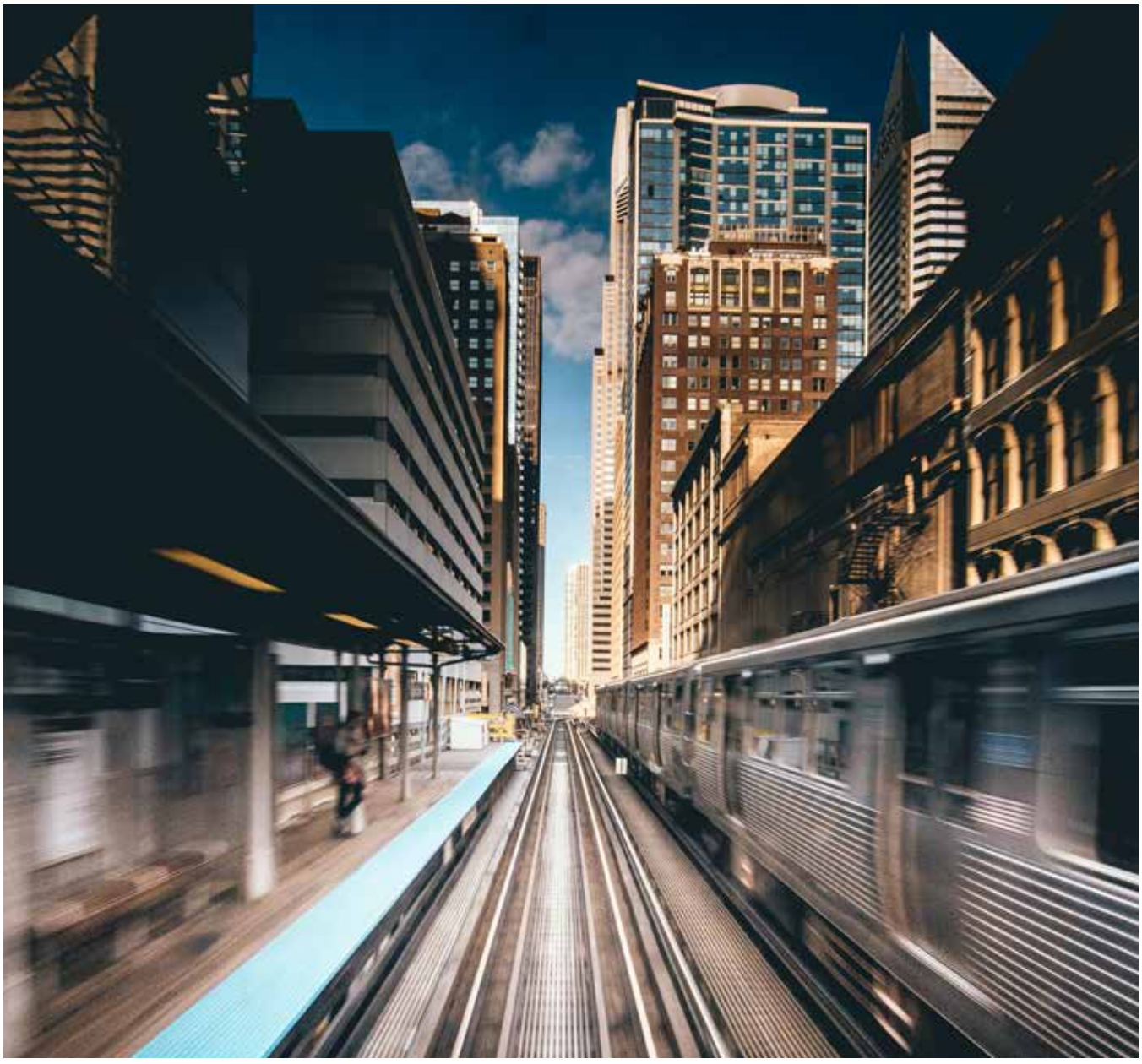
Urban Land Institute

PRIORITIZING EFFECTIVE INFRASTRUCTURE-LED DEVELOPMENT

A ULI Infrastructure Framework



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About the Urban Land Institute

THE URBAN LAND INSTITUTE is a global, member-driven organization comprising more than 45,000 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.

Drawing on the work of its members, the Institute recognizes and shares best practices in urban design and development for the benefit of communities around the globe.

More information is available at uli.org. Follow ULI on Twitter, Facebook, LinkedIn, and Instagram.

About the ULI Curtis Infrastructure Initiative

THE ULI CURTIS INFRASTRUCTURE INITIATIVE aims to build a movement to promote infrastructure solutions that are equitable and resilient and that enhance long-term community value. By creating new global and strategic partnerships, providing technical assistance, building capacity at the local level, and acting as a feedback loop to promote the most innovative and effective best practices, the Curtis Infrastructure Initiative will ensure the success of ULI's mission to positively shape the future of the built environment.

This publication is intended to serve as a framework to guide ULI's infrastructure-related work and connect the topic to best real estate development and land use practices. A thoughtful approach to infrastructure planning and implementation addresses the pressing needs of today and improves diverse communities for the long term. Learn more about the Curtis Infrastructure Initiative at uli.org/infrastructure.

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Introduction

Infrastructure, land use, and real estate development are intrinsically linked. Over the coming years, U.S. communities face many challenges that will be difficult to manage, including a lack of housing affordability, entrenched inequities in the built environment, and a changing climate. These issues are compounded by the combined challenge of maintaining current infrastructure while needing to invest in forward-looking infrastructure.

As the United States prepares to make the largest infrastructure investment in a generation, an opportunity exists for ULI members and key partners to identify and promote more equitable and resilient infrastructure investments that create both long-term real estate and community value. Lessons can be learned from global infrastructure investment approaches.

"Infrastructure is more than roads or physical structures. It's the organizational framework for society that can be manifested physically, socially, and economically. All of these forms of infrastructure are needed for sustainable development and enterprise, and clear communication is required to ensure a common understanding among all the stakeholders."

—Kelly Nagel,
senior vice president, Stoltz Real Estate Partners, McLean, Virginia[1]

The framework for focusing ULI's infrastructure work, grounded in identified ULI member global infrastructure priorities and other Curtis Infrastructure Initiative–supported work, includes the following:

- **We need restorative infrastructure investment that increases equity and sustainability.** A historic opportunity exists to reinvest in U.S. and global infrastructure, but it must be done in a way that enables more holistic and integrated investment in neighborhoods and business districts that takes into account historical and systematic inequities, enables sustainable operations and maintenance, and addresses climate change. This requires efficient allocation of resources and fiscal responsibility by planning, designing, and building infrastructure for multiple co-benefits, value enhancement, and productivity.
- **We need to invest in public transportation and mobility.** Increasing access to jobs, economic opportunities, social interactions, and mobility is essential. Public transportation provides the regional framework for compact, people-centric urban development, enables significant real estate and value creation opportunities, and mitigates climate change. Public transportation should be reliable, frequent, and accessible.
- **We need infrastructure that helps us combat the global threat of climate change.** Many of the infrastructure investment strategies to mitigate and adapt to climate change are similar to those that enable more holistic and integrated urban development. This should include decarbonization and a path to zero emissions through modernizing the energy grid and enhancing everyone's ability to invest in and have access to renewable energy, energy storage, vehicle electrification, and "grid-interactive" buildings as well as building communities that can withstand and bounce back from extreme weather events.

- **We need to connect everyone to affordable and high-quality internet.** Availability of widespread, high-speed broadband networks is critical for everyone. As the world becomes more digitalized, those without access will be increasingly left behind. Broadband should no longer be viewed as a luxury but instead as necessary infrastructure as essential as electricity and water for communities to thrive and grow economically.
- **We need supportive infrastructure investment that increases housing attainability.** Housing is a necessary and critical component in ensuring that communities and people can thrive. The public sector needs to lead in developing an infrastructure framework to spur public/private partnerships to support the development of the full spectrum of housing types at all income levels. This will require some regulatory changes, such as zoning reform. The demand for housing will shape all other infrastructure investments.

This framework must be viewed through the lens that continuing inequities in the United States and around the globe threaten our social and economic foundations, especially because infrastructure serves as the organizational framework for building community and place. Now is the time to prioritize effective infrastructure-led development that builds long-term real estate and community value through a holistic and integrated approach instead of disconnected investments.

Connecting Real Estate Development and Infrastructure

The quality of infrastructure, along with consumer demand, is a key driver for real estate development investment.[2] Those core physical infrastructure investments such as regional transportation, electricity, water, and broadband are essential for building construction and use but are often off site and rarely controlled by the developer or investor. Typically, developers and investors work with the infrastructure already in place, connecting the buildings through constructing access points and helping pay for the infrastructure through impact fees, value-capture revenues, property taxes, and other user fees. Often, the infrastructure shapes the development based on physical limitations as well as regulatory and financial policies, together with the end user or tenants, who determine the development's type, size, and scope.[3]

The real estate development process creates a direct value-enhancing relationship between those who build and maintain infrastructure (horizontal), the developers of buildings (vertical), and the end user or tenant. The community benefits by being able access services and use social infrastructure, which is often maintained by the local or state government and sometimes by the developer since both infrastructure and real estate development build community and place. The greatest value can be generated for the real

Phases of the Real Estate Development Process

An illustration of how the real estate development process leverages infrastructure investment to generate value for the property as well as the community.

Common Real Estate Approaches to Deliver Infrastructure

Type	Description	Example
Public master developer	The local jurisdiction provides horizontal infrastructure work for the project site and then sells or leases development rights for phased vertical development. Alternatively, the local jurisdiction retains a third-party fee developer to execute the horizontal development, then sells development rights to one or several vertical developers.	The 28-acre Encore! is a mixed-use, mixed-income project in Tampa, Florida. The project included $25 million in horizontal infrastructure and $132.2 million in vertical construction. The project was financed with mortgage debt, deferred developer fees, low-income housing tax credits, local funds, HUD grants, brownfield credits, and by the Federal Home Loan Bank.
Private master developer	A private real estate developer executes site assemblage, horizontal infrastructure work, and development. Then one or more vertical construction developers build on sites as they are made available.	The 19.5-acre Denver Union Station project is a large-scale mixed-use development—including office, residential, retail, hotel, and transit uses. Financing for the $487 million project includes company and partner equity as well as U.S. Department of Transportation loans through the Transportation Infrastructure Finance and Innovation Act (TIFIA) and Railroad Rehabilitation and Improvement Financing (RRIF) programs.
Full-service private developer	This is an "all-in-one" approach where a private developer controls all land assemblage and executes phases of the entire future development on the basis of the risk and value proposition of the potential development opportunity.	The Capitol Crossing/Third Street Tunnel project in Washington, D.C., is a seven-acre, 2.2 million-square-foot development over I-395. Private capital financed the $270 million horizontal and $1.03 billion vertical construction costs.

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estate developer, the investor, the municipality, and the community when strategic infrastructure investment is concentrated around proposed or existing community hubs and follows smart growth principles such as reducing sprawl; encouraging density; preserving open space, farmland, and native landscapes; designing walkable and connected neighborhoods; and creating a range of housing affordability options. It is also important to ensure that this infrastructure investment can be adaptable to future needs and allow for infill urban development.[4]

Defining Infrastructure

Infrastructure is a building block for communities everywhere that includes the key spaces that build community—anchor institutions, the civic commons, and housing—beyond just the more traditional core physical infrastructure such as transportation, water, sanitation, energy, broadband, and other utilities. Because infrastructure provides the means for connection, creative placemaking, and opportunity, smart infrastructure investment is an imperative for cities now and in the future, especially as more interconnected systems are needed.[5] In addition to physically constructing the vertical buildings to house institutions such as schools or other public facilities, the real estate industry can be a leader in supporting those public policies and programs that enable horizontal infrastructure that allows for best practices in urban development.[6]

"I don't know that we can think narrowly [about the definition of infrastructure] anymore; I think we have to think holistically because it's just so interrelated with the social, physical, and economic."

—Debra Campbell,
city manager, Asheville, North Carolina[7]

This broad view of the definition of infrastructure enables it to be leveraged in different ways throughout the real estate development process from building physical infrastructure as part of site preparation to the construction of buildings and other public facilities allowing for the end users to move into the properties. This also recognizes that real estate development and infrastructure investment do not happen within a vacuum. Just having a transit stop or access to electricity and water does not translate into new development opportunities. Instead, it is a combination of those social, economic, and physical elements along with a policy framework to guide development in a more holistic and integrated way that results in the creation of long-term real estate and community value.

Generating Economic Opportunity and Real Estate Value

A good example of this multidimensional approach is the construction of the infill NoMa–Gallaudet U Metrorail station in Washington, D.C. This new station—authorized as part of the 1997 National Capital Revitalization Act—generated new real estate development opportunities when it was completed in 2004 in an area previously defined by small-scale manufacturing and distribution facilities.[8] By 2014, this $120 million project delivered an estimated economic output of more than $4.7 billion.[9] This includes more than $247 million in real property tax revenues and $68 million in sales tax and resident income tax for the District of Columbia, which more than paid back the $54 million the city contributed to the project ($25 million as a municipal bond and $29 million in other funds). Local private developers contributed $25 million in cash and donated $10 million worth of land. The federal government contributed the remaining amount.

This real estate value within NoMa extends beyond the Metrorail station. It also includes access to other high-quality infrastructure such as broadband, multimodal transportation, and parks, along with sustainable features, a highly educated workforce, and an overall good quality of life and community.[10] In addition, the neighborhood has flexible zoning rules to encourage development as well as maintain some of the

PAUL ANGELONE/ULI

One NoMa Station (center), a 400,000-square-foot redeveloped historic warehouse, was purchased by the Bristol Group in the 1990s with an assessed property value of $9 million in 1999. By 2005, a year after the NoMa–Gallaudet U Metrorail station had opened, the building's assessed property value had increased to $64 million. Today, the assessed property value is more than $195 million, generating about $3.2 million in property taxes for the District of Columbia in 2021.[11]

neighborhood's original production, distribution, and repair uses. These types of infrastructure investments are crucial in creating new economic opportunities.

Another example is the €2.3 billion (US$2.6 billion) Ørestad Metro system, which opened in Copenhagen in 2002, connecting the city of Copenhagen with the airport. This important infrastructure project created the opportunity to develop the greenfield land adjacent to the new metro, allowing creation of a new neighborhood. By the end of 2006, when the value was realized through purchase and development by private stakeholders, over 52 percent of the overall site was sold or had development underway. The direct payments, real estate taxes, land sales, and operating profits from the metro were then used to pay for the construction of the metro by repaying the debt borrowed to build the rail line.

The benefit of this major project is larger than just being able to build the infrastructure. Developments on the purchased land catalyzed Ørestad, providing community value with residential and office developments, including DR Village, the headquarters of the Danish Broadcasting Corporation (DR). New public amenities were also built, such as the Bella Centre, the largest exhibition and conference center in Scandinavia, and the Royal Arena, a 15,000-seat multipurpose venue.

THOMAS WIDMANN/FLICKR

The Ørestad Metro opened in 2002 and the cost of its construction was repaid by capturing the value of the subsequent real estate development.

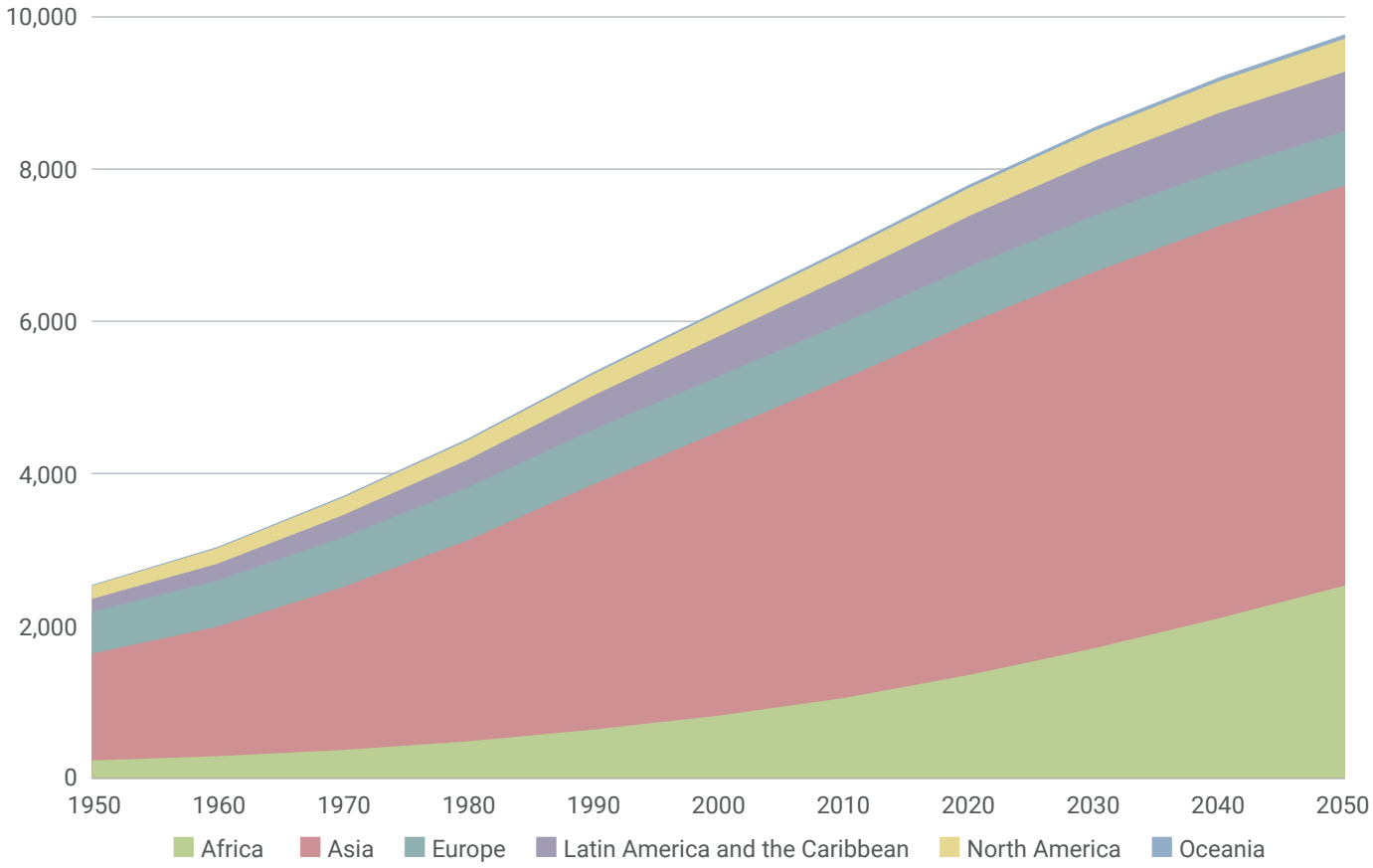
The value generated by these projects was possible only through approaching real estate development, infrastructure investment, and land use policy as intentionally intertwined in a holistic and multidimensional way, instead of making them disconnected investments. This all-in approach allowed the new stations to catalyze urban development that otherwise would not have been created. This approach increases resilience, equity, and economic prosperity.[12]

ULI Member Infrastructure-Related Priorities

An extraordinary need exists for new infrastructure investment to manage a rapidly urbanizing world as well as to maintain already built infrastructure. The United Nations estimates that more than half the world's population (55 percent) is already urban, and this share is expected to grow to more than two-thirds by 2050, with nearly all future population growth occurring in cities.[13] This growth is putting pressure on existing systems especially because a concurrent need exists to invest in infrastructure that increases social equity, mitigates the worst impacts of climate change, and builds resilience.

Estimates vary about the total investment required globally, but more than $7 trillion annually over the next 15 to 30 years is generally a consensus opinion by experts of what is needed.[14] This investment—which represents 30 percent of the 2020 U.S. gross domestic product (GDP), 13 percent of the 38 OECD (Organisation for Economic Co-operation and Development) countries' GDP, and 8 percent of total global GDP—but must be made.[15]

Global Total Population by Subregion, 1950–2050 (millions)



Sources: United Nations, Department of Economic and Social Affairs, Population Division, World Urbanization Prospects: The 2018 Revision, 2018*, online edition; ULI.*

To support and create sustainable growth, the substantial infrastructure investment required must be better prioritized in ways to ensure outcomes that are more equitable and resilient and that build long-term community value. Asked to identify infrastructure priorities for investment in the metropolitan area where they primarily work, respondents to the ULI Member Global Infrastructure Survey conducted April 20 to May 17, 2021, overwhelmingly (66 percent) cited increasing the stock of affordable housing as their top priority. One survey respondent said, "Demand for housing redevelopment will factor the most into shaping infrastructure investment," adding, "Meeting [this] demand requires the ability to move people and the capacity to provide services to residents—water, sanitation, community facilities, schools, parks."

ULI Member Global Infrastructure Survey

Learn more about the methodology and the full findings from the May 2021 survey on better understanding perceived quality and infrastructure priorities by the real estate and land use industry, as well as how infrastructure investment will affect real estate development trends, at knowledge.uli.org/en/reports/research-reports/2021/uli-member-global-infrastructure-survey-findings.

Additional top infrastructure priorities identified by global ULI members include adapting to and mitigating climate change, increasing renewable and green energy generation, maintaining existing infrastructure, and improving public transportation. More broadly, housing affordability, changes as a result of COVID-19 such as work from home, and climate change were identified by survey respondents as primary real estate trends that will influence infrastructure investment in the next five years.

Top Identified Infrastructure Priorities by ULI Members

Top needs	Mean score
Increasing affordable housing	3.23
Adapting to/mitigating climate change	2.99
Increasing green energy generation	2.98
Maintaining existing infrastructure	2.90
Improved public transportation	2.90
Decarbonizing infrastructure	2.74
Improved broadband	2.58
Improving child-care facilities	2.57
Improved pedestrian infrastructure	2.56
Addressing injustice and inequity	2.54
Improved bike/micro-transit	2.53
Increasing electric vehicle charging network	2.40
Reconnecting divided communities	2.39
Improved water/wastewater	2.38
Improved roads and bridges	2.33
Increasing smart buildings	2.32
Increasing electrical grid reliability	2.29
Improved or expanded parks and trails	2.24
Improved health facilities	2.21
Improving last-mile freight delivery	1.91
Improving overall logistics network	1.84
Expanding roadway capacity	1.63
Reducing roadway capacity	1.56
Improved stadiums/entertainment	1.38

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Top priority Priority Low priority

Note: Response to the question, "Again, thinking about the metropolitan area or city where you work or your work is primarily concentrated, what are the highest-priority infrastructure investment needs within the next five years?"

Perceived Quality of Local Infrastructure by ULI Members

Type	Mean rating
Available residential (affordable)	1.28
Electric vehicle charging network	1.30
Available residential (for sale)	1.67
Available residential (rental)	1.77
Community centers and facilities	1.80
Public transportation	1.82
Child-care and preschool services	1.93
Roads and bridges	1.95
Schools (primary and secondary)	2.18
Public health facilities	2.20
Internet speed and availability	2.26
Electricity distribution and generation	2.34
Cell towers	2.36
Natural gas distribution	2.48
Cargo and logistics networks	2.58
Parks, trails, and open spaces	2.59
Airports and seaports	2.67
Private health facilities	2.78
Stadiums and entertainment venues	2.82
Colleges and universities	3.10

Poor Adequate Excellent

Note: Response to the question, "Thinking about the metropolitan areas or cities where your work is primarily concentrated, how would you rate the quality of its infrastructure?"

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Other frequently mentioned trends were addressing racial inequities, managing growth in a way that creates 15- to 20-minute neighborhoods where all needs are in reach of someone walking or biking a relatively short time, and responding to the impact of local and national politics. ULI members outside the United States rated the quality of infrastructure in their own metropolitan area as being higher than those of members who work primarily in the United States.

None of these identified priorities or ULI's broader transformational goals of decarbonizing the real estate industry and increasing housing attainability worldwide will be successful unless the industry invests in people, community, and building capacity to ensure everyone is operating at the same baseline of needs.

Antonia Ornelas, chief program officer of Elevate—a Chicago-based nonprofit that works with community members and real estate professionals to create equitable access to clean energy—explained the need for a more equitable approach during the fall 2021 ULI Infrastructure Forum.

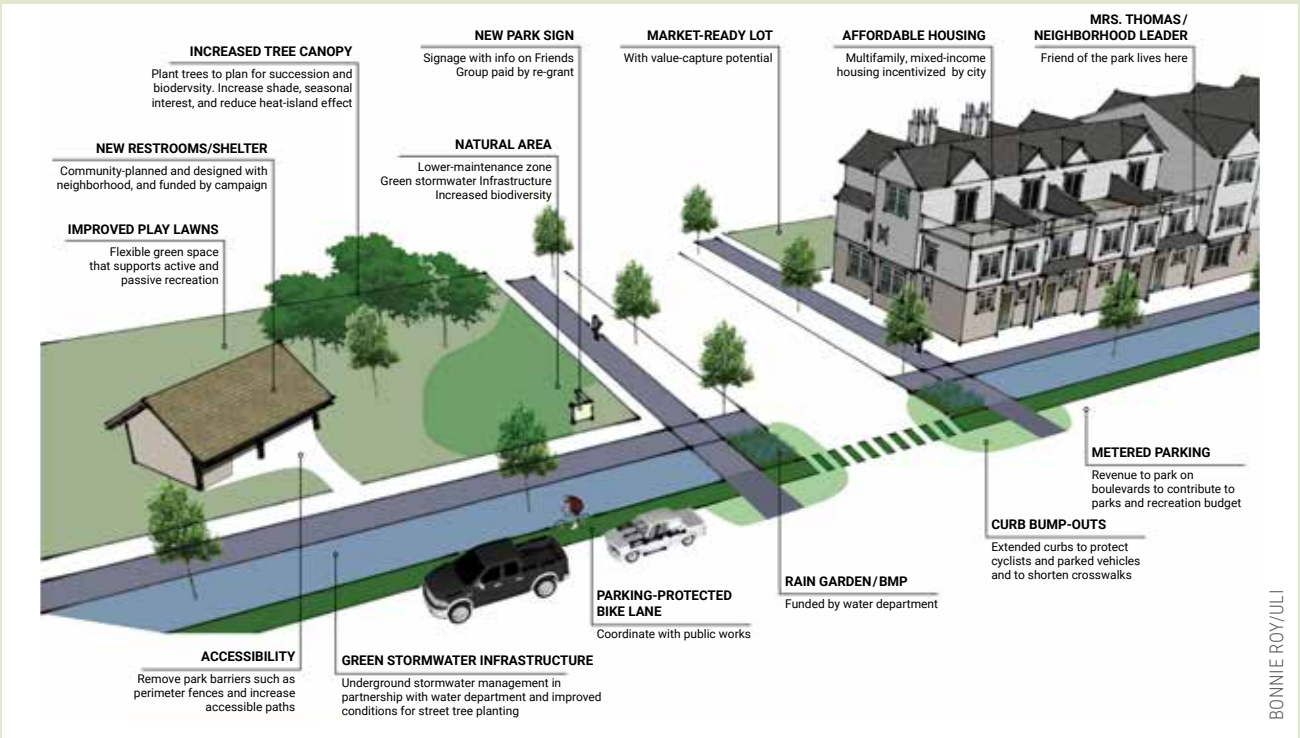
"People are making choices on whether to pay their utility bill, rent, buy food, or medicine," she said. "Under-resourced families and communities are usually not at the table when we talk about clean energy, sustainability or even energy efficiency. In fact, they spend a lot of their income on energy—energy efficiency and renewable energy reduces the energy burden."[16] This is why forming partnerships with other organizations is critical to build capacity, because many areas require investment beyond ULI's expertise.[17]

The more forward-thinking, and flexible, regions that execute successful infrastructure strategies for growth will better succeed and generate more favorable financial outcomes for municipalities, improve the economy more broadly, and increase social outcomes. ULI members can help lead on those areas that touch directly on the built environment and that are influenced by the real estate industry.

Equitable Investment in Infrastructure and Housing

The Shaw Symposium on Urban Community Issues in June 2021 identified the following 10 key themes and takeaways for a more equitable approach to regional planning and investment in infrastructure and housing to inform a framework for new investment moving forward:

1. Previous models of planning, financing, building, and maintaining the core components of communities had fundamental flaws.
2. The built environment needs repairs, focusing on both physical elements and restorative equity.
3. The status quo model of housing and infrastructure investment must evolve to meet new challenges.
4. The concept of infrastructure is evolving, and full-spectrum housing opportunities are a necessary component of a modern infrastructure strategy.
5. The different elements of the built environment should be viewed as interconnected systems.
6. Adaptation and resilience are critical components of future systems.
7. The future of many regions and communities strongly resembles the cities of the past.
8. Suburban areas can and should become more equitable and sustainable.
9. The scale of the intervention needs to meet the scale of the challenge.
10. The time for action is now.



Strategic neighborhood and regional approaches can be taken to apply large global concepts centered on improving social equity, health and wellness, natural resource management, and organizational sustainability to improve communities and create new development opportunities. The illustration of Ivanhoe Park in Kansas City, Missouri, shows how this approach can leverage holistic infrastructure improvements to spur neighborhood revitalization and implement ULI member priorities.[18]

To learn more about this report and others, visit knowledge.uli.org.

Key ULI Infrastructure Focus Areas

To break down the substantial infrastructure investments required into more achievable impacts and initiatives that the real estate industry and ULI members can address, five key focus areas were developed. These are grounded by ULI member–identified priorities, reflect the work by the Curtis Infrastructure Initiative, and relate to the places where the real estate industry has the most influence, namely at the building, neighborhood, and regional levels that form the broader ecosystems in which different types of physical, social, and digital infrastructure investments are needed. These focus areas enable equity and sustainability, invest in public transportation and mobility, combat the global threat of climate change, increase internet connectivity, and leverage infrastructure investment for increased housing attainability.

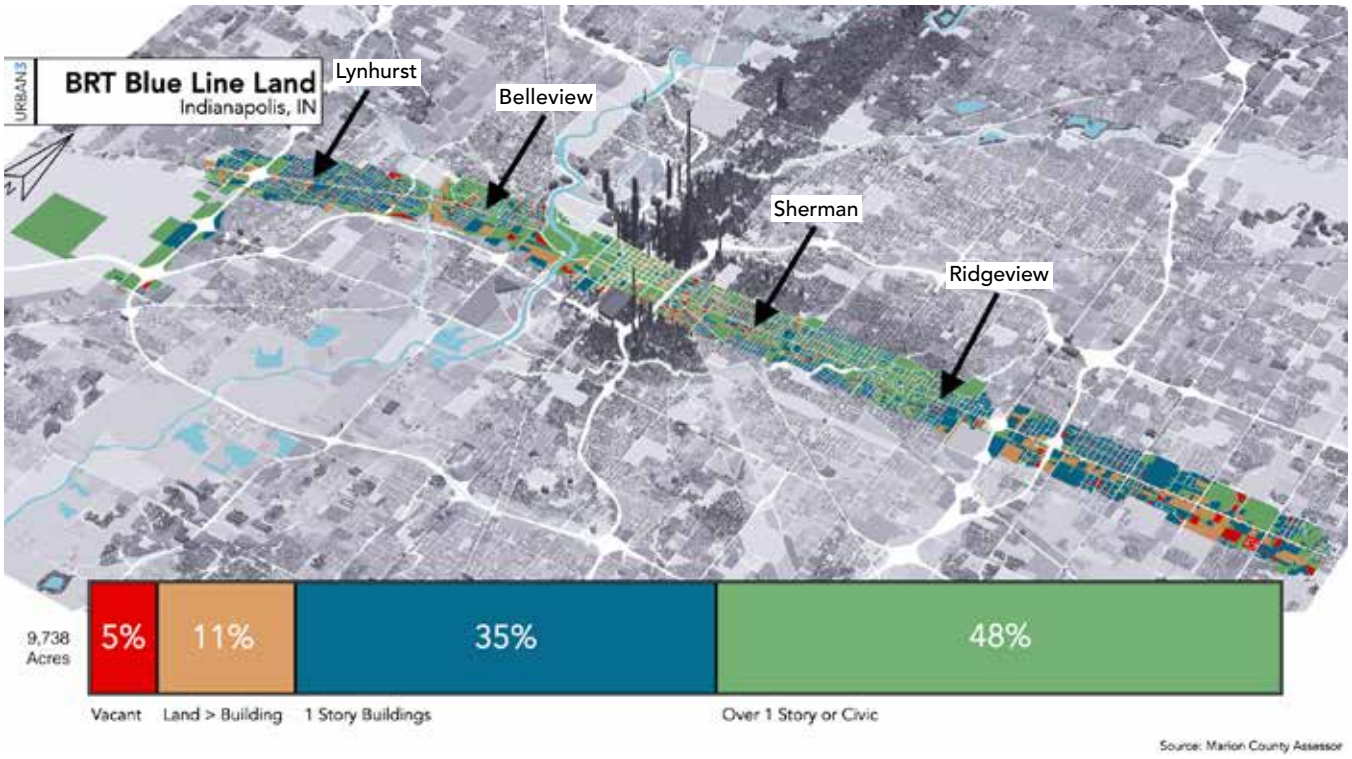
Infrastructure Should Increase Equity and Sustainability

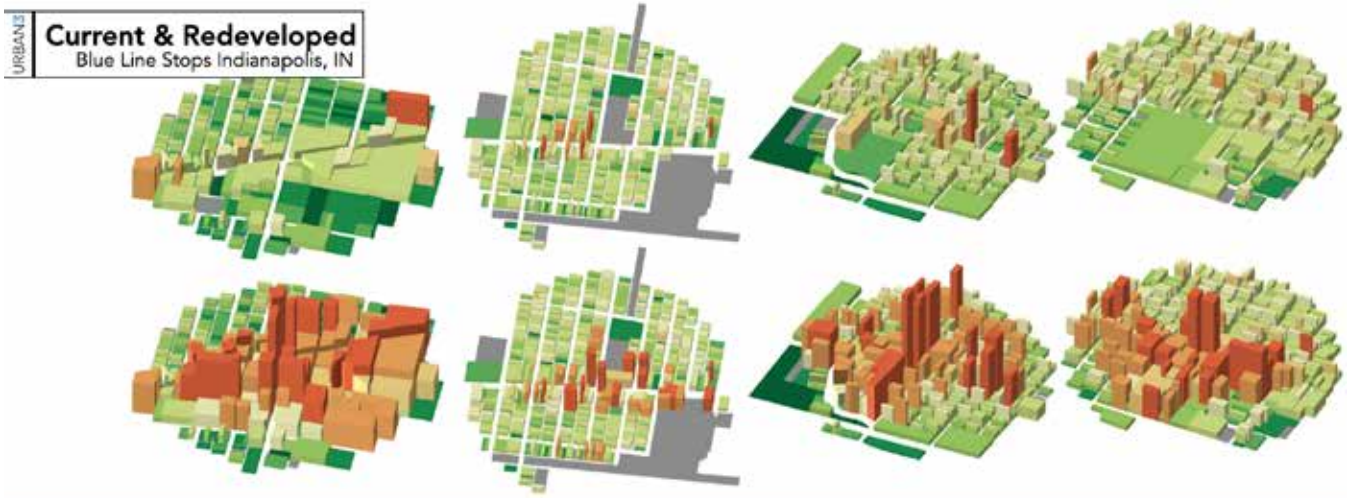
Infrastructure investments are critical to the country's economic, social, and environmental well-being, but all too often these investments have favored some communities at the expense of others. Interstate highways, for example, have greatly improved the overall mobility and economic prosperity within the country, but they have also cut once thriving communities in two, displaced thousands of low-income households, and otherwise disparately affected Black and other communities of color.

Some of these physical and social divides were intentionally advanced and unintentionally exacerbated by prominent ULI members.[19] In the Minneapolis and St. Paul region, for example, sociologist Dr. Calvin Schmid mapped racial and ethnic enclaves that were used to implement racial steering, direct federal funding, and construct highway expansion that benefited primarily white, middle- to upper-class residents and businesses and harmed communities of color.[20] Today, areas of concentrated poverty and communities of color are located in similar areas that were divided physically and socially by infrastructure investments.[21] This is not unique to Minnesota but was repeated across the United States.

To address the legacy of infrastructure investment, it is important to approach infrastructure investment and real estate development in a more holistic and integrated way to repair past harm, meet people where they are, and build trust within affected communities. There needs to be a rethinking of how infrastructure and real estate development are implemented to best leverage historic investments in infrastructure so that the same mistakes are not made again and systemic inequities are not further entrenched by new infrastructure investments. Simply maintaining existing infrastructure is not enough since new investment must be intentional to create more equitable and sustainable outcomes.

Bjorgvin Saevarsson, chief executive officer of the Yorth Group, discussed this idea during a workshop hosted by ULI Minnesota and the ULI Curtis Infrastructure Initiative on developing a people-centric financing model for stitching the St. Paul, Minnesota, Rondo neighborhood back together. "Restorative development is the creation of net-positive outcomes for districts, communities, cities, and businesses through the integrated management of water, energy, materials and food production," he said. "This closed-loop infrastructure can serve as a catalyst for a public/private circular ecosystem that yields economic, social and environmental benefits, such as living wages, community health and well-being, and restored natural systems."[22]





Stop Area	Lynhurst	Belleview	Sherman	Ridgeview
Current Value	$18M	$15.9M	$18.4M	$25.4M
Added	$54.4M	$8.4M	$27M	$30.5M
% Change	300%	52%	147%	120%
Est. New Taxes	$629k	$111k	$351k	$358k

URBAN3

More than 1,500 acres of underused land (top) is within a five-minute walk of the proposed Blue Line bus rapid transit line in Indianapolis, creating the opportunity to generate millions in taxable value per acre through urban infill (bottom). This analysis helped make the case to update the city's zoning code to encourage equitable transit-oriented development to reinvest in disinvested parts of the city.[23]

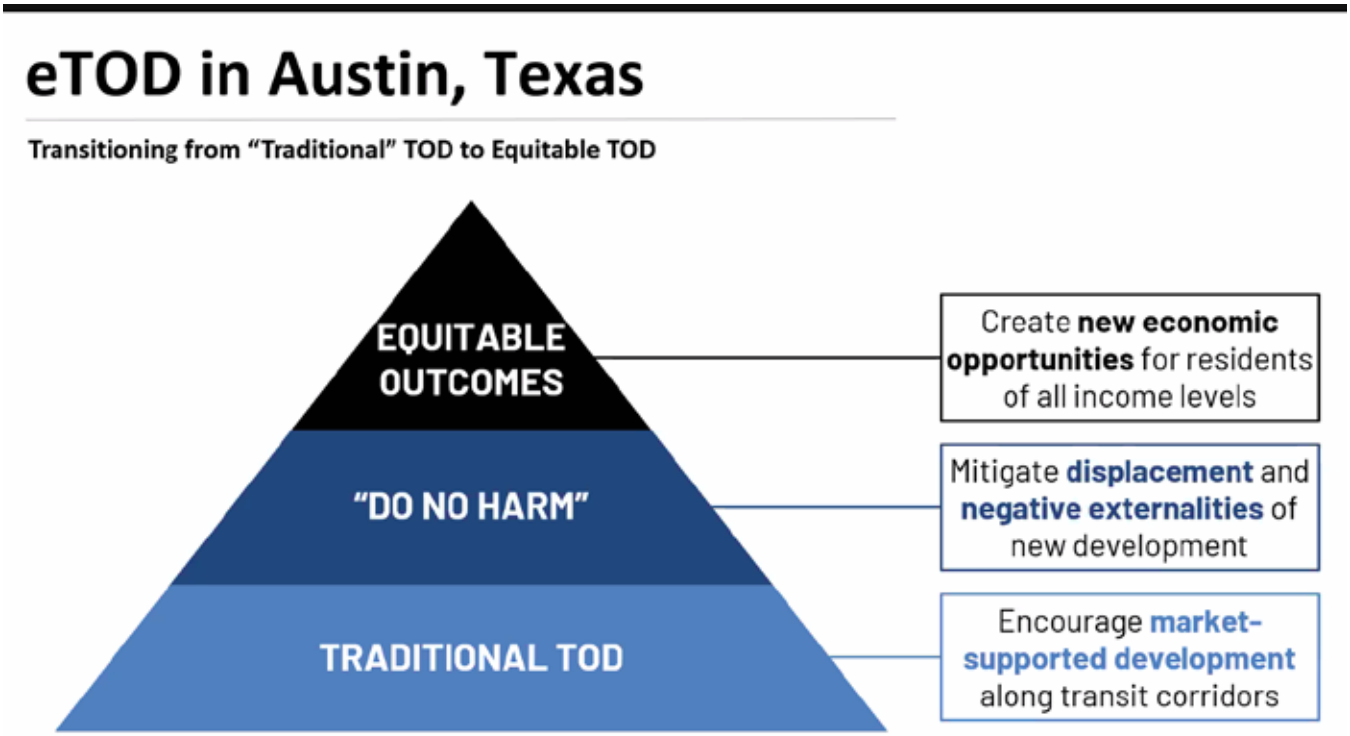
Infrastructure investment strategies that create more restorative approaches are similar to those that adapt to respond to and mitigate climate change, enabling more equitable, people-centric urban development.[24] This requires a shift from typical infrastructure investment strategies that usually create the sprawl that is common within the United States.[25] This type of development is also more financially able to support the very infrastructure investments required since they are more people-centric and walkable than those designed for vehicles.[26] They typically generate enough revenue to pay for new real estate development through value-capture or general revenue and are dense enough to be able to pay for longer-term maintenance of aging infrastructure as well.[27]

The real estate industry has the responsibility and the opportunity to better measure impacts of benefits to community and society and not just risk mitigation, particularly about urban infill. More and more real estate developers and investors are beginning to take this approach while maintaining healthy financial returns.[28] This approach will also create more climate-friendly, equitable outcomes, and healthier and financially sustainable communities.

But this requires better land use decisions, allowing for more compact, walkable communities to be developed in historic patterns, a reinvestment in public transportation, and reducing air pollution to increase health.[29] It also means acknowledging how past infrastructure investments affected communities of color—particularly those that are Black.[30] Intentional efforts must be made to address inequities in the built environment to increase equity and sustainability through a more restorative approach.

Infrastructure Should Invest in Public Transportation and Mobility

In surveys conducted for ULI's *Emerging Trends in Real Estate® 2022* report, infrastructure and transportation were seen to be of great importance



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Project Connect is a multibillion-dollar locally driven investment in public transportation approved by voters of Austin, Texas. This investment is occurring as the state plans to further expand I-35 through downtown Austin. Better integrating infrastructure investment strategies will be critical to creating more equitable and sustainable outcomes.

Select Global Approaches to Mobility

Location	Category	Approach	Activity
Netherlands	Public transit	Integrated land use and public transportation improvements	Reduction in time for the passengers, better locating urban facilities closer to stations, and improving the user experience of the waiting and transfer time.
Paris	Policy	15- to 20-minute city	Incentivizing the hyper-proximity of work, shopping, health, and culture within 15-minutes of their housing by walking, bike, or public transit.
Hong Kong	Urban development	Station area planning (transit-oriented development)	Tung Chung is a new town that is centered around an extension of Hong Kong's robust mobility networks including bicycles, rail, and ferries.
Pittsburgh	Integrated services	Mobility hubs	Increase travel options and access to fixed public transportation routes enabling residents and visitors a range of multimodal options increasing equitible outcomes.

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for real estate and development issues.[31] While this includes all types of transportation, investing in robust, frequent, and reliable public transportation is essential to ensure the ability to provide equitable access to all residents beyond creating automobile-centric communities. This creates an opportunity to reallocate public space for different uses that create real estate and community value.[32]

Key for success is an integrated approach to urban and infrastructure development. It combines infrastructure and mixed-use development with density to create sufficient critical mass and intensity of space, making the business case for the initial investment. This includes not only transportation but also social infrastructure such as affordable housing, public realm improvements, schools, and cultural facilities, alongside the commercial real estate development.

A strong example of prioritizing public transportation as part of the real estate development process is Aspern Seestadt near Vienna, Austria, which is the largest urban expansion area in Europe. The rail connection was built before the opening of the project. The public/private development agency Wien 3420 AG is responsible for ensuring Aspern is equipped with all the needs of a modern business hub, including excellent public transportation links with Vienna's main train station, which is 17 minutes away. This initiative goes hand in hand with smart mobility projects in Aspern itself, where planning decisions have been able to encourage 40 percent bicycling and walking, 40 percent public transportation use, and just 20 percent vehicle traffic. As a result, reciprocal benefits will be seen in the community as residents enjoy cleaner air, improved access to employment opportunities, and an improved quality of life in a city of short distances.

To create livable cities, it is essential to recognize that transportation infrastructure development, urban and economic development, and community development are not discrete but together contribute to equitable and resilient real estate development. Infrastructure investments made today should support the future of real estate development that follows best practices. This requires public transportation to serve as the backbone of an integrated, multimodal system, but it must adapt to provide the service required as commuting and use patterns change.

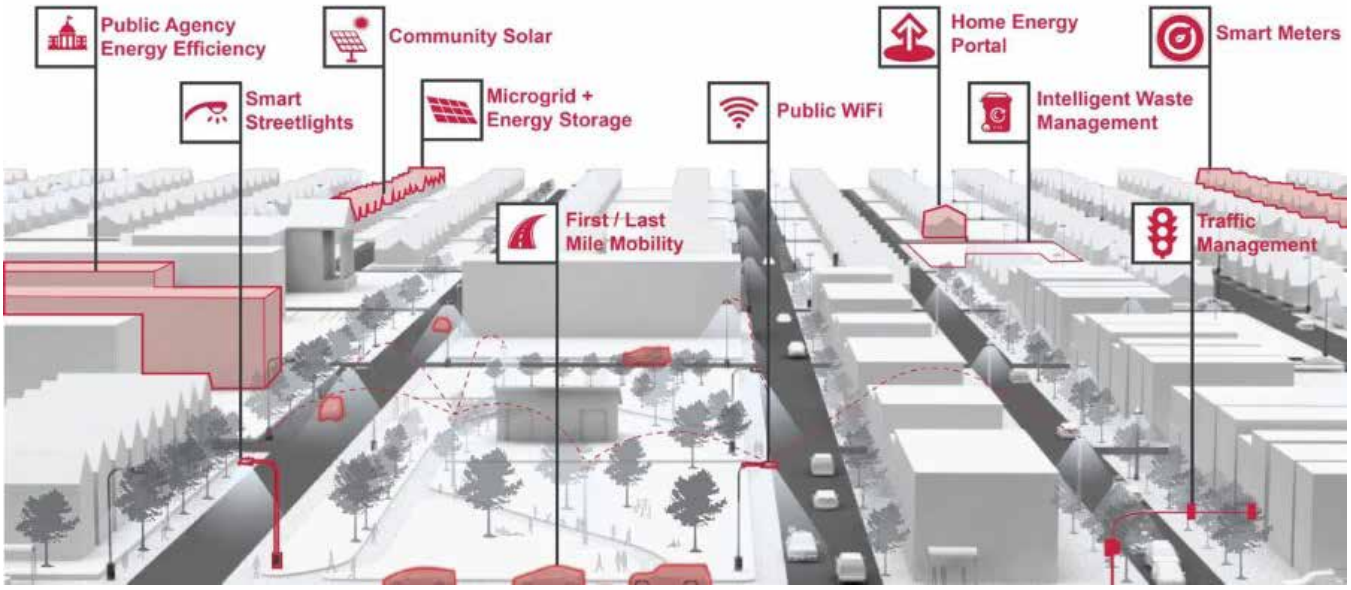
Infrastructure Should Combat the Global Threat of Climate Change

Buildings are responsible for 40 percent of global greenhouse gas emissions and up to 70 percent of emissions within cities. The real estate industry has a responsibility and an opportunity to decarbonize to address the climate crisis. To reach carbon neutrality, substantial investment in energy efficiency, electrification, and renewable energy will need to be made by both the public and private sectors.[33] This will require infrastructure investment such as grid modernization and more distributed energy resources to better be able to manage increased demands on electrical systems. These investments can create co-benefits, such as how Chattanooga, Tennessee, modernized its public power grid to create resilience from extreme weather and at the same time was able to enable affordable access to high-quality and reliable broadband.[34]

This also applies directly to real estate developers as environmental, social, and governance (ESG) principles are becoming essential to attract institutional financial investment. Green buildings are expected to account for tens of trillions of dollars by 2030, growing faster than their nongreen counterparts.[36] A key reason for this is a growing understanding of the cost of inaction related to climate change. Billion-dollar weather and climate disasters are becoming the norm. Since 1980, the United States has seen 308 events with total costs exceeding $2 trillion.[37] These events are increasing in frequency, and every year it becomes more important to invest upfront in resilience strategies to mitigate the cost of stress events both in the United States and globally.

"In the last six months, institutional investors working in the private market are beginning to ask sustainability- and infrastructure-related questions as part of their [due] diligence in their interactions with private developers. This is something that has been going on for a long time in Europe and the world but not on the radar of major capital partners within the U.S."

—Todd Mansfield,
chairman and chief executive officer,
Crescent Communities[38]



AECOM

ComEd's first microgrid in Chicago's Bronzeville neighborhood, which is intended for smart city improvements. AECOM developed resilience metrics for the grid modernization project.[35]

A June 2019 ULI Advisory Services panel in downtown Miami, estimated that if there is no upfront investment in mitigating future storm events or seasonal king tides in the next 25 years there likely will be uninsured losses in the range of $5 billion to $7 billion. With robust resilience investments, these losses could be reduced to about $650 million.[39] Lessons can be learned from nature-based systems that are typically more restorative and regenerative. Forests, for example, have adapted by creating a complex ecosystem of cooperation that is more than just individual trees, and this style of development was adopted by Tokyo through a cycle of destruction and renewal from natural and manmade disasters.[40]

One key change that real estate developers and policymakers can make is to create the opportunity for more people-centric, walkable communities that are centered on community hubs since outlying suburban areas produce more greenhouse gases per capita than the inner suburbs and core areas.[41] This can help enable more integrated investments in infrastructure that will support broader electrification, decarbonization, and building resilience to meet the climate crisis.

Infrastructure Should Increase Access to the Internet

Broadband is necessary as the world becomes increasingly interconnected and digitalized. The internet serves as the base for innovative technology and the functioning of commerce. Applications such as property technology (or proptech), ride sharing, and broader smart-city adaptation are now possible because of broadband. All this connectivity and digitalization relies on the speed, capacity, and reliability of our world's internet infrastructure.

MIKA BAUMEISTER/UNSPLASH

The ULI Curtis Infrastructure Initiative report Broadband and Real Estate: Understanding the Opportunity *identifies the challenges and opportunities in addressing the digital divide, the tools and techniques available for the real estate and land use industry, and the need for communities to expand and best take advantage of this connectivity.*

COVID-19 only further showed the importance of broadband as large-scale work from home, school from home, accelerated e-commerce, telehealth, and online family gatherings became necessary. This demand has also helped shift the real estate industry itself from thinking just in terms of physical space to also considering how to engage in a virtual environment. The need for increased bandwidth will only accelerate.

Unfortunately, like so many other aspects of society, access to this connectivity and its many benefits are often deeply uneven—both between urban and rural communities and between neighborhoods and zip codes within the same city—thus creating what is known as the "digital divide." For example, in New York City about 18 percent of the city's households—more than 1.5 million New Yorkers—do not have a home broadband subscription service or a mobile broadband service, and more than 40 percent of households only have one of these services.[42] The digital divide has no single solution. Each community must identify what works best for it based on its needs. This will help develop a plan with achievable goals that leverages effective coordination and partnerships from the public, private, and nonprofit sectors.

Infrastructure Should Increase Housing Affordability and Attainability

The housing affordability crisis is most prominent within the most-populous regions, but many members of the workforce across the United States lack affordable homes because lower-income households have difficulty finding attainable units, and segregation by income and race occurs in all market types.[43] A well-coordinated, holistic approach to infrastructure investment is needed to encourage and create more attainable housing: enabling affordability requires a more integrated strategy of market and nonmarket approaches beyond just the need to build more housing of all types.

"We try to think about 2008 as a financing issue where the subprime mortgages came in and undermined the whole structure of debt, which then collapsed the economy. But deep down, it was that we were building the wrong kind of housing in the wrong, distant locations in places where people could no longer afford both the commute and the mortgage or the rent, and when you add those two items together, you're at over 50 percent of household disposable income. And so the idea is that this solution was always at the edge of a collapsed economy."

—Peter Calthorpe,
founder and president, Calthorpe Associates[44]

This includes making transportation more affordable by reducing the need for owning one or more vehicles per household; increasing the ability to walk, scooter, or bicycle; and increasing access to public transportation, especially at off-peak commute times.[45] Finally, this means addressing a mismatch of employer locations with where their employees live to raise incomes, increase health outcomes, and build resilience.[46] This is especially true as the wealth gap between the lowest-income and wealthiest Americans has significantly increased. Only upper-income households increased their wealth between 2001 and 2016 (33 percent), compared to middle-income and lower-income household wealth, which shrank by 20 percent and 45 percent, respectively.[47] Then when incomes are finally increasing for all income groups, they are disproportionally going to those who are in the top 5 percent of households. In addition, embedded inequities in the built environment militate against wealth building, particularly through their impact on Black households, such as lower-valued home assessments.[48]

GERDING EDLEN/DESIGN: SCHEMATA WORKSHOP, HEWITT, AND BERGER PARTNERSHIP

Seattle's Sound Transit issued a request for qualifications and proposals for firms interested in submitting real estate development plans near the Capitol Hill light-rail station. Gerding Edlen was awarded the bid and is building a mixed-use project that includes a partnership with Capitol Hill Housing to own and operate many of the affordable units. Helping close the financing gap will be public funding from the city's housing authority and King County, as well as use of Seattle's Multifamily Property Tax Exemption Program.

These reasons, plus an overall shortage of new and especially entry-level homes, zoning restrictions, and an overall decline in the production of new homes have resulted in unattainable housing, especially at the lower end of the income spectrum.[49] This challenge is not only a U.S. problem but growing rapidly globally—especially in high-income countries and cities. Infrastructure investment, along with flexible and smart land use regulations, can help catalyze new private-sector housing production.

For example, attracting capital (debt and equity) for market-rate housing is fairly easy, but a barrier to new housing construction exists if infrastructure funding is not in place since there typically is not an immediate payback for an investor.[50] The public sector can act as an accelerator for this development by investing in infrastructure early and allowing the cost to be paid back over a longer period of time. This is one of the reasons that Japan has been able to keep up with increasing costs by building more than 1 million new homes annually paired with high-quality infrastructure investments.[51]

Financing and Delivering Infrastructure

Respondents to the ULI Member Global Infrastructure Survey identified the national or federal government (63 percent) as the most important source of funding for their top infrastructure priorities. Conversely, the private sector (50 percent) was identified as the least important source of financing or funding for the top infrastructure priorities. The state or provincial government and the city or other local government were seen as more important than the private sector but less important than the national or federal government.

But this does not mean the private sector cannot play an important role in the implementation of infrastructure priorities. Half the respondents noted the role the private sector plays in financing and funding infrastructure investment despite not identifying it as the most important actor, which reflects an opportunity for public/private partnerships for infrastructure project financing and delivery. One survey respondent said a real estate trend affecting infrastructure investment will be "leveraging private or local investments to support federal funding." This provides the opportunity for the private and nonprofit sectors to develop infill projects within the broader infrastructure ecosystem designed and implemented by the public sector.

"There's something unique about infrastructure that goes beyond the distinct site upon which an investment is happening. [This] gives public bodies the ability to be better able or positioned for infrastructure investments."

—Leslie Woo,
chief executive officer, CivicAction + CivicAction Leadership Foundation[52]

Public Funding

The government—at all levels—should play a leadership role in financing and funding investments that provide a public good but that might not offer a return on investment within a period typical for market-driven transactions. This requires strong public institutions, direct public investment, and engagement with those people who are most affected by the decision-making to ensure that opportunities have equitable outcomes and fully leverage the best attributes of the public, private, and nonprofit sectors.[53] Some good framework plans developed by local jurisdictions and key

Financing and Funding Top Infrastructure Priorities

Type	Most important	Important	Less important	Least important
National or federal government	63%	16%	12%	10%
State or provincial government	12%	46%	28%	14%
City or other local government	14%	20%	38%	27%
Private sector	11%	18%	22%	50%

Note: Response to the statement, "To finance or fund the top infrastructure priorities you identified for the next five years, please rank the following sources in order of their importance, with 1 indicating the most important."

Value Capture

Value capture is a tool that enables the recovery and reinvestment of land value increases resulting from public infrastructure investment and can help a city looking to fully leverage its public investment in infrastructure in a sustainable manner. The uplift through value capture can be used to fund public realm improvements and equity initiatives such as affordable housing and new employment opportunities. This approach also avoids a common misalignment between who funds, who uses, and who benefits from an infrastructure development project.

partners include capping Antwerp's ring road, Chicago's Equitable Transit-Oriented Development Policy Plan, Pittsburgh's ONEPGH, and Washington, D.C.'s 11th Street Bridge Park's Equitable Development Plan.[54]

The U.S. federal government is poised to provide significant funding for physical, social, and economic infrastructure.[55] This includes $550 billion in new infrastructure funds from the Infrastructure Investment and Jobs Act that will be invested in broadband, public transportation, roads, and bridges, reconnecting divided communities, providing electrification and water, and building resilience.[56] The American Rescue Plan Act of 2021 provided an additional $195.3 billion to state, territory, and tribal governments and can be used for infrastructure investments such as water, broadband, and other infrastructure, as well as an additional $130.2 billion for similar puposes for local governments.[57] Finally, if signed into law, the Build Back Better Act will invest in additional infrastructure, such as mitigating climate change, public transportation, and public housing, as well as other non-infrastructure-related and place-based items.[58] This all builds on existing funding already appropriated that will help with many needed infrastructure investments across the United States.[59]

Key federal agencies that provide financial and technical assistance for local urban development include the U.S. Department of Transportation, the U.S. Department of Housing and Urban Development, and the Economic Development Agency. Other agencies like the U.S. Department of Energy and the U.S. Environmental Protection Agency play a supportive role in providing technical assistance and resources but are not as prominent in directly funding and financing real estate development.

"To avoid transformational mistakes, one needs the ability to measure, adapt, and change course when even well-meaning policies (such as urban growth boundaries and adequate public facilities ordinances) lead to unintended consequences (i.e., some policies encouraged the very type of unsustainable leapfrog development they were meant to prevent)."

—**The ULI report *Shaw Symposium on Urban Community Issues: Equitable Investment in Infrastructure and Housing***[60]

As new investments are made, it is important that these funds enable projects that are "shovel worthy" and not just shovel ready.[61] This is especially true in transportation where investment should encourage compact, urban development and not the sprawl that often occurs with urban freeway expansion as federal transportation funding is allocated to states.[62] As noted by a respondent in the ULI Member Global Infrastructure Survey, "[R]eal estate is a two-tiered system. Capital flows to where wealth concentrates and encounters barriers where household sustainability is highly vulnerable. This is manifested in geographic disparities, which then translate into how to allocate resources for infrastructure investment which serves the whole and closes the gaps in income, community health, and opportunity."

This often translates into the fact that it is harder for communities of color and smaller communities to be able to access lower-cost capital.[63] Past

decision-making and local context should inform the development of metrics and targets to allocate funding in a way that ensures more equitable and resilient outcomes.[64]

"The federal package is just one component of how state and local officials and developers are looking to put together the political and financial support for their projects. ULI is a natural convener on these discussions and can act as a guidepost [on their environmental, social, and financial impact] since every project needs to attract different levels of [federal, state, and local support] to be successful."

—Stephen Engblom,
executive vice president and the global director of Cities, AECOM[65]

In local jurisdictions, one of the most common ways to fund infrastructure is through the municipal bond market, which often offers the lowest cost of capital to catalyze infrastructure delivery and maintenance. Municipal bonds can be supplemented by both the local jurisdiction's capital plan that is funded by taxes or other user fees and direct private investment. These private sources of capital are either those that invest in infrastructure projects themselves or real estate developers and investors looking to better connect infrastructure to their projects.

Public/Private Partnerships

Public/private partnerships are a way to combine the strengths and resources of both the public and private sectors most effectively. These partnerships are legal cooperation agreements that are used in economic development, infrastructure development, social services delivery,

Key Recommendation 1:
Bringing together **leadership on a shared vision** for stations early in the process leads to improved planning, delivery, and operations for the community.

Key Recommendation 2:
Stations are **integral parts of communities** and should be developed in partnership with both public- and private-sector stakeholders.

Key Recommendation 3:
The **value created by transit stations can be amplified with integration** into the urban fabric, and careful consideration should be given to how that benefit is redistributed.

ULI TORONTO

Key recommendations developed by ULI Toronto as part of a Curtis Infrastructure Initiative grant looking at how to better integrate Ontario public transportation investment into community planning. Learn more about efforts by the Curtis Infrastructure Initiative to build capacity at uli.org/infrastructure.

and other applications and are formed when a government—or other public entity—lacks capital and capabilities that business can provide and a business lacks the standing, faith of the public, and skills that a government can provide. This situation creates opportunities that otherwise would not be possible or likely in the near term.

ULI has extensively researched and examined successful public/private partnerships over the years. Some of the hallmarks of partnerships that work include the following:

- Clear definitions and roles;
- Robust, mutually beneficial relationships;
- Holistic, flexible planning and financing for the span of the full project;
- An integrated internal and external communication plan; and
- A pervasive spirt of stewardship in partnership actions.[66]

Public/private partnerships, commonly referred to as PPPs or P3s, are traditionally partnerships between a private entity and a public or quasi-public entity. This definition of public/private partnerships is evolving, however, through inclusion of nonprivate or nongovernmental organizations to further grow the ability to solve complex projects. This might mean more philanthropic or community members are more engaged in the process following a history of distrust or inaction by either the public or private partners to complete a project.

This approach shifts the implementation and/or ownership of the project to different partners such as community development corporations, community-based organizations, and other grassroots organizations because these groups may have more political will and trust, ability to deliver on promises, or access to financial resources through initiatives such as the Justice40 Accelerator or community development financial institutions. This is being used to address complex infrastructure challenges and real estate development to deliver results.

Conclusion

Keeping the status quo means retaining unsustainable outcomes that cost the public and private sectors revenue and maintain inequities within the built environment. This revenue could be used to invest in the ULI focus areas to enable equity and sustainability, invest in public transportation and mobility, combat the global threat of climate change, increase internet connectivity, and leverage infrastructure investment for increased housing attainability.

As Craig Lewis, ULI Curtis Infrastructure Initiative advisory board chair, said during the initiative's launch, "Building globally competitive infrastructure is more than just addressing crumbling roads and bridges it is also about setting up systems that help us recover from COVID-19, eliminate racial injustice, and are resilient to our changing climate."

Ultimately, infrastructure investment and real estate development are about people and their experiences in the built environment. We need better infrastructure investment and development that makes our communities more resilient and equitable, that builds long-term real estate and community value. The catalyst for this infrastructure must be federal funding, but such funds can and should be supplemented by municipal funding and public/private partnerships. The cost of inaction is large, so we must act now!

Key Actions for ULI Members

Some key actions for ULI members and other real estate development and land use professionals include the following:

- **Connect.** Join with other ULI members by getting involved with the Curtis Infrastructure Initiative's growing community of practice focused at the intersection of infrastructure investment, real estate development, and land use. This includes the virtual Infrastructure and Land Use Exchange and the in-person ULI Infrastructure Forum at the Spring and Fall meetings.
- **Inspire.** Share your knowledge about infrastructure and land use for an Urban Land publication, a growing resource library of case studies and best practices, and emerging research and publications on infrastructure and land use topics.
- **Lead.** Leverage your expertise and knowledge to aid a community in a technical assistance and capacity building project to help ensure infrastructure investment and land use decisions ensure more equitable and resilient outcomes that build long-term community value.

Learn about these opportunities and more at navigator.uli.org. Together, we can build more equitable and resilient communities.

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