnerable groups can access secure, suitable homes and supportive social infrastructure. Its strategy is to acquire, develop and manage housing and social-purpose assets with long-term rent caps for disadvantaged groups, while maintaining financial sustainability through scaled, mixed portfolios and disciplined risk management[267].

Combining short- and long-term capital to align incentives: Housing providers are reshaping business cases and structuring projects that combine short-term development finance with long-term institutional capital from pension or insurance funds, helping stabilise cash flows and scale delivery pipelines. France's Banque des Territoires combines pre-financing with 40-year operating loans for affordable housing[257]. Catella Residential Investment Management launched a European residential impact fund targeting affordable, sustainable homes while maintaining risk-adjusted returns and robust governance, measurement and reporting[258]. (See case study: ABP–Greystar venture)

Embedding affordability and carbon performance in investment criteria: Fund managers are beginning to use lifecycle carbon data and affordability metrics to guide asset selection and value retention in dedicated funds

CASE STUDY:

PATRIZIA Sustainable Communities Fund – impact-driven investment: PATRIZIA's Sustainable Communities Impact Fund launched with a final close of nearly €300 million in December 2023, aiming to deliver affordable homes across 25 European cities and house over 7,500 low-to-median income residents. The fund targets over two-thirds of its assets in affordable and social housing, with the remainder in alternative living and social infrastructure. The long-term stewardship is built on both a financial risk-adjusted return, active asset management and measurable positive social and environmental outcomes[269].

to attract institutional capital. CBRE Investment Management (CBRE IM) has established its Affordable Housing Fund to deliver social and affordable rented housing in the UK, including shared ownership properties, key worker housing and homeless hostels[259]. French investment manager AMPERE Gestion's Fonds de Logement Intermédiaire fund invests in intermediate rental housing for those that do not qualify for social housing but cannot afford market rates[260]. (See case study: PATRIZIA Sustainable Communities Fund)

Conditioning public and blended finance on long-term affordability covenants: Public funders and blended finance vehicles are attaching conditions such as long hold periods, rent controls, and reinvestment clauses to ensure long-term affordability. These covenants ensure that public capital delivers sustained social outcomes rather than short-term gains. Vienna's subsidised housing system demonstrates this model, with affordability covenants and resale conditions ensuring regulated rents remain permanent and value is reinvested locally[261]. (See initiative: The Shift, Taskforce on Affordable and Sustainable Housing)

Prioritising place-based capital allocations and transparent fund disclosures: Housing providers are strengthening stewardship and accountability by aligning a proportion of capital to community priorities. Transparent disclosure on reinvestment ensures that affordability and decarbonisation outcomes are met and that value created through housing remains in the local economy, strengthening social impact credibility and community benefit. The UK's Local Government Pension Scheme has integrated place-based investments to ensure funding supports both financial and social returns in targeted urban areas[262]. (See case study: Simply Affordable Homes fund)

Embedding long-term investment safeguards through regulation: Regulators are deterring short-term speculation and aligning financial performance with community stability

CASE STUDY:

Simply Affordable Homes fund – embedding social and climate outcomes: The Simply Affordable Homes fund, managed by Savills Investment Management, raises patient capital from institutional investors to acquire homes from housing associations and fund the delivery of new homes. The fund has committed to an impact-led strategy with a theory of change co-developed with impact advisory services firm The Good Economy, embedding social outcomes and decarbonisation commitments. As of July 2025, the fund owned 367 homes across the UK, demonstrating an investable model for low risk, inflation-linked income stream[270].

at a national level. For example, France's Pinel Law[263] provides tax reductions in exchange for long-term letting commitments over six, nine or 12 years. Renovation safeguards such as rent-rise caps and right-to-return clauses also ensure decarbonisation does not displace residents. Germany caps rent increases from energy upgrades to 8% annually[264], while France links exceeding of normal boundaries to verified energy performance[265]. (See case study: Barcelona rent protection; Dutch WWS points system)

Initiative: **The Shift – directives and investors guidelines for aligning housing financed with human-rights**: Non-profit The Shift connects and mobilises those working to secure the right to housing. The Shift Directives set a rights-based framework for investors, lenders and regulators, translating human-rights principles into governance, due diligence and disclosure expectations[273]. Its Investor Guidelines translate human-rights principles into portfolio practices[274].

Initiative: **TASH – Taskforce on Affordable and Sustainable Housing:** The Taskforce on Affordable and Sustainable Housing (TASH), co-convened by IHRB, mobilises investors, policymakers, city leaders and civil society to align housing finance with human rights and planetary boundaries. It maps investor impacts and risks, develops standards and accountability for affordability, anti-displacement and whole-life carbon. TASH also advocates for more ambitious EU policy[275].

CASE STUDY:

Barcelona rent protection – place-based anti-speculation housing policies: To tackle the housing affordability crisis with limited public resources, Barcelona developed the multi-faceted 2016–2025 Right to Housing Plan. Through this plan, the city allocates public land, reclaims short-term rental properties, and mobilises private stock via a Rental Housing Pool and a Cession Programme. These offer grants, tax relief and renovation subsidies for regulated leases, plus rent guarantees, insurance and legal and technical support. It also buys homes for the public stock, with 661 acquired so far for €73 million. These tools have mobilised over 1,000 dwellings in gentrifying areas, preventing displacement and improving upkeep[271].

CASE STUDY:

Dutch WWS points system and Affordable Rent Act: Affordability pressures and information asymmetry in the rental market required transparent, enforceable rent regulation linked to dwelling quality and efficiency. The Woningwaarderingsstelsel (WWS) assigns points for size, amenities and energy performance to set a legal maximum rent, for both social housing and the regulated middle sector, with public tools enabling tenants and landlords check scores. This has resulted in stronger tenant protections and clearer price–quality alignment with regulation expanding to mid-market units, while rewarding energy-efficient homes[272].

#09 Diversifying delivery, tenure and reuse models

Barriers addressed

02 Vacant and underused homes and buildings
06 Public opposition and limited community ownership
08 Short-term business cases undermining long-term value

Description

Housing providers, lenders and public authorities can broaden delivery by engaging a wider mix of partners, ownership structures, and tenure models. Working with small and medium enterprise (SME) builders, housing associations, community-led initiatives, and innovative joint ventures, including co-living, shared-ownership and mixed-use schemes, can better reflect evolving demographic needs and local contexts. Diversifying delivery channels in this way can unlock investment, scale socially inclusive, low-carbon housing, and reach market segments overlooked by traditional providers.

Current situation

Affordable housing delivery remains concentrated among a few large housing providers and standard tenure models, which results in limited diversity across housing types, ownership structures, and delivery approaches.

This narrow focus constrains innovation in affordability and decarbonisation. Standard delivery models often prioritise short-term cost and volume over long-term performance or the capacity to adapt to evolving social and environmental priorities.

CASE STUDY:

Bermondsey Project – adaptive reuse and regeneration of industrial site: Bermondsey, in central London, faces high housing demand and affordability pressures alongside derelict industrial sites where regeneration risks displacing existing residents. Greystar's Bermondsey Project combines large-scale regeneration with 35% affordable homes, retention of key heritage assets and energy performance 55% above regulatory requirements[289]. Working in partnership with Southwark Council and local residents has ensured sustainability outcomes are embedded from the outset. The scheme will deliver over 1,600 new rental homes, improving affordable supply and lowering energy use whilst preserving heritage.

CASE STUDY:

Poblado Dirigido de Orcasitas – first eco-solar neighbourhood in Madrid: Energy costs and investment in low-cost renewables are a challenge for vulnerable households in Madrid. In the Poblado Dirigido de Orcasitas, Madrid City Council and the local community have promoted an energy retrofit of more than 100 residential buildings (around 1,800 units). Madrid's first "eco-solar neighbourhood" followed, with a shared solar system of 265 photovoltaic panels across seven residential buildings, two single-family homes, and three commercial premises, benefiting approximately 130 families. The project combines public subsidies with the participation of technical entities and the community organisation of residents and local businesses[286].

However, smaller builders, housing associations, and community-led initiatives, which are likely more attuned to local needs and willing to pilot affordable, low-carbon approaches, face financial and regulatory barriers.

Procurement and investment frameworks reinforce these constraints by valuing upfront cost over lifetime performance, limiting the opportunities to integrate carbon, comfort, and affordability outcomes.

This concentration of players also overlooks emerging living formats such as intergenerational housing, co-living, and shared tenure, that can better reflect demographic change and make productive use of smaller or underused sites.

Broadening delivery and tenure diversity would strengthen resilience, inclusion, and the ability to scale affordable, low-carbon housing across different contexts.

Current responses

The market has started addressing issues related to diversifying delivery, tenure and reuse models.

Scaling delivery with community and flexible partnership models: Housing providers and public authorities are collaborating through joint ventures and frameworks that bundle sites, standardise procurement, and pool financing. Flexible models, such as long leases, land-for-housing swaps, community energy schemes, or separating land and property ownership, lower barriers for new entrants and support long-term affordability and carbon compliance. London's Small Sites programme[276] and France's bail réel both demonstrate how aggregating sites and diversifying partnerships can unlock supply, de-risk delivery, and reach more diverse populations[277]. (See case study Poblado Dirigido de Orcasitas; see initiative MOBA Housing SCE).

CASE STUDY:

Sostre Cívic – La Bertrana cooperative housing: Residents in Catalonia face high housing costs and limited affordable housing options while cooperative housing models remain under-supported. Sostre Cívic's La Bertrana encompasses 60 cooperative homes on municipal leasehold in Manresa. Built in timber to passive, near-zero-energy standards, it fosters communal living with around 300 sq m of shared space. Financed through member equity and development-bank support, the scheme locks in long-term affordability, lowers carbon, and shows how co-ops can scale on public land[287].

CASE STUDY:

Vindmøllebakken – "Gaining by Sharing" co-housing: Conventional housing models in Nordic cities prioritise shared ownership and space, enabling affordability, interaction, and the efficient use of resources. Vindmøllebakken applies the "Gaining by Sharing" model, reducing private floor area and providing extensive shared facilities across a 52-unit community of townhouses and apartments including communal kitchens, workshops, library, and guest units, enabling affordability and reduced environmental impact.[288]

Setting aside smaller parcels for community-led housing within larger schemes: Private developers are allocating portions of large development sites to community-led or cooperative housing groups (where residents collectively own and manage their homes) through simplified tenders or co-development agreements. This approach diversifies tenure, strengthens local trust and enhances social value for investors. Barcelona's La Borda cooperative built on leased public land under a 75-year agreement to deliver affordable, sustainable homes through participatory governance, proving that inclusive models can coexist with profitable mixed-use projects[278]. (See case study: Sostre Civic; see initiative: European Community Land Trust Network)

Mainstreaming co-living and intergenerational models to optimise housing use: Housing providers can integrate co-housing and intergenerational designs into mixed-tenure projects, implementing adaptable layouts, support for later-living and shared amenities. This can respond to cultural needs and provide flexible layouts, to improve market fit, meet changing demand, reduce carbon costs, and enhance community well-being[279]. Milan's Cenni di Cambiamento community-orientated project demonstrates how energy-efficient timber buildings and communal spaces attract younger and multi-generational residents[280]. (See case study: Vindmøllebakken)

CASE STUDY:

Temporary housing – conversion of college dormitory into emergency shelter: In Toulouse, France, a former college dormitory sat empty amid growing urban housing demand and an acute need for emergency shelter. The building was rapidly converted within one month to host 220 people, including 95 children using low-cost renovations and compliance with safety codes. The project was extended for 12 months, and community spaces are planned to be opened for wider neighbourhood use[290].

Aligning housing allocations with demographic and local needs: Housing providers are adapting homes and neighbourhoods to changing demographics through flexible layouts, intergenerational living, and voluntary "right-sizing" options. These approaches support ageing in place, improve use of existing stock, and strengthen community ties. Shared space and time-based models, such as using schools or community facilities for mixed purposes, further optimise space and enhance wellbeing. In Belgium, 1ROOF2AGES promotes the subletting of unused space in homes occupied by seniors to students[281] while Greater Manchester's housing strategy encourages rightsizing by increasing the supply of homes attractive to older residents who are currently under-occupying family homes, and ensuring housing allocations make best use of the existing stock[282].

Adaptive reuse of under-occupied or vacant properties for low-carbon housing: Housing providers are repurposing vacant or underused buildings into affordable, low-carbon homes, reducing embodied carbon and expanding supply without using new land. This includes the adaptation of large buildings into smaller units, conversion of non-residential buildings into affordable homes, or reuse of vacant properties to expand the supply of affordable homes. In Haarlem, the Netherlands, the developer Wedda and Going Dutch Development carried out an office-to-residential conversion that delivered near-zero-energy homes through adaptive reuse[283]. In the UK, Shelter is delivering social homes through the reuse of vacant homes[284]. (See case study: Bermondsey Project; Temporary housing, see initiative: Habitat for Humanity).

Scaling rent-to-own and intermediate rent tiers for affordability pathways: Housing providers are expanding rent-to-own and intermediate rent models, enabling tenants to build savings and equity over time while ensuring stable occupancy rates. Under a typical rent-to-own model, a future buyer moves into an affordable home as a private rental tenant, with the option to purchase the property at a pre-agreed price at a later date. The rent accrues to offset against a deposit at the time of purchase, acting as a savings plan for the buyer. These models broaden access to affordable ownership and provide longer-term stability. In Poznán, Poland, the city structured municipal business plans for fair rent-to-buy schemes, aligning tenure, pricing and long-term funding[285].

Initiative: **MOBA Housing SCE – cooperatives for affordable housing:** MOBA Housing SCE is a transnational alliance of cooperatives advancing affordable, non-speculative housing in Central and South Eastern Europe. Formed by groups in Belgrade, Budapest, Ljubljana, Prague, Zagreb and others, it pools expertise and finance to launch replicable, resident-led projects. The MOBA model centres on community ownership that develops, finances and manages multi-apartment buildings, developing tools including the MOBA Accelerator, a loan facility that de-risks delivery for smaller players[291].

Initiative: **ECLTN – European Community Land Trust Network:** A pan-European network supporting the growth of community-led, permanently affordable housing by connecting Community Land Trusts (CLTs). Through capacity building, advocacy and partnerships with cities and funders the network is establishing CLTs as an option for inclusive and sustainable housing[292].

Initiative: **Habitat for Humanity – Empty Spaces to Homes:** Empty Spaces to Homes is a programme transforming vacant buildings into affordable social housing for vulnerable individuals and families. The initiative repurposes underused spaces to create safe and decent housing, supporting local communities and local authorities while helping others replicate their approach[293].

#10 Leveraging low-carbon innovation

Barriers addressed

04 Policy volatility and incentive inconsistency
11 Limited uptake of low-carbon materials and technologies
12 Skills shortages and limited productivity in construction

Description

Innovation across the housing value chain remains fragmented and slow to scale. In affordable home retrofit and new build projects, scaling the use of low-carbon and reused materials, along with modular or prefabricated construction, can promote circularity and lower embodied carbon. On the operational side, the integration of renewable energy, storage and smart building management systems can cut emissions, reduce lifecycle costs and verify real performance. Across the value chain, clearer market and procurement signals can help accelerate the uptake of these innovations.

Current situation

Low-carbon material and construction innovation is progressing, but adoption remains slow and fragmented, confined mainly to pilots rather than mainstream delivery. The construction industry is risk averse and most comfortable using historic cost data and practices with existing precedence.

There are few incentives to move towards new, lower-carbon housing solutions. Asset-based procurement models discourage standardisation, while planning, insurance, and regulatory systems lag behind the use of low-carbon, reused, or bio-based materials, creating uncertainty and barriers for developers and insurers.

CASE STUDY:

Vonovia serial modernisation with prefabricated façades: Residential retrofits are often slow, expensive and disruptive to residents. In Garmisch-Partenkirchen, Upper Bavaria, Vonovia is using an innovative approach to retrofit and modernise 74 apartments in 1975-era buildings to class A. The use of prefabricated, insulated timber modules constructed from locally sourced wood speeds up delivery and reduces embodied carbon, while triple-glazed windows, ventilation with heat-recovery, sun-protection glazing and rooftop photovoltaics minimises operational emissions. The modular approach cuts installation time lowers tenant disruption while keeping rents affordable[307].

Modular, off-site, timber systems and other modern methods of construction (MMC) offer significant potential to cut embodied carbon and speed delivery but face inconsistent demand, limited manufacturing capacity, and uncertain insurability. While circular practices are emerging, they remain constrained by fragmented rules and lack of clear standards.

Heat pumps, photovoltaics, energy storage, demand-side flexibility and other renewable and electrification technologies are mature but expanding too slowly to meet climate goals. Low gas prices, high upfront costs, installer shortages and split landlord–tenant incentives continue to inhibit uptake.

Scaling demand for low-carbon materials, modular systems, and building electrification can stimulate domestic manufacturing, drive investment in circular supply chains, and create high-quality local jobs. By aligning housing innovation with industrial policy, governments and investors can transform construction into a driver of green growth across Europe's economy.

Current responses

The market has started addressing issues related to leveraging low-carbon innovation.

Integrating low-carbon materials and renewable energy technologies: Progressive housing providers are integrating low-carbon concrete, steel, bio-based materials, and reclaimed components in their procurement while scaling pre-assembled renewable energy kits combining heat pumps, solar panels, smart controls, and batteries. Hof van Duurzaamheid in Amersfoort-Noord, the Netherlands, is PATRIZIA's first large-scale cross-laminated-timber (CLT) family-housing scheme[294]. Ecoworks are pioneers of serial renovation, installing retrofit kits, combining renewable energy technologies and prefabricated panels for a range of German housing providers[295]. (See case study: Vonovia serial modernisation; Energiesprong Milano)

Aggregating demand for materials and technologies through procurement coalitions: Construction companies and developers are joining city- or region-wide procurement coalitions and buyers' clubs that pool purchasing power across retrofit and new-build projects to stabilise demand for low-carbon supply chains. Multi-year frameworks with standardised specifications allow suppliers to plan production and reduce

CASE STUDY:

Energiesprong Milano – industrialised deep retrofits: Milan faces the challenge of affordably renovating large numbers of poorly insulated buildings. The Energiesprong Milano initiative, backed by Italian philanthropic foundation Fondazione Cariplo and Comune di Milano, is a three-year programme that aims to pilot rapid, large-scale, zero-energy retrofits across the city's public housing stock of approximately 28,000 units. Building upon the Dutch "Energiesprong" model, the project will categorise buildings into groups for industrialised deep-retrofit schemes and develop market-ready guaranteed-performance solutions tailored to Milan[308].

CASE STUDY:

OPAL - mainstreaming bio-based materials in social housing: Many French social homes still use conventional materials with high embodied carbon, weak circularity and poor indoor air quality. French public housing company OPAL designed and tested a replicable method to specify and deliver bio-based components in new build and retrofit, documenting choices, performance, procurement approaches and lessons. The pilot created an internal knowledge base and repeatable specifications that cut risk, accelerate adoption, improve comfort, lower embodied carbon and signal demand for suppliers to scale[309].

CASE STUDY:

EFFIC – industrialising and standardising residential retrofits: Residents and housing providers lack integrated services for retrofit delivery. EFFIC is a Spain-based specialist in energy-efficient building renovation, offering a full-service model that combines technical diagnostics, subsidy management and retrofit implementation. With over 50,000 projects across 3,000 municipalities and over 20 years' experience, EFFIC enables homeowners' associations to cut energy bills by up to 50% and increase building value by around 20%. For SMEs, their services include audits, decarbonisation plans, real-time monitoring and access to the national EPC system, helping businesses monetise savings[310].

costs for materials and technologies. The Amsterdam Metropolitan Region coalition unites developers, builders, and municipalities to jointly scale timber construction[296], while the UK's Greener Futures Partnership of housing associations procure services at scale[297]. (See initiative: Energiesprong Global Alliance).

Developing certification and insurance frameworks for innovative materials: Housing providers, suppliers, and insurers are collaborating to establish performance-based certification and warranty systems for bio-based, low-carbon and recycled materials. Common testing protocols and transparent data reduce the perceived risk of innovative materials and unlock access to insurance and finance. These frameworks increase confidence for lenders and investors, allowing wider specification of low-carbon materials in affordable homes. Metabuilding Labs creates an EU-wide open innovation testbed for novel building envelope technologies[298]. (See initiative: Built by Nature and case study: OPAL)

Implementing platform-based modern methods of construction: Suppliers and housing providers are co-developing interoperable modern methods of construction (MMC) systems with shared specifications and open digital platforms. These systems standardise prefabricated components such as facades, structural frames, and energy pods, allowing repeatable, low-risk delivery. Belgium-based ToGatherHomes offers pre-engineered timber typologies via a digital library that automates feasibility and tendering[299], while in Ireland, modular homes company NUA manufactures homes using off-site modular systems with light gauge steel and timber frames[300].

Establishing low-carbon and circular supply chains manufacturing hubs: Manufacturers and suppliers are investing in regional sourcing and manufacturing hubs for low-carbon, bio-based and circular materials, alongside renewable energy technologies and components. For example, ATRIUM

CASE STUDY:

Concular - offering re-used materials for renovation and construction products: Widespread material reuse is held back by a lack of robust data on the availability and quality of reusable building components. German circular construction company Concular has developed an online platform and shop for circular building materials. In buildings about to be refurbished, Concular maps the materials and connects supply and demand between buildings being deconstructed and those integrating reused materials. Registered users can check stock and receive notifications when required items arrive to help integrate the reclaimed materials into new projects. Launched in 2020, Concular has implemented over 1,000 projects to date[311].

CASE STUDY:

Berlinovo – modular micro-apartments for adaptable living: Berlin is home to a large student population but lacks affordable apartments. Berlinovo Immobilien Gesellschaft collaborated with Arup to deliver 129 compact 16 m² apartments with a kitchenette and bathroom, providing 2,400m² of new living space. The modular designs use a technically optimised prototype that speeds assembly, standardises components and allows later reconfiguration for different resident groups. The scheme demonstrates rapid, adaptable delivery with efficient use of space and lower embodied carbon impacts, creating a replicable model that can adapt to alternative needs such as homes for retirees or refugees[312].

is an EU and UKRI funded project which develops high-performance, bio-based materials for construction from renewable sources such as hemp, mycelium and bio-polymers[301]. Heidelberg Materials has developed a first-of-its-kind recycling plant in Poland enabling the selective separation of demolition concrete[302].

Embedding digital quality assurance across retrofit and construction stages: Developers and contractors are using digital twins, BIM-integrated inspections, and thermographic verification to ensure quality standards and mitigate performance gaps during retrofit and construction. Technology company xRI allows real-time tracking of site progress and quality[303]. UK-based retrofit specialist Domna combines AI-driven portfolio modelling with on-the-ground retrofit delivery[304]. By reducing performance gaps between design and delivery, these systems ensure homes performs as intended and avoid costly maintenance and repairs. (See case study: EFFIC)

Building circular supply chains and promoting material reuse with digital traceability: Developers and contractors are embedding pre-refurbishment and pre-demolition audits to ensure that existing materials can be kept at their highest value. Material resource and disassembly plans for completed buildings together with the use of material passports can enable these materials to be recovered at end-of life. Material recovery helps retain asset value while achieving measurable embodied-carbon reductions. Platforms like ROMULUS from tech company Maconda enable machine-readable building audits[305], while non-profit online platform Opalis connects reclaimed material suppliers and buyers across Europe[306]. (See case study: Concular).

Initiative: Energiesprong Global Alliance – scaling future-fit homes: Non-profit retrofit organisation Energiesprong standardises deep retrofit and new-build delivery through prefabricated façades, integrated energy systems and performance guarantees. By aggregating demand and aligning procurement, the alliance has enabled over 10,000 net zero homes across the Netherlands, UK, France, Germany and Italy, demonstrating a scalable, industrialised model for affordable decarbonisation[313].

Initiative: ULI Accelerator – digital innovation for real estate: The accelerator brings together public and private partners to test digital innovations including for low-carbon and affordable housing. The aim is to translate digitalisation into practical, scalable solutions and stronger market signals to accelerate uptake across the sector[314].

#11 Investing in value chain upskilling and reskilling

Barriers addressed

03 Disjointed approach to housing, retrofit and infrastructure planning
05 Limited public-private alignment and collaboration
12 Skills shortages and limited productivity in construction

Description

The knowledge and capacity gap in Europe's real estate sector must be addressed to accelerate the delivery of low-carbon, affordable housing at scale. This will require strategic investments in vocational education, workforce development, and partnerships between industry and educational institutions can build the skills needed to plan and deliver large-scale retrofits, adopt modern construction methods, and ensure high standards of quality control. Strengthening job quality, training pathways, and working conditions will help attract and retain the diverse, skilled workforce required for a just and low-carbon transition in affordable homes.

Current situation

Workforces across the European housing value chain are not yet equipped with the skills needed to deliver low-carbon, affordable homes. Skills shortages hold back progress across all stages of the value chain from design and manufacturing to on-site delivery and building management.

Vocational education and training remain largely focused on conventional trades and outdated construction methods, with limited integration of modern methods of construction (MMC), circular design, and renewable or electrification technologies.

Small and medium-sized enterprises (SMEs), which dominate Europe's construction sector, often lack the financial capacity and time to

CASE STUDY:

Construye 2030 – upskilling for industrialised retrofit: Launched in 2022, Construye 2030 addresses the skills gaps, low diversity and lack of adoption of industrialised processes for energy-efficient building retrofit in the Spanish construction sector. Led by Fundación Laboral de la Construcción, the programme updates national training standards and provides practical learning on insulation, airtightness and energy systems. The participation of women is promoted through partnerships with female-empowerment groups and accessible learning materials. Aligning skills development with Spain's green transition, supports inclusive entry into jobs critical for achieving national retrofit goals[320].

release staff for structured training or upskilling. This limits the diffusion of new techniques and slows productivity gains.

Overcoming this requires coordinated investment in reskilling and lifelong learning, supported by digital learning platforms, accredited on-site apprenticeships, and regional training hubs that connect industry, academia, and public authorities. Strengthening peer-to-peer learning networks across regions can further accelerate knowledge transfer and replicate best practice.

A joint public–private commitment to workforce transformation is also critical to modernise Europe's construction sector, enhance competitiveness, and ensure that the transition delivers quality, inclusive employment.

Current responses

The market has started addressing issues related to value chain upskilling and reskilling.

CASE STUDY:

FEEBAT – national retrofit training scheme: France requires 430,000 skilled workers by 2030 to meet targets to improve the energy efficiency of millions of buildings. French government-backed training scheme FEEBAT trains building professionals in energy-efficient renovation, offering courses for craftspeople, SMEs, architects, project managers and educators. The programme helps participants gain new retrofit contracts and comply with certification frameworks, while supporting teacher-trainers and apprenticeship networks[321].

Building integrated planning capacity in local authorities: Some local governments are upskilling planners, permitting officers, and procurement teams to assess carbon, energy, and affordability impacts at project level. Training includes urban design and masterplanning, whole-life carbon accounting, and cross-department collaboration. Capacity building improves the quality of decisions, reduces permitting delays and ensuring plans deliver low-carbon, affordable housing. C40's *Climate Action Guide for Urban Planners* helps develop skills around climate-responsible spatial planning, low-carbon housing frameworks and policy for sustainable urbanisation[315].

Developing project commissioning and management skills for housing providers: Social landlords and housing associations are establishing structured training for retrofit commissioning, procurement, and lifecycle performance management. Covering contract management, cost-benefit analysis, and tenant engagement, alongside fair pay and inclusion standards for all contractors. Building in-house capability to deliver retrofit at scale, ensures fair, safe, and diverse employment across the supply chain. Warmer Homes London brings together local councils, housing associations, builders and training organisations, for project commissioning training to deliver large-scale affordable retrofits[316].

Embedding carbon literacy across built-environment professionals: Professional bodies are mainstreaming carbon and circularity training for architects, engineers, and surveyors through revised accreditation and CPD requirements. This informs design choices on life-cycle carbon, operational costs, and resident affordability. In the Netherlands, BNA, the Royal Association of Dutch Architectural Firms, leads sustainability training programmes, including courses on energy-neutral construction and renovation and timber construction[317].

Upskilling contractors and building-services providers for retrofit delivery: Trade associations and training bodies are developing accredited programmes

for retrofitting, low-carbon heating, ventilation, and insulation to expand supply chain capacity. This includes retraining gas engineers for heat pump installation, harmonising credentials across borders, and expanding diversity through targeted entry programmes for women and underrepresented groups. EUCERT, the European Heat Pump Association's training programme, supports education and training for heat pump installers across Europe[318]. (See case study: Construye 2030; and initiatives: BUILD UP Skills and New European Bauhaus Academy).

Harmonising low-carbon and affordable housing curricula and training programmes: Industry bodies, universities, and training providers are developing adaptable new curricula across vocational and higher education that develop carbon and affordability literacy and practical innovations as technology evolves. Meeting industry needs by preparing workers for future demand and mobility across Europe by harmonising credentials and training programmes. RE-DWELL's Innovative Training Network is supporting a new generation of professionals with the transdisciplinary skills needed for the transition[319]. (See case study: FEEBAT national retrofit training scheme).

Expanding sustainable finance skills across lenders and investors: Banks and investors are introducing carbon literacy and transition-risk training to align financing decisions with decarbonisation goals. This includes climate risk-adjusted valuation, business case modelling, and blended-finance design into lending practices, amongst other areas. Finance professionals can then structure low-risk, long-tenor investment for affordable housing retrofit and reuse. (See case study: BNP Paris and EIB).

Initiative: **Transition Pathway for Construction – transforming the construction ecosystem:** The High-Level Construction Forum (HLCF), led by the EU, is supporting the implementation of the Transition Pathway for Construction, which sets out the actions necessary towards a resilient, competitive, greener, and more digital construction ecosystem and affordable housing for all Europeans[323].

Initiative: **New European Bauhaus (NEB) Academy – upskilling built environment professionals:** The NEB Academy is the EU funded upskilling initiative for a carbon-neutral built environment. Supporting educators, policymakers, industry stakeholders and civil society, through regional hubs and online training, to address critical skills gaps in construction[324].

Initiative: **BUILD UP Skills – upskilling construction professionals**: The BUILD UP Skills initiative launched by the European Commission in 2011, supports the up-skilling of construction professionals across Europe, especially for building decarbonisation, deep renovation, near-zero-energy buildings, heat pumps and circular methods. It funds national skills strategies, qualification schemes and innovative training models, promoting demand for trained professionals through awareness, skills passports and procurement requirements[325].

CASE STUDY:

BNP Paribas and EIB – combining blended finance with capacity building: BNP Paribas used technical assistance from the European Investment Bank (EIB) ELENA finance facility to train a team of energy, marketing and quality assurance experts working directly with housing associations. It built capacity to provide energy audits, preparation of documentation and technical advice before issuing loans for retrofits. Combining these various solutions, created a "one-stop-shop" service supporting over 820 renovation projects[322].

#12 Enabling system-wide knowledge sharing

Barriers addressed

05 Limited public-private alignment and collaboration
12 Skills shortages and limited productivity in construction

Description

Europe's housing markets remain highly localised, with fragmented regulations and delivery systems limiting the transfer and replication of successful low-carbon and affordable housing models. Establishing stronger cross-border collaboration, shared learning platforms, and common standards can accelerate innovation and reduce duplication of effort. By enabling the exchange of data, financing models, and technical expertise, housing providers can scale proven delivery models across markets, increasing efficiency, investor confidence, and the perception of low-carbon, affordable housing as a mainstream investment opportunity.

Current situation

Affordable housing systems across Europe have evolved under national frameworks, leading to highly localised approaches and limited cross-border exchange. The public-sector-led nature of the affordable housing has led to learning in separate "silos" and a lack of interaction with private finance and mainstream real estate networks.

As private capital increasingly enters the affordable housing sector, networks are still forming, and trust is limited. Most innovation remains project- or city-based and is rarely codified or transferred. Without mechanisms to share what works, the sector reinvents solutions, restraining the pace of decarbonisation and potential scale. Mechanisms and funding are required to drive effective peer to peer exchange.

Fragmentation also reinforces affordable, low-carbon housing as a niche market rather than an investable asset class, constraining innovation and investment. Collaboration would enable scale and the political and social visibility that would encourage stronger momentum and coordinated action towards affordable, low-carbon housing across governments.

Current responses

The market has started addressing issues related to system-wide knowledge sharing.

Documenting and disseminating city-level case studies: Cities are documenting case studies focusing on zero-carbon and affordable retrofit schemes to help other regions learn from real-world examples. These showcase successes and challenges, providing insights into technical, financial, and social solutions to help accelerate decarbonisation efforts, reduce the risks of implementing new models, and foster collaboration on affordable housing. The 100 Climate-Neutral and Smart Cities Mission shares lessons for housing providers from successful low-carbon housing initiatives in cities like Ljubljana and Freiburg[326].

Establishing cross-national learning platforms: International networks

such as C40 Cities,[327] Eurocities[328] and Energy Cities[329] have set up dedicated public-private working groups that allow cities, countries, and stakeholders to exchange best practices, solutions, and innovations. These platforms will help to accelerate learning, enabling cities to share resources and solutions, and promote collaboration across borders on housing decarbonisation and affordability. (See initiatives: Cities4Co-housing Network; Portico).

Forums for multi-stakeholder dialogue and peer learning: Multi-stakeholder dialogue forums strengthen collaboration between investors, developers, municipalities, and other stakeholders. Providing space to discuss common challenges, solutions, and opportunities, helps to foster collective action and peer-to-peer learning on low-carbon and affordable housing. The World Green Building Council (WorldGBC)[330] and its European network regularly hosts forums for stakeholders in real estate and construction to engage on net zero strategies. Similarly,

Laudes Foundation[331] supports multi-stakeholder forums on sustainable housing and decarbonisation strategies. (See initiative: ULI Europe).

Repositories of affordable housing knowledge, solutions and standards: Initiatives are emerging to build centralised knowledge hubs for affordable housing solutions, which include designs, financing models, decarbonisation strategies, and policy instruments. These open archives can contain data-driven insights on various housing typologies, climatic zones, and the policy instruments that worked to achieve affordable, zero-carbon housing. The Built4People programme, co-funded by the European Commission, is a public-private partnership that maintains an open database of research and innovative solutions for affordable [332].

Initiative: **Cities4Co-housing Network – collaborative and community-led housing:** As part of the EU urban cooperation programme URBACT, Cities4Co-housing supports collaboration among municipalities to transfer and adapt successful practices. The network builds upon the success of CALICO, an innovative collaborative housing model in the Brussels Capital Region. The pioneering model combines long-term affordability with community land trust principles, gender inclusivity and community-based care services[333].

Initiative: **Portico – the gateway to urban learning on sustainable urban development:** Portico is an online knowledge and collaboration platform launched by the European Commission to support cities, regions and stakeholders in designing and delivering integrated sustainable urban development. Developed under the European Urban Initiative, it serves as the central gateway for guidance, tools, and peer learning[334].

Initiative: **ULI Europe – international exchange for affordable and sustainable living**. The ULI helps build networks to address the lack of knowledge sharing across cities, regions and countries. Sector experts from across Europe convene on topics such as affordable living, urban regeneration and sustainability. C Change for Housing is also founded on a collaborative approach and invites participation across markets to increase impact[335].

Initiative: **Homes that Don't Cost the Earth – affordable homes within planetary boundaries**: Homes that Don't Cost the Earth is a UK-focused network-building project led by design and strategy company Dark Matter Labs, Arup, University College London Institute for Innovation and Public Purpose (UCL IIPP) and communications firm Rising Tide, and supported by Laudes Foundation. The initiative hosts an open platform containing a toolkit of policy, financial and technical interventions that can provide affordable homes for all, while protecting and enhancing our environment[336].

Initiative: **Sustainable Housing for All – affordable, sustainable and equitable homes:** A consortium of the Dutch Green Building Council (DGBC), Platform31 and Platform Woonopgave is conducting a two-year research programme titled *Sustainable Housing for All*, funded by Laudes Foundation. The study examines the intertwined housing challenges of affordability, social justice and climate impact within the Netherlands and Germany, and will produce a roadmap of policy actions that deliver affordable, sustainable and equitable housing solutions[337].

Initiative: **Vivienda Innovadora Verde y Asequible (VIVA) – housing models linking affordability with sustainability**: VIVA is a collaborative initiative in Spain, led by NESI and sustainability consultancy Ecometro, and funded by Laudes Foundation, addressing the housing crisis by linking affordability with sustainability. VIVA seeks to broaden perspectives on housing as an issue that encompasses social, economic, environmental, and cultural dimensions. It brings together public, private and community actors organisations and individuals to co-design new housing models, financing and policy changes[338].

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