

Building society

How to improve the building sector's social impact through retrofitting and affordable construction

A report by the UBS Sustainability and Impact Institute
December 2023



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Executive Summary

The primary role of our built environment is to meet human needs for shelter, connection, work, and services. Yet, the inadequacy of numerous current buildings contributes to many of society's problems, like poverty, ill-health, and climate change. In this report we look at how the social impact of our built environment can be optimized by retrofitting existing buildings; expanding the stock of adequate, affordable housing; and improving construction practices.

Improvements to the built environment can contribute to achieving various other sustainability goals, like reducing poverty and inequality, improving health outcomes and physical comfort, ensuring more equitable access to education, and improving the resilience of the energy infrastructure.

The 3 R's of socially inclusive new construction

In this report we introduce a three-pillar framework to determine whether new development projects fulfill the criteria to be considered socially inclusive and, therefore, sustainable. We call this framework the 3 R's—Right building; Right way; Right place.

- **Right building:** Is the building economically accessible to the local community, and does it fulfill its needs? Whether the need is more housing, community areas, or commercial space, it requires the correct building type, at the needed capacity with the right facilities, and, with a view to the future, ease of convertibility to an alternative use.
- **Right way:** Is the building being constructed in a way that benefits the local economy, e.g., using local materials and suppliers where possible, providing employment for local people at living wages? Is it minimizing social costs e.g., enforcing safety protocols onsite and ensuring workers are not being exploited offsite? And is it designed inclusively, e.g., incorporating natural light, efficient insulation, healthy ventilation, and, where appropriate, space for communal areas?
- **Right place:** Is it located in an area with good connection to others, to public transport, in reasonable proximity to job opportunities, and outside of areas prone to environmental and social risks?

Addressing the global shortage of affordable housing

Housing in the biggest developed markets has become increasingly unaffordable in recent years—between 2019 and 2021 the number of severely unaffordable markets rose by 60%. In emerging markets too there are severe shortages—the number of urban residents living in slums or slum-like conditions amid a lack of adequate, affordable housing has hit an estimated 1.1 billion, with a further 2 billion more projected over the next 30 years. Addressing this problem will require significant investment, an estimated USD 17tr in emerging markets alone, with 90% of that in Africa and Asia. While individual markets have their own particularities, we outline five key areas holding back the

supply of affordable housing and suggest potential reforms. These include regulation and policy; finance availability; skill shortages; insufficient harnessing of innovation; and lack of stakeholder coordination.

Part of the solution is likely to be provided via blended finance instruments to address liquidity constraints and funding bottlenecks.

The social opportunity from retrofitting existing buildings

The profound social effects of the existing built environment and the significant potential for both positive and negative direct impacts as well as externalities make building retrofits a key part of the toolkit for reducing social harms and improving societal outcomes. Retrofitting can contribute to revitalizing economically struggling communities, creating jobs, reducing energy bills, improving local human capital via the benefit to physical and mental health outcomes, and reducing harmful emissions. For this to be meaningfully achieved, however, retrofitting needs to take place at scale. For that to happen, communities must be brought on board. In this sense, retrofitting and area regeneration are symbiotic processes, with the success of one partially dependent on the other. Aligning communities with retrofitting priorities requires communicating and demonstrating the benefits of retrofitting to individuals and the broader public sphere.

Two key factors to spur large-scale retrofitting

Perhaps the most straightforward route is establishing and expanding a retrofit supply chain for governments at local and national levels to commit to retrofitting social housing stocks, i.e., government-owned housing. This has the advantage of laying out a clear policy path and can provide a pipeline of projects, clarity to market participants, and a signal to expand retrofitting capacity.

But most buildings are privately owned. Achieving community-level retrofitting in the private sector is likely to demand the kind of coordinating role played by “one-stop-shops” both to group retrofitting projects to reduce costs, and to effectively coordinate stakeholders across the value chain in public and private spheres.



Find more insights in our latest white paper:
“Rethink, rebuild, reimagine—Laying the foundation for better buildings.”
www.ubs.com/better-buildings

1. Why better buildings are key to achieving social goals

At a glance

- Optimizing the built environment via energy-focused retrofitting can support many other sustainability goals, like reducing poverty and inequality, improving health outcomes, and enhancing the resilience of energy infrastructure.
 - The construction needs of the coming decades, particularly in emerging markets, necessitate changes to construction practices if social harms are to be minimized.
 - Major investment and innovative financing will be needed to provide adequate, affordable housing to the hundreds of millions dwelling in slums today and in future.
-

Over the coming decades a large amount of new construction will be necessary—an additional 75% of floor area—particularly in emerging markets, which are expected to see 80% of global new construction through 2050.¹ This is required to accommodate growing and shifting populations, rising living standards, and continued urbanization. It is also needed to address the acute shortage of affordable housing. But new construction needs to happen in a way that avoids practices that are exploitative and exacerbate existing inequalities. Construction should promote social inclusion by considering the needs of the local population and impact on its quality of life, by building more affordable, locally appropriate, and ecologically sustainable housing, while ensuring that housing is built in places where social opportunities are maximized, i.e., ready access to jobs, social services, and not far from dynamic cities.

In this report we outline the importance of improvements in new construction practices and modifications to the existing building stock, not just to Sustainable Development Goal 11—“*Make cities and human settlements inclusive, safe, resilient and sustainable*”—but also to various others. Retrofitting of the existing building stock is essential for example, to improve energy efficiency, reduce emissions, and improve resilience to climate change (Interview 1), but also to address the social impacts on physical and mental health caused by today’s buildings, reduce the impact of high energy costs, and improve living standards more broadly. This will require large-scale retrofitting of existing buildings, particularly in developed markets, where new construction needs are lower and existing buildings will be in use for decades.

¹ International Energy Agency (2021), Net Zero by 2050: A Roadmap for the global energy sector, P141.

Interview 1

Decentralized energy. Sebastien Groh, Founder of SOLshare (Bangladesh)

What is the relationship between the reliability and affordability of access to electricity and social outcomes?

The UN's SDG 7 calls for affordable access to reliable and sustainable energy—which over 700 million people lack today. Research suggests that access to sustainable electricity is also a key enabler of the other SDGs, so it's hugely important. Lack of access keeps people poor. For example, a consumer in a developed market, connected to the main grid, might pay USD 0.40 per kwh for electricity, but that might rise to USD 7–10 for someone with no grid connection. It costs 20 times more for someone who is perhaps 20 times poorer, a classic poverty penalty, where the poor are penalized for being poor, which keeps them in a vicious cycle.

What are the potential solutions?

We need to connect the resources we already have. First, in Bangladesh, there are 6 million solar home systems (consisting of a rooftop solar panel and a battery inside the home), which is by far a record. These can't be connected individually to the grid as it's too expensive, but pooled together, it becomes cost effective. Second, we have over 4 million electric three-wheeler vehicles (taxis). Most of these use lead batteries, so the first step is to replace them with smart lithium batteries, then connect them to create a virtual power plant. So, we can use the electric vehicle batteries as distributed energy storage, connect them to the grid, and allow them to provide grid ancillary services, thereby balancing demand and supply.

Do you think decentralized systems are the future of power?

Yes. The old paradigm of a large power plant generating electricity, not near people's homes, is outmoded. It's very prone to failures—if there's a natural disaster, and there is one node, system failures occur. In Bangladesh we have one hurricane after another, but our grids stay up, because we have decentralized systems that have redundancy. Up until recently there weren't any reasonable alternatives to centralized systems. Developed countries have the sunk cost of their existing systems, so they won't switch. But climate change means these are under more stress and it's very expensive to maintain them. In an emerging market, one can leapfrog that outmoded tech.

2. Growing the built environment inclusively

At a glance

- New construction is necessary, but to be socially inclusive, it should fulfill the 3 R's—the right building, built in the right way, in the right place.
 - The world faces an acute shortage of adequate, affordable housing with appropriate living standards. Expanding it is both a social imperative and a major investment opportunity.
 - We identify five key reform areas to tackle affordable housing shortages. Part of the solution could be via blended finance instruments that address liquidity constraints and funding bottlenecks.
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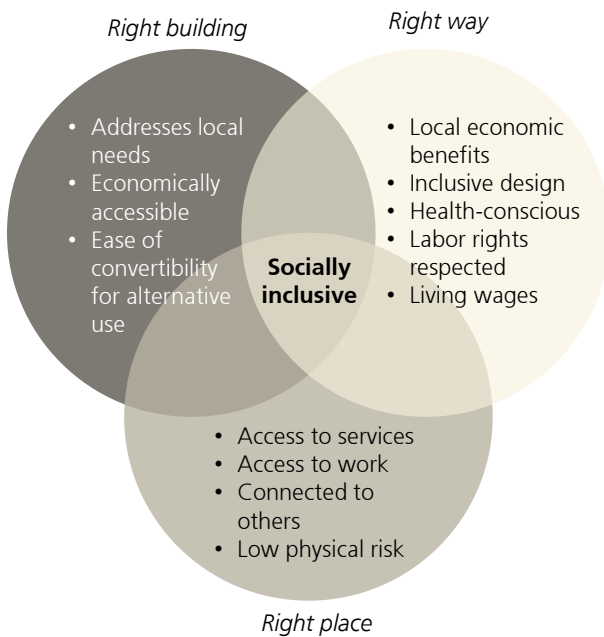
2.1. Principles of socially inclusive building

There is no one-size-fits-all approach to inclusive building—each real estate market has its own idiosyncrasies driven by differences in climate, aesthetics, stage of economic development, available materials, demographics, local regulatory regime, and other factors, not to mention politics. But in our view, the three broad principles that new buildings should fulfill to be considered sustainable from a social perspective are (Figure 1):

- 1) **The right building:** Does the building meet the economic, physical, and social needs of citizens for whom it is designed?
- 2) **Built in the right way:** Is the building constructed such that it minimizes social costs, i.e., is it inclusively designed, with occupant safety and well-being in mind, and workers that are ethically recruited and treated fairly? This should be in addition to minimizing greenhouse gas emissions, pollution, and resource waste during construction and over the building's lifecycle.
- 3) **Built in the right place:** Is the building located in an area with good connection to others, to public transport, in reasonable proximity to job opportunities, and outside of areas prone to environmental and social risks?

Figure 1: Broad principles of socially inclusive buildings

Our three-pillar framework (the 3 R's) is useful to gauge whether new development projects fulfill the criteria to be considered socially inclusive and, therefore, sustainable



Source: UBS

The right building...

- **Economically accessible to the local community:** Economic accessibility is about pricing at a level that allows the local community to partake in the benefits of a development at a reasonable cost. Affordability does not imply fully subsidized, non-market rate housing. In some cases, a non-affordable development will include an affordable element or service offering or enable a related affordable development in the same or nearby area. For example, in New York City, permission for a luxury residential tower at 5 World Trade Center was granted on the condition that one-third of the 1,200 units be reserved for low- and middle-income renters, spread throughout the development.²
- **Fulfilling local needs:** Whether the need is more housing, community, or commercial space, (Box 1) it requires the correct building type, at the needed capacity with the appropriate facilities, and, with a view to the future, ease of convertibility to alternative use.

Box 1: UBS Detroit office community spaces

In 2019 UBS opened a branch of UBS Financial Services on Woodward Avenue in downtown Detroit, the first wealth management firm to do so since 2010. The opening was part of UBS's commitment to downtown Detroit and the local community. As part of this, 50% of the available space of the 11,000 square foot office is made available for local, UBS-approved, non-profit organizations to host board meetings and other activities. In addition, UBS piloted its Keys to Your Future program in Detroit, a personalized digital curriculum designed to help local high schoolers.³

² New York Times article, (2023), *Affordable apartments are coming to the top of New York's skyline*, Accessed on 12/1/23.

³ Businesswire, (2019), *UBS Financial Services Inc. Opens First Detroit Office In Historic Downtown Woodward Shopping District*, Accessed on 12/13/23

... the right way...

- **Local economy benefits:** To maximize the economic benefits to the surrounding area, a development should use sustainably sourced and preferably local materials and suppliers where possible, provide employment for diverse local people (Box 2), and pay those workers living wages. In cases where skill shortages are a problem, investment may be needed in training and upskilling. In some developments this may inform the design and type of materials used, e.g., using smaller concrete bricks that individual workers can lift rather than large blocks that require an expensive crane and crew to move. The Better Brick Nepal (BBN) initiative, supported by Humanity United, for example, is creating a market-based model that incentivizes brick-kiln owners to transform traditional business practices to business models involving zero tolerance of debt bondage and child labor, and implementation of safe and humane working conditions. Partners such as GoodWeave and the Global Fairness Initiative provide technical assistance and equipment to produce better quality bricks and access to a larger market, provided they meet labor standards.

Box 2: UBS Arena and the boost to the local economy

UBS Arena, an events space and sports venue, home to the New York Islanders ice hockey team, opened in 2021. Located within Belmont Park, New York, US, it is part of a USD 1.5bn redevelopment expected to generate around USD 25bn in economic activity, including 3,000 permanent jobs and major infrastructure improvements like the newly constructed Elmont Station. The project has a goal of earmarking 30% of construction contracting dollars for state-certified minority and female-owned business, and an additional 6% to service-disabled, veteran-owned businesses. UBS Arena also plans to work with community organizations and elected officials with the aim of filling 30% of jobs at the venue with local residents.⁴

- **Minimized social costs:** Beyond onsite conditions (e.g., enforcing safety protocols, as in the BBN initiative), the offsite conditions in which vulnerable workers and their families are housed can exacerbate social ills such as inequality, lack of access to services like health and education, or predatory behavior, unless proactively addressed. The Baan Dek Foundation assists companies in Thailand with monitoring the living conditions of their workforce and advises them on best practices to improve opportunities and living standards.⁵ Similarly, the Working Capital Fund invests in solutions to reduce labor exploitation using new technology to improve transparency in supply chains.⁶
- **Inclusive design:** Here we refer to a combination of socially relevant factors, including connection to a building's surroundings, which may mean more open facades rather than hermitically sealed, closed-off hard edges, which has the added benefit of providing recesses for natural shading as temperatures rise; natural light and greenery, which are important for mental health;⁷ healthy ventilation, be that mechanical (more likely in developed markets) or passive (more likely in emerging markets); and which leave gaps for communal spaces. The Las Americas Social Housing development by SO-IL in Leon, Mexico offers one such example.⁸ This is a

⁴ UBS Arena, *Community*, Accessed on 12/13/23

⁵ Baan Dek Foundation, (2022), *Building better lives, together: Strategic plan (2022-2025)*.

⁶ The Working Capital Fund is a double bottom line fund with the goal to reduce labor exploitation by accelerating the development and deployment of ethical supply chain solutions to the benefit of the hundreds of millions of vulnerable workers. The solutions focus on sectors with a high risk of labor exploitation such as manufacturing, agriculture, and construction, but can be applied more widely.

⁷ Bratman G. N. et al., (2019), *Nature and mental health: An ecosystem service perspective*, Science Advances.

⁸ Architect Magazine article, (2021), *An intimate look at SO-IL's Las Americas*.

prototype development, which is specifically aimed to avoid flat, squared-off facades and dark, window-less corridors. It favors irregular shapes made from low-cost prefabricated components that provide privacy, a sense of ownership, and shading, while also maximizing communal shared spaces and natural ventilation.

... the right place

- **Access to work and services:** Just as real estate valuations stem from location, so do social outcomes, to a large degree.⁹ Housing is attractive from a social perspective when it offers ready access to services like education, retail, and healthcare; when work opportunities can be accessed; and health risks avoided. Buildings that do not tick these boxes risk reinforcing existing inequalities and inequities. In practice this typically means proximity to vibrant towns or cities or strong transport links, an emphasis on density over urban sprawl, and building up rather than out. This runs counter to the trend of recent decades, in which urban sprawl has outpaced population growth in most cities, *“with detrimental effects on the sustainability of urban development.”*¹⁰
- **Connection to others:** From an environmental and a social point of view, dense, walkable, mixed-use neighborhoods have higher levels of social capital—i.e., social and community engagement—compared with car-oriented suburbs. People who live in walkable neighborhoods are *“more likely to know their neighbors, participate politically, trust others, and be socially engaged.”*¹¹
- **Minimize physical risks:** Constructing in areas vulnerable to natural disasters like earthquakes, flooding, or wildfires is clearly undesirable, but that has not stopped it from happening on a large scale. A study found that 57% of structures in the US were in *“hazard hotspots,”* with around 1.5 million buildings in hotspots *“for two or more hazards.”*¹² Rising global temperatures are amplifying risks and bringing more areas into danger. New construction should avoid adding to the stock of buildings threatened by intensifying physical risks.

2.2. The shortage of affordable housing

Affordable housing is a somewhat slippery concept, with varying definitions. Some use it as a synonym for social housing, rented at subsidized or below-market rates.¹³ In the US, EU, and OECD, it typically means housing where costs such as rent, mortgage payments, and utility bills do not exceed 30% of post-tax household income, with over 40% being an indicator of *“overburden.”*^{14,15} Other definitions may look at disposable income instead.¹⁶ But while there may not be a universally accepted definition, there is general consensus that there is a major global shortage of housing that is both affordable and that offers an appropriate standard of living.

⁹ Acolin, A., & Wachter, S. (2017). *Opportunity and Housing Access*, Penn Institute for Urban Research, P7.

¹⁰ UN, (2023), *Sustainable Development Goals Report*, P35.

¹¹ Leyden, K. M., (2003), *Social capital and the built environment: Importance of walkable neighborhoods*, American Journal of Public Health.

¹² Iglesias, V., et al., (2021), *Risky development: Increasing exposure to natural hazards in the United States*, Earth's Future.

¹³ Czischke, D., & van Bortel, G., (2018), *An exploration of concepts and policies on 'affordable housing' in England, Italy, Poland and The Netherlands*, Journal of Housing and the Built Environment.

¹⁴ US Department of Housing and Urban Development, *HUD User Glossary Resources*, Accessed on 11/28/23.

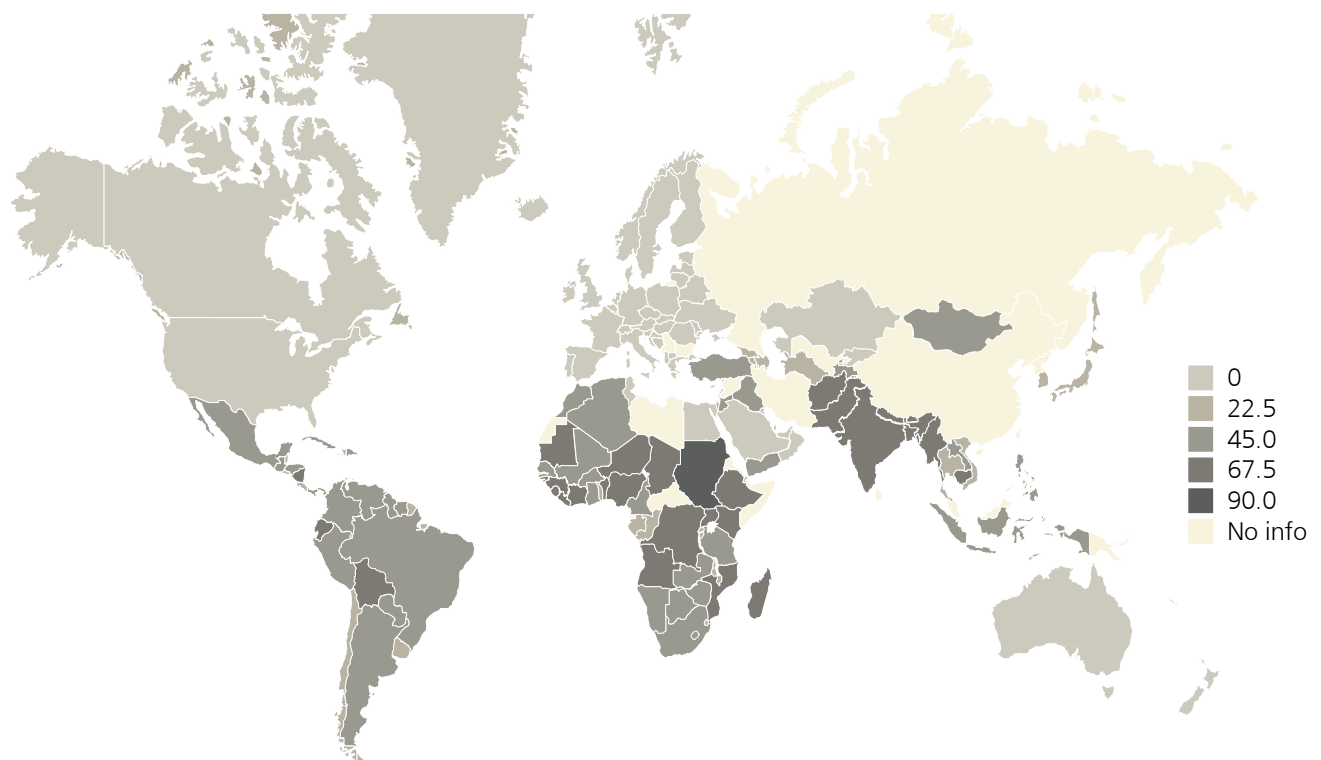
¹⁵ Rosenfeld, O. (2017) *Analysis of interpretations of the term affordable housing in the EU Urban Agenda Partnership for Housing*, P9.

¹⁶ Ibid, P9.

Housing in the biggest markets has become increasingly unaffordable in recent years—between 2019 and 2021 the number of severely unaffordable markets rose by 60%.¹⁷ This is not just a developed market story. Roughly 80% of the world’s cities do not have enough affordable housing for their population.¹⁸ Continuing urbanization in emerging markets coupled with the lack of sufficient affordable housing has resulted in the growth of informal settlements, with a commensurate rise in the number of people in sub-standard housing, unconnected to basic services. An estimated 1.1 billion urban residents live in slums or slum-like conditions (Figure 2), with 2 billion more projected over the next 30 years.¹⁹ Just providing adequate housing for those in sub-standard dwellings would require an estimated 300 million new homes to be built by 2030, with 90% of those being in Africa and Asia.²⁰ This would require an estimated investment of USD 17tr, according to the Reall Foundation (Interview 2). In developed markets trillions more are needed to expand the stock of affordable housing, with an estimated CAD 1tr needed by 2030 in Canada alone.²¹

Figure 2: Proportion of urban populations living in slums, 2020

Affordable housing is a dire need and an opportunity. Blended finance instruments can catalyze investment in this segment



Sources: Sustainable Development Report, UBS

Money alone is not enough. Securing the right level of investment and putting it to work effectively will require progress in multiple areas. Solutions are diverse, with various market particularities at play. In Mexico, where most residential properties are self-built,²² purely targeting traditional developers and their supply chains would miss a large portion of the challenge. But there are issues common to

¹⁷ Urban Reform Institute, (2022), *Demographia International Housing Affordability*, P5.

¹⁸ World Green Building Council, (2023), *Sustainable and Affordable Housing*, P9.

¹⁹ UN, (2023), *Sustainable Development Goals Report*, P34.

²⁰ Reall Foundation, (2020), *Impact Report Briefing*, P3.

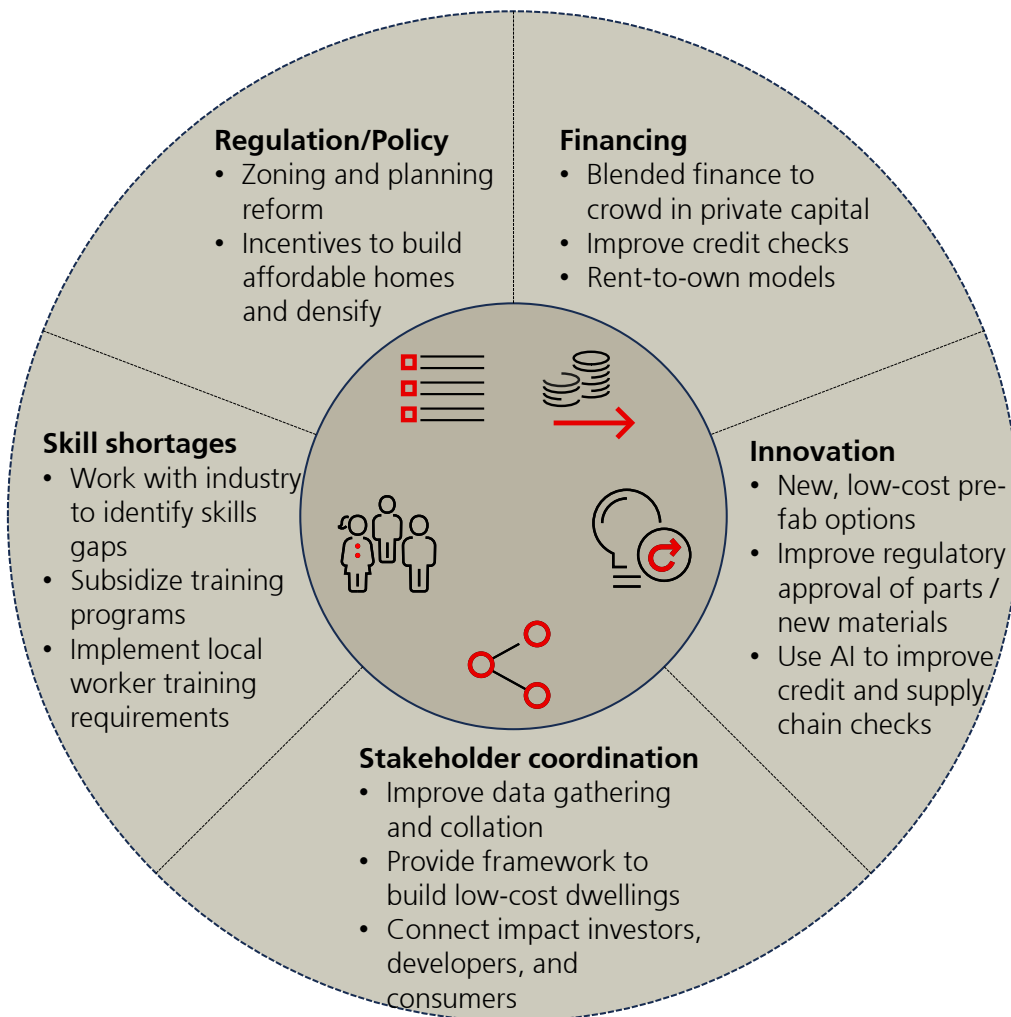
²¹ CMHC-SCHL, (2023), *Achieving housing affordability by the next decade*.

²² Edge, (2020), *Mexico: Green Building Market Maturity Snapshot*, P1.

most markets that are holding affordable housing back. We outline five key areas that would, over time, shift the needle on affordable housing (Figure 3). This is not an exhaustive list—not included for example is the role played by immigration policies and their impact both on skill shortages and housing demand, or the potential for converting underutilized spaces, e.g., office-to-residential conversions.

Figure 3: Five key reform areas to address affordable housing shortages

Realistic actions by stakeholders including governments, investors, corporates, and NGOs could most readily move the needle



Sources: World Economic Forum, World Green Building Council, UBS

Regulation and policy come in many stripes, from measures to increase the stock of publicly owned housing e.g., via increased spending allocations to government building, to those designed to increase private construction e.g., via tax breaks or other fiscal incentives. Non-financial changes might include upzoning—increasing the number of units permitted on a plot—which can help encourage density, increase infrastructure efficiency and use, decrease commuting times, and increase the number of properties in desirable areas.

Innovative financing can help address liquidity and funding bottlenecks. Domestic and foreign private finance (mostly debt) for “green” construction has been increasing, although the use of such

instruments remains low in emerging markets. This is due to the fragmented structure of construction value chains, highly localized regulations, the presence of informational asymmetries between the segments of the value chains and policymakers, and the prevalence of small and medium-sized construction companies.

Blended finance instruments can be part of the solution. It utilizes limited pools of concessional funds to mobilize larger sums of public and private sector financing toward development goals, often with climate-related objectives. The concessional component can be used to increase the commercial viability of projects via risk mitigation and improvement of the risk-return profile of cutting-edge investments. The concessional element can be philanthropic or from development institutions and is typically structured as co-investment (primarily as debt, but also as equity, risk-sharing, or guarantee products) with expectation of reinvestment for future projects or other uses.

Innovation to improve supply chain transparency: There is increasing investor and consumer interest in knowing the sources and ways of manufacturing the materials that make up their products.²³ This is also true for the construction supply chain, which is fragmented and has a tendency toward informal working arrangements. Several innovative tools are now being used to allow the voices of workers to be heard and facilitate the availability of such data to companies.²⁴

Stakeholder coordination across the value chain through third parties like the Reall Foundation can promote best practice and bolster the business case for affordable developments by establishing and demonstrating the market for affordable green housing in emerging markets. This can involve working with building designers and developers, to ensure the buildings are built to the right specifications and price point; working with providers of capital to increase the pipeline of projects with the appropriate scale and risk profile; and working with, with governments to align with policy and planning goals. Lastly, they may work with the purchasers of the homes themselves, e.g., by helping them demonstrate that they are a reliable payer and therefore credit worthy.

Skills shortages in sustainable construction techniques limit the potential of investment in green buildings or materials. Government subsidization of training programs is one obvious way to increase the number and scale of efforts to upskill the labor supply. Another, less direct way is to provide confidence of the demand for such skills, e.g., by allocating government funds for building programs. Finally planning and funding incentives can be used, e.g., permitting new construction and providing preferential tax treatment based on the use of local labor can incentivize the training of local workers.

²³ Financial Times, (2023), *So you think you know your supply chain?* Accessed on 12/05/23.

²⁴ For example, the Working Capital Fund invests in solutions to reduce labor exploitation using new technology to improve transparency in supply chains.

Interview 2

The affordable housing opportunity. Ian Shapiro, CEO of the Reall Foundation

How big is the affordable housing investment opportunity?

If we just look at emerging markets, we have 1.2 billion people in inadequate housing and roughly 2 billion more will be added to that in the next generation. We need to house populations sustainably. We estimate that 300 million new homes are required by 2030, 90% of those in Africa and Asia, which will require an investment of USD 17tr. Green affordable houses are the solution for those in inadequate housing, and that is currently a largely untapped green investment opportunity.

What are the key challenges to expanding the stock of affordable housing?

First, you must demonstrate that there are reliable payers. Of course, homeless people will need a charitable solution, but many millions of people are currently paying rents comparable with the cost of much nicer homes. The problem is that they pay in cash, have no written record of reliable payment, and don't have proof of employment to get a better rental agreement or mortgage. Lack of paperwork fosters risk aversion. So, we need data and evidence of viability.

Then you have the problem with affordable housing itself—its low margins. So, a USD 100,000 property in Nigeria will have a 25–30% margin, hence that market is saturated. However, a USD 25,000 property has a 10–12% margin, so that market is barely served, but is therefore a huge opportunity. It's a volume play, not a margin play.

Finally, there's the financial risk issue. Developers can't risk building in a low-income market and being stuck with large numbers of houses they can't sell, so de-risking of the proposition is necessary.

Is this fundamentally a commercial or an impact investing opportunity?

It's both. Grant finance is needed to build up the evidence base. We also need philanthropic capital to take first-loss positions and unlock other more risk-averse capital. We have people queuing up to give us senior investment, but we need junior investment to take the first-loss risk. We think they will get their money back, but it's about getting the USD 10mn to unlock the USD 50mn.

Ultimately, we are only looking to get these markets going—we can't do it all ourselves! We are confident this is a commercially viable area even without organizations like Reall, and indeed, without us involved and our associated costs, the returns will be higher.

3. Optimizing the social impacts of retrofitting

At a glance

- Retrofitting improves the environmental and social impacts of the built environment. It needs to be thoughtfully done so that it does not inadvertently exacerbate existing inequalities.
 - Leaning into retrofitting's social potential can help achieve the community acceptance required to scale the retrofit revolution, which is essential to realize climate goals.
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3.1. The social opportunity of retrofitting

The profound social effects of the existing built environment and the significant potential for both positive and negative direct externalities make building retrofits—changes to the building that upgrade various aspects, which may include insulation, energy efficiency, and ventilation among other things—a key part of the toolkit for reducing social harms and improving social outcomes.

Improving the living standards and health outcomes of building occupants

Besides the obvious effect of lower energy bills and associated energy poverty reduction, there are various potential health and socio-economic benefits. Poor ventilation is associated with respiratory disease—mold and damp, which takes hold in poorly ventilated buildings, is the cause of an estimated quarter of the 22 million asthma cases in the US.²⁵ Another study has found that if one moves to a cold home from a warm one, the risk of severe mental distress doubles.²⁶ Cold homes are also associated with higher blood pressure.²⁷ A 2018 paper prepared for the UK government by National Energy Action estimated that the full societal costs of cold homes in the UK, including health impacts, treatment costs, and lost education and employment opportunities, amounted to GBP 18.6bn per year,²⁸ equivalent to almost 1% of GDP.

²⁵ Cox-Ganser, J. M., (2015), *Indoor dampness and mould health effects—Ongoing questions on microbial exposures and allergic versus nonallergic mechanisms*, National Library of Medicine.

²⁶ Clair, A., Baker, E., (2022), *Cold homes and mental health harm: Evidence from the UK Household Longitudinal Study*, Social Science & Medicine

²⁷ Zhao, H., Jivraj, S., & Moody, A., (2019), *My blood pressure is low today, do you have the heating on? The association between indoor temperature and blood pressure*, Journal of Hypertension.

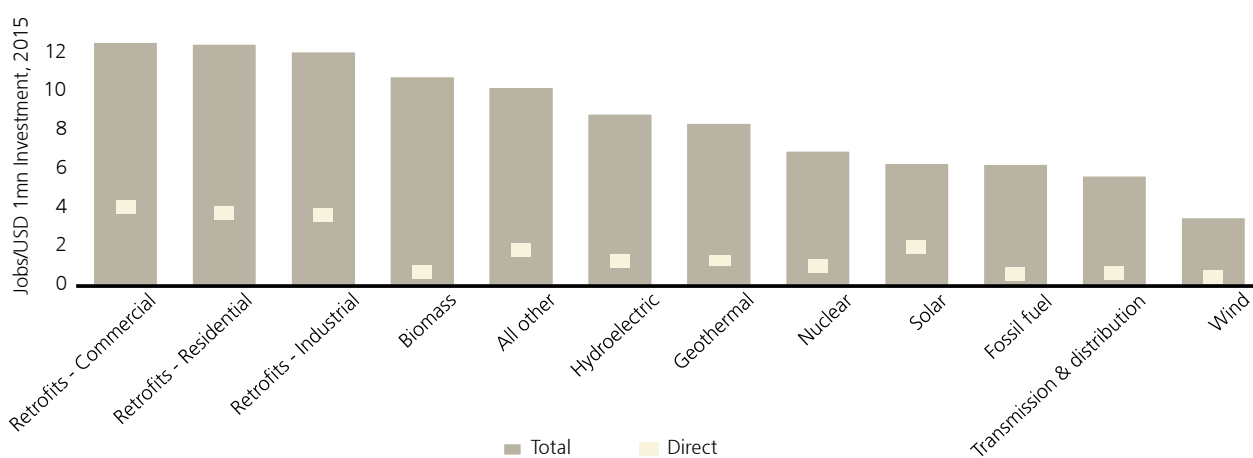
²⁸ National Energy Action, (2018), *Under one roof: Health & housing sectors tackling fuel poverty and cold-related ill health together*, P24.

The socio-economic boost from establishing retrofit supply chains

Large-scale retrofitting has the potential to create jobs in the local area and raise the quality and value of its buildings at the same time. However, simply directing capital toward retrofits is not enough. It must be accompanied by the building out of retrofit supply chains to get costs down, with the associated training and upskilling that it entails (Interview 3). Done right, a retrofit revolution can be a better job creator than most other forms of energy-related investment (Figure 4). In the US and EU alone, it has been estimated that retrofitting could add over 3.5 million new jobs in the transition to Net Zero.²⁹ McKinsey estimates global direct and indirect job gains from just the installation of insulation could number 6 million by 2050 in a Net Zero scenario, with additional jobs expected from other retrofit activities like the installation of heat pumps and replacement windows.³⁰

Figure 4: Comparison of employment multipliers across energy sectors in the United States

Investment in retrofitting can generate more jobs than most other forms of energy-related investment



Sources: Brown, M.A. et al., (2020), Estimating employment from energy-efficiency investments, MethodsX; UBS

The risk of exacerbating existing inequalities

It is important to be wary of, and manage, the risk that retrofitting could reinforce existing inequalities, both within and between regions. There are several ways this could happen:

- **Poorer communities in lower value properties could be left behind** as these building owners may on average have weak credit risk profiles, while the retrofit cost to property value is also likely to be less attractive from a lender's perspective. Furthermore, studies suggest people are reluctant to take on debt, even at zero interest, to fund retrofitting.³¹ This will favor wealthier owners that have significant savings. It is important, therefore, to ensure that financing, particularly non-debt financing, flows to properties in low-income areas, e.g., in the form of grants or pay-as-you-save models.
- **Tenants could be excluded**, especially those from lower-income backgrounds. First, because the owner makes the decision to retrofit, and second because that decision is influenced by a split incentive, i.e., building owners face the upfront costs to fund retrofits without seeing the benefit themselves, and are therefore often reluctant to pay for the works.³² This can be solved to

²⁹ Brown, M. A. et al., (2020), *Estimating employment from energy-efficiency investments*, MethodsX.

³⁰ McKinsey & Co., (2022), *The net zero transition: What it would cost, what it could bring*, P131.

³¹ Institute for Public Policy Research, (2023), *More Than Money: Moving Towards a Relational Approach to Retrofitting*, P16.

³² Middlemiss, L. et al., (2023), *Conceptualising socially inclusive environmental policy: A just transition to Net Zero*, Social Policy and Society.

some extent with stricter regulatory requirements on landlords, but done too aggressively, could result in properties being withdrawn from the rental market altogether.

- **Gentrification risks** arise if retrofits lead to higher rents and thus force poorer tenants to move out, a process sometimes called green or low-carbon gentrification.³³ This is particularly a problem in “hot” real estate markets where prices are more sensitive to improvements in amenities. An effective way of countering this is to ensure that retrofits in these markets are combined with an expansion in the stock of affordable housing. Gentrification also refers to the access of current buildings owners to building upgrades. For example, adaptation gentrification refers to the ability of wealthier households to afford to adapt their properties to physical climate effects, e.g., adapting to rising sea levels or worse storm surges by putting properties on stilts or building water defenses, while poorer neighborhoods suffer the full effects.

3.2. Retrofitting as a route to area regeneration

Retrofitting can contribute to revitalizing economically struggling communities, potentially raising property values, creating jobs, and improving local human capital via the benefit to physical and mental health. For this kind of effect to be meaningfully achieved, however, retrofitting needs to take place at scale. For that to happen, communities must be brought on board. In this sense, retrofitting and area regeneration are symbiotic processes, with the success of one dependent, at least in part, on the other. Aligning communities with retrofitting priorities requires communicating and demonstrating the benefits of retrofitting to individuals and the broader public sphere. This means not just communicating the benefits of lower energy bills, the comfort benefits of better insulation, or the environmental benefits of lower emissions. One of the strongest motivating factors to take environmentally positive actions is improving people’s health.^{34,35} In imposing charges on polluting vehicles, for example, the UK’s Bradford City Council focused on its role in improving respiratory health of local people, rather than preserving the environment.³⁶

Retrofitting and area regeneration can go hand-in-hand. Indeed, both are likely to be more effective if that is the case. Focusing retrofitting funding in poorer areas has dual social and environmental benefits—poorer areas will typically have the most inefficient homes whose energy consumption and related emissions will see the greatest improvements;³⁷ their residents are also more likely to suffer from the related physical and mental health ailments that retrofitting helps to ameliorate. More meaningful conclusions require more data regarding the long-term impact of regeneration on the prosperity and quality of residents’ lives. The Prosperity in East London 2021–2031³⁸ is a 10-year longitudinal study across 15 sites where large-scale regeneration is taking place. Using measures of prosperity defined by residents, communities and businesses, the study will understand who benefits how, and what are barriers to prosperity.

³³ Bouzarovsk, S. et al., (2018), *From urban sustainability transformations to green gentrification: Urban renewal in Gaziosmanpaşa, Istanbul*, International Journal of Urban and Regional Research, P845.

³⁴ Amelung, D. et al., (2019), *Human health as a motivator for climate change mitigation: Results from four European high-income countries*, Global Environmental Change.

³⁵ Petrovic, N. et al., (2014), *Motivating mitigation: When health matters more than climate change*, Climatic Change.

³⁶ Bradford City Council, (2022), *Breathe better Bradford*, Accessed on 12/1/23.

³⁷ Willand, N. et al., (2020), *Retrofit poverty: Socioeconomic spatial disparities in retrofit subsidies uptake*, Buildings & Cities.

³⁸ London Prosperity Board, *Prosperity in East London 2021-2031*, Accessed on 12/04/23.

Two key factors to spur large-scale retrofitting

Perhaps the most straightforward route to achieving a retrofitting revolution³⁹ is for governments at local and national levels to commit to retrofitting social housing stocks, i.e., government-owned housing. This has the advantage of laying out a clear policy path, providing a pipeline of projects, clarity to market participants, and a signal to expand retrofit capacity in the supply chain. Such a commitment is admittedly expensive in terms of upfront capital, even if it contributes to lower ongoing expenditure on healthcare etc. in the longer term. A key problem is that the expenditure from one arm of government e.g., housing authorities, worsens its capital position in the short term, potentially conflicting with its statutory fiscal requirements, while potential improvements resulting in savings accrue elsewhere, e.g., to health or social care departments. There is a need not just for greater funding of housing authorities, but also greater policy alignment on a reflection of the broader benefits of retrofitting housing authority and government decisions.

Most buildings globally are privately owned and some social housing estates may have a mix of homeowners and tenants. Achieving community level retrofitting in the private sector is likely to require the kind of coordinating role played by “one-stop-shops” like Energiesprong, both to group retrofitting projects (to reduce costs), and to coordinate stakeholders up and down the value chain and public and private spheres effectively. These types of organizations are likely part of the longer-term solution, but are at an early stage in their development, and will likely need greater investment, both public and private, before they become self-sustaining.

Interview 3

Improving areas by retrofitting. Sebastien Delpont, Energiesprong France

How do you see retrofits being rolled out at community scale?

At first, we work with social housing organizations, who can purchase thousands of retrofits. You see a two-fold cost decrease when you increase numbers by that amount. If you expand from 1,000 houses in the Netherlands to tens of thousands in the UK, France Ireland, etc., then it becomes worthwhile for people to invest in the solutions.

We are now operating in the UK, Germany, France, the Netherlands, the US, Canada, and others. We have to adapt to local regulations, local climate, so retrofits are not the same everywhere. But we have standards that allow offsite manufacturing to industrialize retrofit panels and reduce costs. Offsite manufacturing means people don't have to be onsite for more than two weeks.

How do you view the social benefits of retrofitting?

We want to improve quality of life and increase pride in the area. Properties can have a completely different look and feel after the retrofit—social housing doesn't look or feel like social housing anymore. And there is a community impact when you're doing dozens in the same area. You start with the least efficient, worst performing buildings, as the case for retrofitting is the best there. And the more retrofits we do over time, the more costs should come down.

What type of people do Energiesprong projects tend to help?

Currently our clients are public authorities—we are a free consultant paid by the state to support these policies and help people work together. But eventually we want to find an approach that could be used via one-stop-shops to work with private households, which could afford to have higher transaction costs.

³⁹ UBS, (2023), *Retrofit Revolution*.

4. Summing up

1. Improving the social and environmental impact of our buildings are connected goals—success on one is likely to aid success on the other, and vice versa.
2. Where new construction is necessary, it should, from a social desirability perspective, fulfill three criteria. First, meet the economic, physical, and social needs of the citizens for whom it is designed. Second, be constructed in a way that minimizes social costs, both from labor and occupant perspectives. Third, be located in areas with good connection to others, to public transport, to job opportunities, and outside of areas prone to environmental and social risks.
3. A key aim of new construction should be to address the worldwide shortage of affordable housing. Various stakeholders, from governments and investors to corporates and NGOs, can take realistic actions to address the available land, finance, skilled labor, and other bottlenecks constraining the affordable housing supply.
4. The social impacts of the existing building stock will be addressed through large-scale retrofitting, which can achieve various social goals, like improving health and even educational outcomes, in addition to improving energy efficiency. Achieving scale is more likely by leaning into the capacity for retrofitting to contribute to area regeneration. This will likely require a mixture of public- and private-led efforts.

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Approval Date: 12/18/2023

Expiration: 12/31/2024

Review Code: IS2307438

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