Net Zero for All: The Built Environment's Role in a Just Transition to Zero

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ABSTRACT

The real estate sector faces a difficult road ahead in achieving net zero carbon by 2050. While the technical solutions exist to reduce emissions from buildings, such as energy efficiency, renewable energy, and electrification, equity-blind applications of these systems will likely overlook the social and economic impacts of the transition on low-wealth and marginalized communities, potentially exacerbating existing disparities. This paper explores the concept of a just transition for real estate, an intentionally equity-focused approach to net zero buildings that aims to ensure that the benefits and costs of decarbonization are fairly distributed among all actors in the sector: investors, developers, owners, tenants, employees, supply chains, and communities. Specifically, the paper addresses the business case for real estate to adopt a just transition, as the perceived lack of returns from equitable development has consistently presented a major barrier. The paper also provides case studies of real estate projects that have successfully implemented just transition principles in their decarbonization strategy and development and demonstrates how they have created value. The paper concludes with recommendations for owners, developers, and investors on how to foster a just transition for the building sector by linking decarbonization with addressing longstanding environmental justice issues.

Introduction

"As we talk about a just transition to net zero, we're thinking about how we shift the governance and economics of buildings and properties and their development into the hands of folks who have historically and systemically been excluded, marginalized, experienced disinvestment, and otherwise harmed by our industry. The transition is intended to redress these past harms and create new relationships of power." (Lee et al. 2023)

The case for real estate to reach net zero remains pressing. As the window to avoid catastrophic climate change narrows, the need to drastically reduce emissions could not be more urgent. Buildings are responsible for roughly 40 percent of global emissions, and reaching net zero by 2050 or sooner will be possible only with rapid acceleration of that effort.

Simultaneously, the need to address social inequity grows continually more pressing. Marginalized communities (such as Black, Indigenous, and other communities of color and low-income communities) experience the effects of climate change first and worst, and are often shut out of the environmental, economic, and social benefits of the net zero transition.

Real estate's role in achieving net zero and building community well-being situates the industry in a unique position to address these intersecting challenges. Real estate leaders in sustainability and equity have already begun implementing equitable decarbonization strategies in partnership with community stakeholders, demonstrating their transformative capacity.

This paper provides an overview of the concept of equitable decarbonization, explains the business case for centering equity within the net zero process, illustrates what this process might look like in practice, and presents examples of real estate actors implementing equitable decarbonization solutions.

The Business Case for a Just Transition

Pursuing net zero and social equity in real estate both make a compelling business case, and linking the two can often strengthen the proposition. Although the specifics of a return on investment will differ across property types and sectors, macro-scale market and policy drivers suggest real estate can create material financial and nonfinancial returns by investing in an equitable transition to net zero:

Stable markets.

According to ULI Los Angeles's *The Case for Social Equity in Real Estate*, investing for social equity and directing capital into previously disinvested areas can enhance value over time by demonstrating the potential for untapped markets, redirecting spending to community-based enterprises, and activating unexpressed human and social capital (Moscovich et al. 2021).

More valuable buildings.

Net zero real estate assets outfitted with upgraded, efficient technologies in envelopes, heating, ventilation, and air conditioning (HVAC) systems, energy generation, and building management increasingly capture a green premium (Barkham 2022), carrying lower operating costs and higher net operating income (NOI), and often qualifying for better finance terms. Sharing these boosts in value with occupants and communities helps ensure that net zero also supports economic justice.

Investor demand, access to capital, and brand benefits.

Real estate firms are increasingly expected to act on both climate change and social equity by investors, tenants, and the wider public. Firms that effectively link the environmental and social aspects of their environmental, social, and governance (ESG) program will be considered increasingly competitive for investment.

For example, nearly 70 percent of investors and 100 percent of investment managers surveyed for ULI's *Social Impact: Investing with Purpose to Protect and Enhance Returns* report expected their social value and social impact activity to increase over the next three years. The largest market driver behind this growth, identified by 75 percent of investors, was public pressure and reputational benefits (O'Roarty 2022).

Increased community and financial support for development.

Projects that incorporate strong net zero and social equity goals are more likely to win backing from community stakeholders, likely reducing costly delays caused by public pushback. Similarly, local permitting authorities are often more likely to approve projects with these attributes, helping reduce costs and lead to faster development timelines.

Diversified, resilient supply chains.

Setting targets to increase hiring of local, minority and/or women-owned business enterprises (MWBEs) as vendors, suppliers, and contractors on net zero development projects increases the development team's flexibility and adaptability to changing market conditions. This

can help support project delivery, expand the sustainability workforce, increase local insight into community needs, and lower barriers to growth for communities traditionally cut off from capital and business opportunities.

Real Estate's Role in an Equitable Transition

"When we think about a green transition, a just transition, it isn't just whether we are building a building that doesn't emit carbon, as much as it is whether we are building a building that everyone was able to participate in and see some level of economic vitality from." (Lee et al. 2023)

According to the Center for Energy and Environment, a just and equitable transition refers to moving from the current carbon-intensive energy system to decarbonized technologies and fuels in planned, managed steps, so that the benefits and costs of that transition are equitably distributed across society. If successful, all groups—across class, race, geography, and gender—will have parity in outcomes and fully realize the economic and health benefits of this new energy system ("Equitable Decarbonization of the Building Sector," n.d.).

The Just Transition framework originated in the labor movement and was formalized by non-profits such as Movement Generation and the Climate Justice Alliance. Research points to three main goals for a just transition process (Carley and Konisky 2020):

1. Decreasing economic, social, and environmental burdens for marginalized communities from the fossil-fuel based economy;
2. Increasing access to the triple-bottom-line benefits of the clean energy transition; and
3. Expanding decision-making power for how the first two goals should be accomplished through deep, meaningful community engagement.

Net zero in real estate refers to a building portfolio that is highly efficient and fully powered by on-site and off-site renewable energy sources, so its annual and life-cycle operational carbon emissions drop to zero or negative over time.

The ULI Real Estate's Journey to Net Zero (Figure 1) illustrates how to reach that point. A just transition to net zero for real estate means embedding social equity—defined as "just and fair inclusion into a society in which all can participate, prosper, and reach their full potential" (PolicyLink 2018)—in each step of this pathway. The Journey begins with the core steps of energy efficiency, on-site renewable energy, electrification and grid interactivity, and then off-site solutions for renewables and offsets, and highlights aligning with tenants on emissions reductions and embodied carbon as remaining challenges for the industry to innovate on.

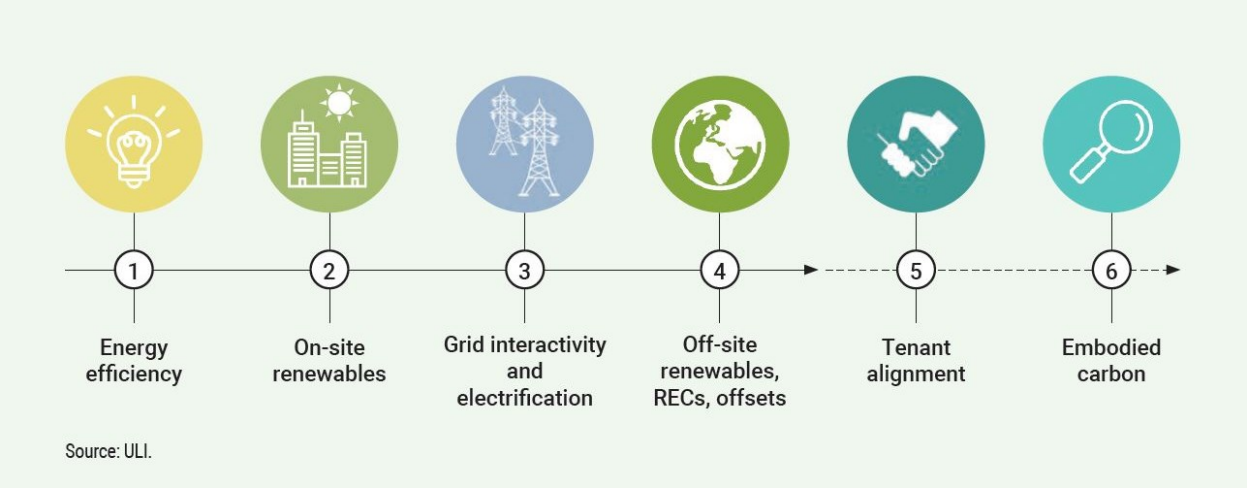

Figure 1. Real Estate's Journey to Net Zero. Source: ULI.

A just transition to net zero for real estate includes a wide array of strategies, including several depicted in Figure 2 below, designed to achieve the goals of a just transition mentioned above: reducing the burdens marginalized communities face, expanding access to the economic, social, and environmental benefits this major transformation may generate, and using community engagement to guide the process.

Figure 2. Examples of a Just Transition to Net Zero for Real Estate. Source: ULI.

These strategies can be found in action in the case studies presented in the final section of this paper, and the table below summarizes which strategies are best expressed in each case study, though many overlap and reflect multiple facets of a just transition – both those named here and beyond.

Table 1. Case studies and strategies used for a just transition.

Case Study	Examples of a Just Transition
Energy Efficiency: Mixed-Income Passive House with Bridging the Gap Development	• Workforce development • Affordable, healthy, resilient, net zero buildings • Diverse project staff and development partners
On-site Renewables: Arverne East by L+M Development Partners	• Deep community engagement • Affordable, healthy, resilient, net zero buildings • Equitable wealth building and investments
Off-Site Renewables: Community Solar in STAG Industrial's Solar Portfolio	• Community-owned or affordable renewable energy
Embodied Carbon: BoKlok's Modern and Sustainable Modular Housing	• Affordable, healthy, resilient, net zero buildings • Community-owned or affordable renewable energy

Engagement underpins the just transition. Real estate firms must connect with the communities they operate in and treat marginalized groups as partners in shaping the built environment. Engagement strategies include adjusting models and goals of interacting with stakeholders during development processes and move further to the right along the Spectrum of Community Engagement to Ownership in Figure 3 below.

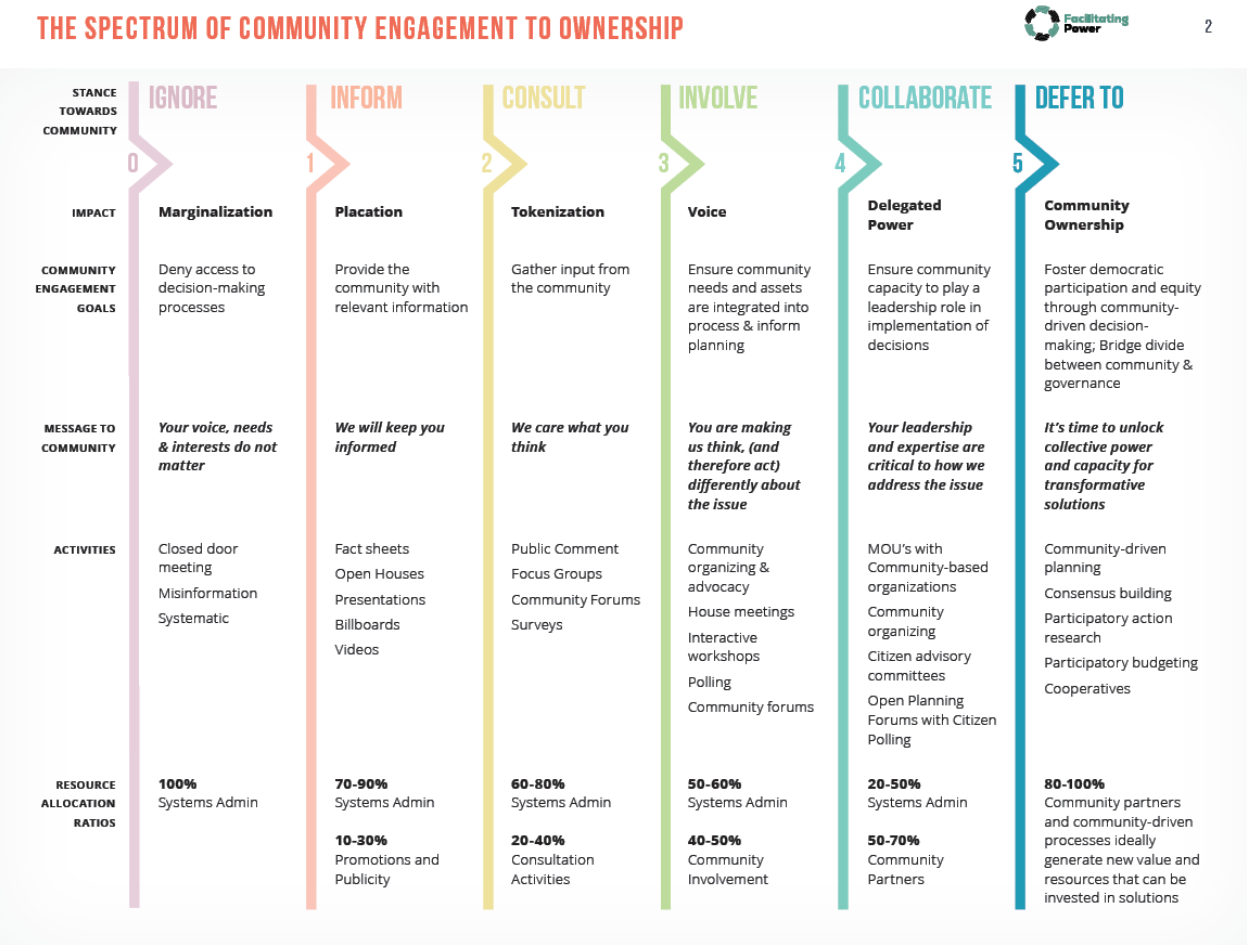

Figure 3. The Spectrum of Community Engagement to Ownership. Moving from left to right along this spectrum helps ensure that community voices and needs are not only reflected in, but become the driving forces behind, equitable net zero real estate. Source: Facilitating Power and the Movement Strategy Center.

Linking Decarbonization and Environmental Justice: Recommendations for Real Estate to Foster a Just Transition

"Building electrification must focus first and primarily on the goal of improving the health and resilience of the people rather than the goal of decarbonizing our building stock. . . . Instead of adding one more problem for families to solve, an equitable transition will position electrification as a solution to existing household problems—one that lowers bills, improves health, and makes homes more comfortable." (Miller et al. 2019)

Several critical equity-related challenges that marginalized communities face have been identified through decades of work in the fields of environmental justice and equitable development. Each can be addressed within a just transition to net zero, and real estate developers, owners, and investors wield powerful tools to do so.

The Equity Assessment Tool (Race Forward 2019) and the Urban Sustainability Directors Network (USDN) and partners' Equity and Buildings: A Practical Framework for Local Government Decision Makers (Hays et al., 2021) document many of these issues, including sustainability challenges. Several are summarized below, alongside potential solutions

the real estate industry can use to address them in net zero development projects. More can be found in ULI's earlier report on this subject, *Net Zero for All: A Just Transition for Real Estate.*

Energy burdens

Black, Indigenous, and people of color pay a significantly higher share of income on household energy bills due to often living in less-efficient housing stock and having lower average income relative to average energy bills. High energy burdens are associated with outcomes such as greater risk of respiratory disease, increased stress, and reduced economic mobility (Drehobl, Ross, and Ayala 2020). To reduce energy burdens, real estate can:

- Partner with experienced providers to expand supply of healthy, resilient, net zero affordable housing to reduce overall costs of living, for example through modular housing;
- Develop shared ownership, local on-site and off-site renewable energy (e.g., rooftop solar, microgrids, community solar) in partnership with stakeholders from marginalized communities, or provide technical assistance with renewable energy procurement;
- Use or help residents use existing utility programs like Mass Save in Massachusetts or Austin Energy's Weatherization Assistance, or government funding programs under the Inflation Reduction Act for low or no-cost home energy efficiency upgrades (e.g., envelope weatherization or insulation, energy-efficient appliances and HVAC systems), or locate external funding sources to conduct these upgrades without passing the cost on to tenants.

Economic exclusion

BIPOC households and businesses possess less wealth, higher unemployment, and lower access to capital than white households (Race Forward 2019). A lack of financial resources to cover the upfront cost of net zero upgrades or fluctuations in energy costs will disproportionately affect low-income and BIPOC populations and risk stranding them with energy-inefficient, high-carbon, unhealthy buildings and systems. To improve economic inclusion, real estate can:

- Diversify procurement policies and supply chains to prioritize women and BIPOC-owned businesses that provide clean energy or decarbonization services;
- Lease office, retail, or community space to BIPOC-owned businesses and organizations;
- Include workforce training hubs and programs in developments for BIPOC residents and communities for decarbonization-related professions to support wealth-building and supply chain resilience;
- Consider launching (or investing in existing) wealth-building and investment opportunities for marginalized communities in real estate decarbonization ventures, for example using equitable crowdfunding platforms such as Small Change or setting targets for raising equity from BIPOC investors;
- Partner with BIPOC-owned real estate companies on net zero development projects.

Gentrification and displacement

Low-income residents and tenants, many of whom are BIPOC, are already at increased risk of displacement from a lack of affordable housing. Although property values and residential or commercial rents are often higher in net zero buildings, overall tenant costs are often lower due to the extremely low (or potentially zero) energy costs and protection from utility rate structure increases (Petersen and Carmichael 2018). However, if this is not the case, net zero new buildings or retrofit projects could potentially exacerbate displacement. should help stabilize existing community residents and prevent additional displacement. For example, real estate can

- Ensure net zero upgrades or energy procurement strategies reduce tenant energy costs as much as possible, if not to zero;
- Partner with experienced providers to expand market supply of healthy, resilient, net zero affordable housing;
- Use green leases in commercial and multifamily buildings to align tenant-landlord expectations and responsibilities on sustainability, resilience, and social equity goals (Kokernak and Forman 2023)
- Contribute to local or national affordable housing trust funds, which can also support weatherization and energy efficiency of existing homes;
- Support tenants with rental costs through credit recognition for on-time rent payment programs, flexible payment plans, or reduced fees or deposits;
- Engage with policymakers on development of affordability and anti-displacement policies;
- Assist with community wealth-building activities.

Case Studies of Just Transition in Real Estate Development

Understanding why and how real estate can center equity within decarbonization begins by working with affected Black, Indigenous, and people of color (BIPOC) and low-income communities. Collaboration will illuminate both the current inequities in the energy and built environment systems, and the possibilities decarbonization presents for transformative change.

The following case studies demonstrate how real estate can build social equity in several steps of the Journey to Net Zero – energy efficiency, on-site renewables, off-site renewables, and embodied carbon. These development projects also suggest how the strategies mentioned in Figure 2, Examples of a Just Transition to Net Zero for Real Estate, can be put into practice.

Energy Efficiency: Mixed-Income Passive House with Bridging the Gap Development

Figure 3. Fifth and Dinwiddie rendering. Source: Bridging the Gap Development.

Pittsburgh's Bridging the Gap Development (BTG), led by chief executive officer Derrick Tillman, is pushing the boundaries of what an energy-efficient redevelopment in an underinvested area can accomplish.

Its Fifth and Dinwiddie project, a $66 million mix of new construction and existing building rehabilitation, will provide 171 new apartments—20 percent of which will be affordable—alongside commercial office space, co-working space for small local businesses, 12,000 square feet of local retail, and a multipurpose public plaza for community events. All this will serve the Uptown neighborhood, a multiracial low-income community devastated by urban renewal in the mid-20th century.

The project is designed to Passive House standards and is planning a rooftop solar array to reach net zero energy, reducing carbon emissions and the energy burden for low-income residents, while also targeting Fitwel certification and the RESET Air quality standard for their extensive health benefits.

Perhaps most notably, part of the project will include a workforce development hub. "We're training people to install solar panels and [work on] solar farms, and connecting with industry partners to deploy them to good-paying jobs. We are an engine for upward mobility, and we'll directly benefit low-income people in this community by having that resource there," (D. Tillman, CEO, Bridging the Gap Development, pers. comm., February 22, 2023).

Building on their mission for upward mobility, especially for Black communities in Pittsburgh, Tillman notes, "Everything that's important and you hear [a need for] in communities, we're accomplishing it in one development, and advancing economically, socially, environmentally. …We also have other partners and community agencies that will house companies on site, a consortium of community impact all working together to advance equity, impact low-income people and communities, and provide avenues for upward mobility." (D. Tillman, CEO, Bridging the Gap Development, pers. comm., February 22, 2023).

On-site Renewables: Arverne East by L+M Development Partners

Figure 4. A rendering of Arverne East. Source: L+M Development Partners.

Arverne East is planned to be the first net zero community in New York City. The project, a partnership between L+M Development Partners, Triangle Equities, and the Bluestone Organization, will redevelop 116 acres of formerly vacant and underutilized land on the Rockaway peninsula, in a low-income neighborhood hit hard by Hurricane Sandy in 2012, over a 10-year, $1.5 billion development process.

Arverne East will "harness cutting edge energy efficiency and innovative resiliency strategies to become a fossil fuel free community," according to Sara Levenson, managing director at L+M (Lee et al. 2023). "We're really hoping that this could be an example of how you build sustainable, mixed-income, resilient, environmentally just coastal communities, not just in New York City but across the region."

A suite of strategies is planned, including a geothermal district heating, cooling, and hot water network, Passive House building standards for all residential buildings, and extensive solar arrays and other renewables on-site. "When fully built, we're anticipating over 12 gigawatt hours of renewable solar energy to be provided on site," according to Levenson. "Overall, the entire site will produce more energy than it will consume… there will not be a need for off-site RECs to become net zero," (Lee et al. 2023). Other major sustainability and resilience strategies include a 35-acre nature preserve to enhance biodiversity and provide protection from coastal storms; extensive stormwater management systems and green infrastructure; and raising the site and building components up to 16 feet above flood elevations.

Over 1600 units of housing are planned, 80 percent of which will be income restricted to households earning between 30 and 125 percent of area median income, and the remainder will be for sale at market rate.

This major redevelopment will have significant community impacts, and L+M has taken a proactive approach to involving community members and becoming an economic development vehicle. "We have two community advisory boards that are focusing on open space and economic development. And we also have a workforce consortium, which is a conglomerate of a

number of local nonprofits here in Rockaway that's specifically working on workforce development and local hiring," notes Levenson (Lee et al. 2023).

"Economic development is a huge driver… the site is huge and has been vacant for so long. How do we provide existing residents and community members the services that they've been looking for, and plan for the future community? …We're looking to promote and leverage local, [minority and women-owned] businesses in Rockaway …This project really does thrive on community investment and community engagement," (Lee et al. 2023).

Off-Site Renewables: Community Solar in STAG Industrial's Solar Portfolio

Figure 4. STAG Industrial's 9.6-megawatt community solar installation in Hampstead, Maryland. Source: STAG Industrial.

STAG Industrial (a Boston-based industrial real estate investment trust) hosts 25.6 megawatts (MW) of solar on their properties across the U.S., including 20.7 MW of community solar. STAG has completed community solar in Minnesota, Illinois, Massachusetts, and Maryland, with additional projects under construction in New Jersey.

Recently, STAG has sought ways to evolve their strategy to provide renewable energy both to tenants and to local communities. Accordingly, the company combines 'hosted solar' – in which its generated electricity is either purchased by the utility and distributed locally, or where there are community solar programs, residential customers and businesses receive discounted clean electricity – with plans for 'amenity solar', in which its industrial tenants receive green energy to reduce their tenants' scope 2 emissions and STAG's scope 3 emissions, helping place STAG on a path toward decarbonization in alignment with their Science-Based Targets Initiative goal.

STAG's largest array – reportedly the largest community solar project in the country when it came online – is in Hampstead, Maryland. The 9.6 MW system provides clean energy to subscribers in Baltimore and several surrounding counties and is part of Maryland's community solar program that provides low-cost renewable energy to local homes and businesses. Co-

developed by Black Bear Energy and Summit Ridge Energy, the system will generate enough energy to power nearly 1,300 homes.

Community solar faces some barriers, but the outlook overall is positive, according to Black Bear. “Real estate investment trusts (REITs) should view hosting community solar as one additional option in their toolkit to be net zero….As more states come to recognize the myriad benefits of community solar, the opportunity to host solar on industrial rooftops will create an incredible opportunity for REITs to tackle a significant portion of their net zero goals and, more importantly, contribute to greening the grid,” (D. Torbin, CEO, Black Bear Energy, pers. comm., May 5, 2023).

Embodied Carbon: BoKlok’s Modern and Sustainable Modular Housing

Figure 5. Exterior of one of BoKlok’s multifamily structures, including rooftop solar panels. Source: BoKlok.

BoKlok, a joint venture to provide quality housing at an affordable price formed by developer and construction firm Skanska and home design firm IKEA, both global companies based in Sweden, was formed in the 1990s to address rising costs of living.

To determine how much their homes should cost, the companies looked at the cost of living for a hypothetical single mother with two children, working as a nurse. “How much can she spend on clothing, transportation, living a good life? How much money does she have left to pay for living costs? That was our roof, and we needed to build a home that matches that maximum. We started the opposite way around, and it affects everything we do,” (J. Adholm, Head of Sustainability, BoKlok, pers. comm., February 22, 2023).

To meet that need, the company developed a factory-based, modular, all-wood home building system, and does everything in house from design and construction to purchasing land and selling homes, which keeps costs down enough to sell to low-income families and young or first-time buyers. Prices are fixed and no buyer can up the price to get a nicer home: “We call it

democratic application: we want to give each potential customer an equal chance to buy our homes," (J. Adholm, Head of Sustainability, BoKlok, pers. comm., February 22, 2023).

The homes (both single-family detached/semi-detached and multifamily apartments) are built through a proprietary, robotic building system, using FSC- or PEFC-certified sustainable wood, which creates efficiencies in energy use, prices, materials, energy consumption, and waste while offering safer working environments than traditional outdoor construction projects.

Each home is highly energy efficient, using solar panels (standard in Swedish markets), geothermal energy heat pumps, exhaust air heat pumps, triple-glazed windows, and air ventilation with heat exchange (standard in Nordic markets).

Life-cycle carbon emissions have been pared down to roughly 50 percent those of a conventional home. Homes have reached net zero operational carbon, though it is not yet standard, and the company is beginning work in 2023 on its first net energy positive project in Malmo.

From there, the company works with local municipalities to source affordable land in developed areas, close to services and transportation but not in expensive city centers, and builds open, publicly accessible communities with gathering spaces like playgrounds and parks.

Adholm notes that the return on investment for this approach is broad: "It gives us a competitive advantage, as we can target groups other competitors can't. It also makes it easier to access land, as municipalities want to be able to offer this kind of home," (J. Adholm, Head of Sustainability, BoKlok, pers. comm., February 22, 2023).

She also cites the brand and reputation benefits, attractive lower operating costs for homeowners, and better financing opportunities from banks. "The [banks] are looking for green investments. I think this will become even more important when the EU taxonomy comes into force," (J. Adholm, Head of Sustainability, BoKlok, pers. comm., February 22, 2023).

Conclusion

The net zero transition and the enormous economic, environmental, and social changes it will usher in present real estate with a chance to right historic and current inequities. Moving to a low-carbon industry will create generational opportunities in workforce development and green job creation, investment and ownership opportunities in low-carbon projects, and enhancements to asset values across markets. If real estate stakeholders can embed social equity into the processes and outcomes of these wealth-building vehicles, populations typically excluded from market transformations of this scale can become not only beneficiaries but partners and directors of a just transition, channeling its economic momentum into historically underinvested communities. Opportunities exist to boost positive social change in every step of real estate's journey to net zero, and calls to do so from the industry and its chain of investors, regulators, and community stakeholders are growing.

The business case for pursuing a just transition includes compelling drivers such as stabilized markets, more valuable buildings, investor demand, reputational benefits, increased community support for development, and more resilient supply chains. Thus, real estate companies that successfully prioritize equity in the net zero transition will see the greatest benefits to their combined social, environmental, and economic bottom line by capturing these sources of value. And if done right, owners, developers, and investors can use this moment to orient their collective pool of capital and expertise toward building a cleaner, greener, healthier, wealthier industry in partnership with low-income and BIPOC communities.

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