WHAT'S OLD IS NEW

THE BUSINESS CASE FOR ADAPTIVE REUSE

Urban Land Institute

ABOUT

Urban Land Institute

Urban Land Institute is a global, member-driven organization comprising more than 48,000 real estate and urban development professionals dedicated to advancing the Institute's mission of shaping the future of the built environment for transformative impact in communities worldwide. ULI's interdisciplinary membership represents all aspects of the industry, including developers, property owners, investors, architects, urban planners, public officials, real estate brokers, appraisers, attorneys, engineers, financiers, and academics. Established in 1936, the Institute has a presence in the Americas, Europe, and Asia Pacific regions, with members in 84 countries.

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This Report

Adaptive reuse is increasingly recognized as an important approach to urban real estate development that can simultaneously address challenges from carbon emissions to housing shortages. However, adaptive reuse is only a viable strategy for developers if it makes business sense. This report seeks to define the business case for adaptive reuse through a series of expert interviews and case studies. It investigates three successful adaptive reuse projects in different regulatory, urban, and climatic contexts, demonstrating how real-world projects can generate financial benefits while contributing to social, environmental, and economic health of the communities they serve. Ultimately, the report proposes that the business case for adaptive reuse creates a positive feedback loop of economic value by catalyzing urban revitalization.

Cover photo: Congress Square. (Courtesy of Arrowstreet)

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EXECUTIVE SUMMARY

What's Old Is New makes the business case for adaptive reuse as a strategy for commercial real estate companies to revitalize old buildings with new purpose. It investigates three successful adaptive reuse projects in different regulatory, urban, and climatic contexts, demonstrating how real-world projects can generate financial benefits while contributing to the urban revitalization of the neighborhoods around them. The case studies are contextualized in interviews with four global experts from the nonprofit and commercial real estate sectors.

Adaptive reuse is emerging as an essential development strategy to create value for real estate developers, communities, and cities. In the context of growing urban populations, new patterns of commercial building use, aging building stock, and ambitious climate commitments, adaptive reuse has the potential to address many challenges at once. Smart approaches to reusing existing buildings can reduce embodied and operational carbon emissions, improve resilience, align market demand with space availability to reduce vacancy, address challenges such as the housing shortage, and preserve and create community connections to place. They also make good business sense by creating value for commercial real estate entities and the communities in which they work.

The findings demonstrate that adaptive reuse creates a positive feedback loop of economic value by catalyzing urban revitalization. A project's financial return on investment is not the only indicator of a project's success, but the economic outcomes of each project depend also on the social value created, the improved environmental conditions of the neighborhood, and the economic stimulation of the local market, which feeds back into increased market value and potential for further development. To more holistically assess the outcomes of each case study and guide future projects, this study proposes an urban revitalization framework to evaluate the triple bottom line (or TBL, representing people, planet, and profit) results that contribute to the business case for each project.

Three Cases of Adaptive Reuse

The three case studies illustrated in this report represent three vastly different approaches to adaptive reuse. Each tells the story of why reuse was the right business decision and how it yielded urban revitalization based on its physical, cultural, regulatory, and economic contexts.

(Kelly Callewaert © 2020)

West Bottoms Flats in Kansas City, Missouri, illustrates the ability of one project to jump-start economic development in a disinvested neighborhood. Low acquisition prices paired with historic tax credits and local green infrastructure incentives made the project achievable. The one-of-a-kind spaces and prototype micro living units created with the historic warehouse buildings made it a success. Thanks to the community revitalization sparked by the project, rents and market value have consistently and dramatically increased since the first phase of the project opened.

(Courtesy of Arrowstreet)

Congress Square (40 Water Street) in Boston, Massachusetts, brought commercial tenants back to the historic downtown district. After many businesses had left Post Office Square to move to new developments in the emerging Seaport District, this project updated and densified a historic commercial block to entice the businesses back to the city center. The adaptive reuse included a contemporary glass rooftop addition, unusual in Boston, as well as preservation of ornate historic spaces on the ground floor, creating an appealing blend of old and new character. This project's success can be seen in the resurgence of this neighborhood as a transit-accessible business hub in the city.

(Courtesy of KPF)

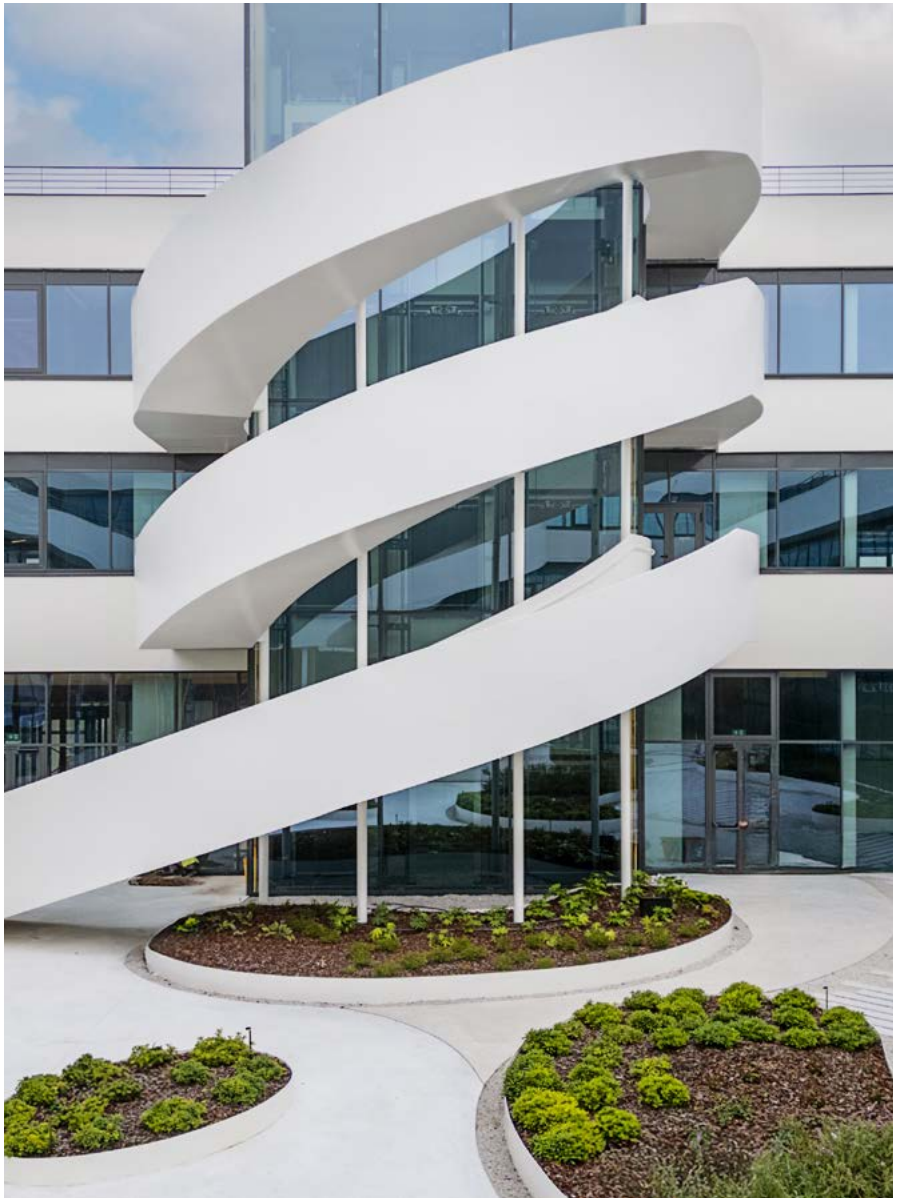
Oriente Green Campus in Lisbon, Portugal, transformed an unfinished shopping mall structure into a biophilic tech campus. This project capitalized on the potential of an immense existing structure in a market with near-zero office vacancy. By working with local planning officials, the project was able to accommodate symbiotic university and business uses under the same roof. The structure was artfully sculpted to promote passive ventilation, access to local greenery, and natural lighting throughout the spaces. It is anticipated that once the space is fully occupied, it will support new retail amenities and services in the neighborhood.

Key Takeaways

- **Reuse projects generate triple bottom line economic, environmental, and social benefits;** the thriving urban environments supported by these projects in turn increase real estate value.

- **Adaptive reuse is a flexible real estate solution that can offer value in various contexts.** The variation across the case studies demonstrates that the business case for adaptive reuse depends heavily on the local conditions: what spaces are most needed in the market, what buildings offer the right opportunity to match market needs with existing structures, what incentives are available, what spaces do communities care about, and what collaboration is possible with the local municipalities?

- **Experienced teams are crucial for realizing transformative visions.** Bringing architects, structural engineers, preservation professionals, and others into the project early can help developers de-risk adaptive reuse projects by promoting better understanding of existing conditions and how to work with the existing structure to maximize transformation while minimizing construction costs.



Oriente Green Campus. (Courtesy of KPF)

THE BUSINESS CASE FOR ADAPTIVE REUSE

Introduction

Globally, cities are grappling with several interrelated challenges. The existing building stock that makes up much of the urbanized world is aging. At the same time, cities are under increased pressure to house growing populations, adapt to changing climates while reducing emissions, and improve indoor and outdoor air and water quality, all while generating vital economic value and tax revenue. Adaptive reuse is gaining momentum as a real estate strategy for urban revitalization that effectively addresses many of these challenges simultaneously. It has the potential to reactivate outdated spaces, contribute to ecological and human health, stimulate economic activity, and safeguard community identity. However, there remain real and perceived barriers to scaling up adaptive reuse. This study aims to demonstrate the economic benefits and environmental and social cobenefits that adaptive reuse can deliver to commercial real estate developers, tenants, and urban neighborhoods.

Through expert interviews and detailed case studies, this report explores the following framing questions:

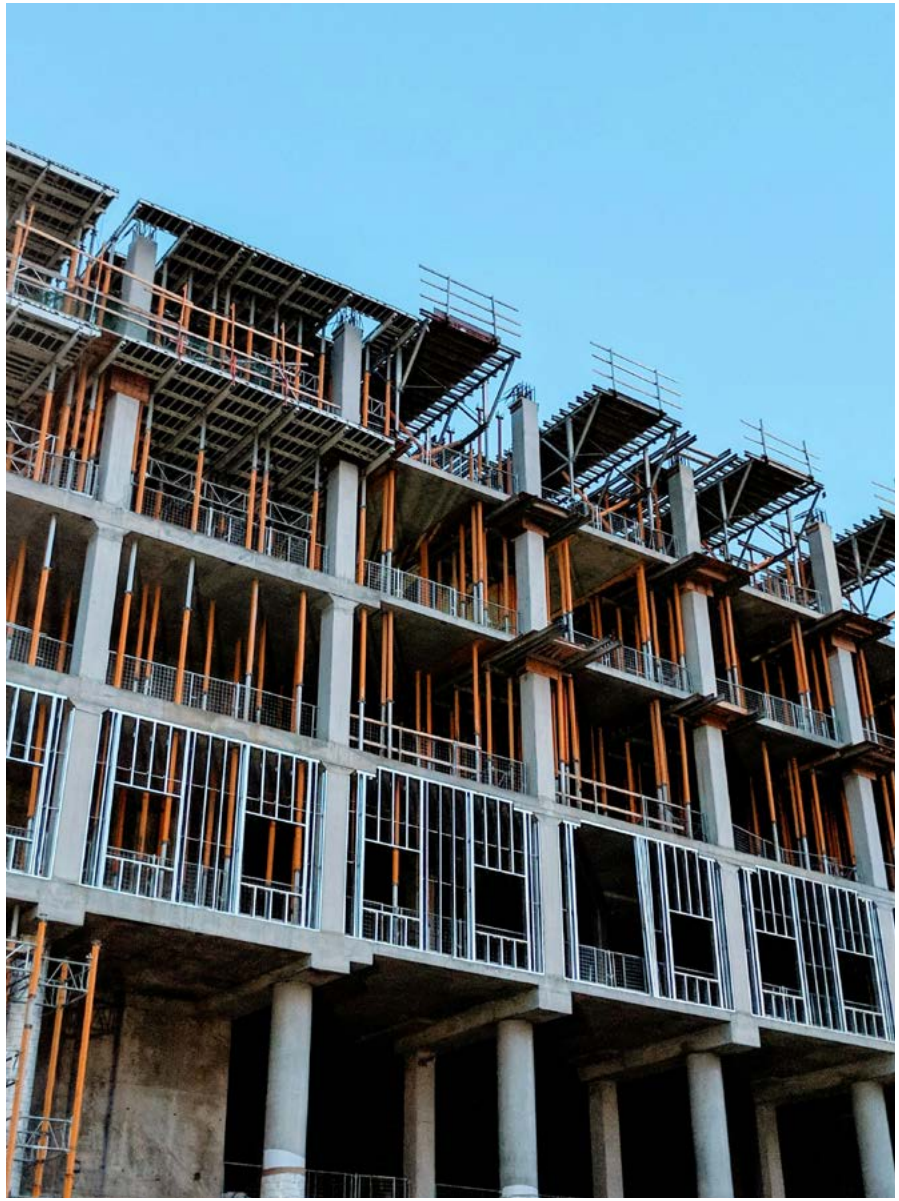
- How can adaptive reuse projects achieve optimal economic, environmental, and social outcomes, and how is success measured?
- What barriers do commercial real estate organizations face when pursuing reuse projects, and how do they overcome them?
- What are the most effective enablers of adaptive reuse, and how can real estate organizations take advantage of them to successfully pursue more adaptive reuse projects?

Defining Adaptive Reuse

> ***Adaptive reuse:*** *The modification of existing structures to reestablish or increase their value under new urban, economic, social, and environmental conditions.*

Adaptive reuse is often defined as renovating an existing building to serve a different function. However, this study uses a definition of adaptive reuse rooted in adaptation in nature, which is the "modification of an organism or its parts that makes it more fit for existence under the conditions of its environment." Since the "organism" is, in this instance, a building or place, adaptive reuse refers to ways in which renovation projects can make existing places more fit for purpose, or more valuable, in the context of today and tomorrow.

Many terms are used in the design and construction industry to describe existing-building reuse projects. Some terms—*preservation, rehabilitation, restoration,* and *reconstruction*—listed in "The Secretary of the Interior's Standards for the Treatment of Historic Properties" are strictly defined and tied to legal processes. Other terms are used loosely and interchangeably and have specific connotations for certain audiences, such as the terms *repositioning, renovation,* and *redevelopment*. Adaptive reuse can involve any or several of these approaches.



Why Now?

Adaptive reuse offers a compelling business opportunity to the commercial real estate sector as a strategy to create economic value while addressing pressing ecological and social challenges.

By the year 2050, 80 percent of the global population will live in cities, and 80 percent of the buildings those people will occupy already exist today. In the United States alone, there are estimated to be 5.9 million commercial buildings containing 96 billion square feet of floor space. A tremendous amount of work will be required in the coming decades to make this massive existing building stock suitable for tomorrow's users.

The COVID-19 pandemic dramatically shifted demand in the commercial real estate market, resulting in a misalignment between the types of spaces that exist and the space needs of current society. For example, Moody's showed national vacancy rates in the U.S. office market of 20.4 percent at the end of 2024, with no expectation that these rates will fall in 2025. Through adaptive reuse, developers can capitalize on high vacancy rates to create more of the spaces urgently needed in the market, such as housing, retail, or child care, and create more demand by repopulating urban centers.

In addition to facing housing shortages and underused downtowns, many cities and real estate firms have made climate commitments to achieve carbon neutrality by 2050 or sooner. C40 Cities reports that buildings contribute an average of 60 percent and up to 80 percent of their member cities' emissions. The UN International Panel on Climate Change (IPCC) identifies renovation and retrofit as critical actions to meet climate targets in the building sector, suggesting that retrofitting must increase from the current rate of about 1 percent up to 2.5 to 5 percent, and perhaps as much as 10 percent, annually. Adaptive reuse offers the opportunity to meet climate action goals with the potential to reduce operational emissions, switch to renewable energy sources, avoid the embodied carbon footprint of new construction, and improve resilience to changing climates.

Adaptive reuse is gaining momentum across the industry, as evidenced by American Institute of Architect (AIA) billings, design awards recognition, and policies such as commercial-to-residential conversion incentives (discussed more later). The alignment of many factors, including high office vacancy rates, housing shortages, and financial incentives, contributes to an uptick in urban adaptive reuse of commercial real estate. The Brookings Institution found that now, more than ever, local governments and neighborhood organizations may be open to collaborations with commercial real estate developers who are willing to invest in urban cores in support of economic and social revitalization.

However, many in the development industry still favor new construction, and there are many barriers to scaling reuse widely across the sector. Reuse projects can be daunting. Existing buildings present more unknowns than ground-up construction, leading to more risk. Depending on the conditions of the existing structure and its compatibility with the proposed use, expensive structural and site work may be required. Building codes may require upgrades for seismic performance, life safety, and accessibility, which can redirect construction costs away from the parts of the building tenants experience. Design teams and developers may be less familiar with the processes and technical expertise required for successful transformation.

Although more studies have brought new attention to reuse, metrics and messaging often focus on single issues for siloed audiences (such as cost, embodied carbon, or cultural heritage) rather than presenting the holistic outcomes that often integrate many of these issues. This study builds upon completed projects and research to demonstrate the business case for adaptive reuse through a cobenefits framework—a mechanism to help developers assess adaptive reuse and its full complement of beneficial effects.

Articulating the Business Case for Adaptive Reuse as Urban Revitalization

The business case for adaptive reuse is not one-dimensional. In addition to generating an immediate financial return and creating distinctive architectural spaces, adaptive reuse benefits include job creation, increased property values, and economic regeneration within communities. These benefits create a positive feedback loop, which in turn enables additional development (see figure 1). By catalyzing urban revitalization, adaptive reuse supports thriving urban environments, which then increase real estate value over time and generate demand for additional development.

Urban revitalization and commercial real estate value are integrally connected. Urban revitalization and urban regeneration are processes that improve the economic, social, and physical conditions of urban centers, often those that have experienced disinvestment. Thriving urban environments underpin real estate value; conversely, adaptive reuse projects can catalyze urban revitalization.

Adaptive reuse is a well-suited approach for urban revitalization because it inherently offers TBL benefits (to people, planet, and profit). Reuse improves environmental conditions within and beyond the building, preserves community places and memories, is often more conducive to supporting small and local businesses, and can generate economic value for the developer, the neighborhood, and the city. It is the interrelationships between these cultural, environmental, and urban benefits of adaptive reuse that drive economic value.

Real estate projects are typically evaluated through financial metrics such as return on investment, net operating income, occupancy rates, and tenant retention rates. These metrics can convey a project's profitability and overall performance within market forces. The holistic business case for adaptive reuse, however, depends on a spectrum of qualitative and quantitative indicators that go well beyond short-term financial returns. Existing frameworks that measure the urban revitalization impacts of real estate developments share a spectrum of economic, social, and environmental indicators (illustrated in more depth later), which together represent holistic outcomes. This cobenefits approach paints a more complete picture of the business case for adaptive reuse.

Whereas this study began with the intention of documenting the economic drivers and outcomes of adaptive reuse, it quickly became clear that the business value of these projects cannot be communicated purely through financial metrics. For commercial adaptive reuse, economic value is derived from many benefits, ranging from the more obvious outcomes such as urban revitalization and avoided carbon emissions to indirect benefits, including demonstrating values alignment with investors, staff, and tenants. Accordingly, this report tells the story of a more holistic business case, illustrating how the broad range of cobenefits associated with adaptive reuse is, in fact, at the heart of economic value.

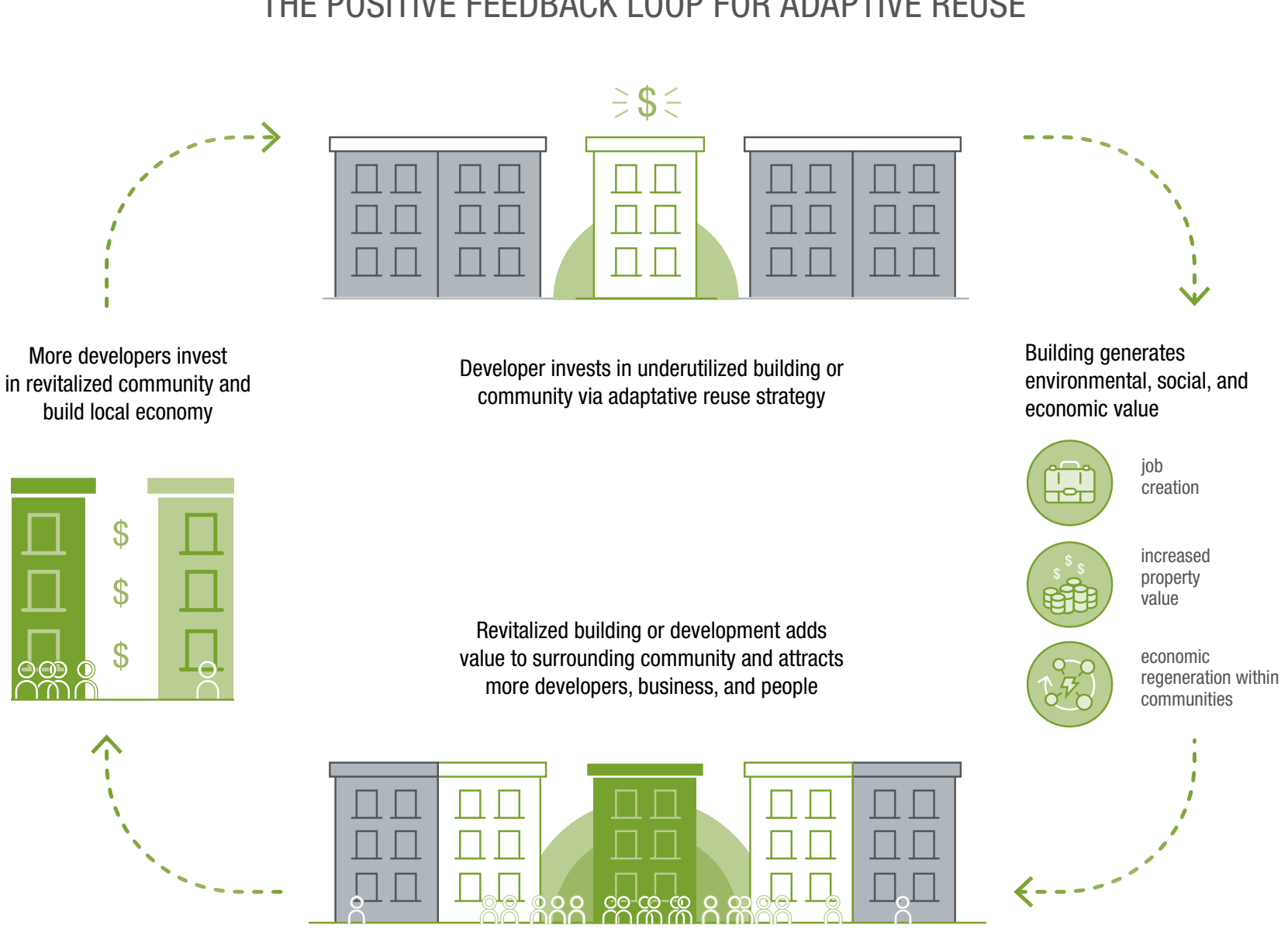


FIGURE 1. The positive feedback loop for adaptive reuse.

Adaptive Reuse Typologies

Obsolescent Use Types: As society evolves, demographics shift, and technologies advance, certain types of buildings are no longer needed for their original purpose. In some cases, the specificity of these buildings may make them challenging to reuse, while in others, inherent flexibility makes reuse more straightforward. A few of these typologies are as follows:

- **Retail:** Shopping and consumer patterns have changed, reducing the demand for malls and large-scale retail. (Example: Westside Pavilion Macy's in Los Angeles was converted into a high-tech office complex.)

- **Industrial:** Many industrial spaces, from manufacturing to postal facilities, are no longer serving their purpose, and industrial processes evolve and urban space becomes precious. (Example: A 1955 newspaper facility, the Bulletin Building, was converted into office, lab, and retail as part of transit-oriented development in Philadelphia.)

Preservation: Many historic buildings lose value if they fall into disrepair and as the neighborhood changes around them. If buildings are protected under preservation or heritage regulations, there may be limitations as to the degree of change that is possible. Even when the use remains similar, large-scale preservation can restore original character while re-creating value by upgrading interior spaces to reflect modern needs; updating heating, ventilation, and air conditioning systems; providing new amenities; and leveraging historic value for new branding. (Example: A 1926 historic office tower, the Book Tower, was converted to office, retail, and residential space in one of the largest adaptive reuse projects in Detroit.)

Up-Valuing Commercial Space: As office and retail space needs evolve, transformative renovations and additions to aging existing office buildings can upgrade their competitiveness and market value. (Example: One Madison added a substantial glass tower to a historic office building in Manhattan, creating a campus that blends new and old.)

Commercial to Residential: The trend of converting underused commercial space into much-needed housing continues to grow. In some cities with active office markets, these projects can revitalize commercial districts by strategically infusing residents and creating mixed-use space. CBRE found that other cities are seeing much more turnover. For instance, in Cleveland, Ohio, conversion projects were planned or underway for nearly 12 percent of its commercial space in the third quarter of 2024.

Oriente Green Campus. (Courtesy of KPF)

EXPERT PERSPECTIVES: ADAPTIVE REUSE IN COMMERCIAL REAL ESTATE

Four experts representing global think tanks, nongovernmental organizations, and commercial real estate developers participated in one-on-one interviews to establish the context of adaptive reuse trends, barriers, enablers, and resources. These experts shared their perspectives on the state of adaptive reuse in the industry, the potential benefits of reuse to achieve economic and environmental benefits, barriers that may prevent adaptive reuse, and levers to accelerate reuse across global commercial real estate markets. Their comments are thematized and summarized here.

Sarah Franklin
Lead, Sustainability and Resilience
Urban Transformation
World Economic Forum (WEF)

Ed Green
Sustainability Director
Grosvenor Property UK

Vincent Martinez
CEO
Architecture 2030

Becca Timms
Former Director of Environmental, Social, and Governance
Jamestown LP

What Is the Business Case for Adaptive Reuse?

Economic Advantage: Adaptive reuse can capitalize on opportunities presented by existing structures, markets, and financial incentives to save money compared to new construction. Dated or underused buildings often have lower acquisition costs. Starting with an existing structure can dramatically reduce construction durations and costs, especially if the design can avoid costly structural upgrades. Shifting market demands create opportunities for increased value through change of use. Lastly, adaptive reuse may offer unique incentives, including expedited permitting, zoning accommodations, and tax credits.

One-of-a-Kind Spaces: It's clear that the unique character of existing buildings, while challenging to quantify, is core to the business case for adaptive reuse. Tenants feel a particular sense of pride when they occupy a space with original details. They feel that there is a story. If done well, adaptive reuse offers a "cool" factor that can't be replicated with ground-up construction. For Grosvenor, Green noted that the historic character of their portfolio is "part of its core value." Timms explained that Jamestown, which has a strong track record in this type of work, does adaptive reuse because "[i]t's the best way to create places that inspire."

Values Alignment: Adaptive reuse can send a strong signal of organizational values. Developers who take on adaptive reuse projects and developers/owners who hold and care for large portfolios of existing buildings demonstrate a commitment to the environment and communities. As Green points out, this values signal is crucial for attracting and retaining investors. It helps the developers retain employees who increasingly care about a values-aligned workplace. It also appeals to tenants who want assurance that their real estate choices reflect their brand and climate commitments.

Outdoor seating at West Bottoms Flats. (Kelly Callewaert © 2020)

What Are the Current Trends Related to Adaptive Reuse?

Economic and Environmental Focus: Adaptive reuse is increasingly recognized for its economic benefits and environmental cobenefits. Environmental outcomes include reducing whole life carbon—an ever more valuable result as cities ratchet up climate policy requirements. As Franklin noted, "Adaptive reuse isn't a new idea, but the value proposition of adaptive reuse is evolving. It used to be primarily a social case—revitalizing communities, preserving cultural heritage—but now it is also emerging as a key environmental strategy for the built environment."

Policy and Regulatory Push: There are a growing number of policies, particularly at the city level, that directly or indirectly support adaptive reuse. In the United States, the City of Los Angeles expanded its Adaptive Reuse Ordinance to offer zoning relief to projects across the city. Many other cities across the United States, from Boston to Chicago to Washington, D.C., are offering incentives to developers to convert underused commercial space into much-needed housing. Martinez observed that in the European Union, environmental regulations have sparked a "renovation wave" to address emissions from the extensive existing building stock. He noted that policies such as the proposed mandate to upgrade unreinforced masonry buildings in Seattle can act as a catalyst for adaptive reuse, creating an intervention point at which buildings will already require some level of renovation to comply with local requirements.

What Benefits Does Adaptive Reuse Offer?

Long-Term Value: Extending the life of existing buildings often capitalizes on the durability of older buildings and materials. Green noted that good design and construction are "enduring." Grosvenor's portfolio includes many houses built in the 18th century, which had been converted into offices and are now back to housing. Green observed, "As a sector, we have spent a long time building office buildings that can only be office buildings. The lessons that we have from the historic estate are that great buildings are [adaptable]."

Environmental Impact: Adaptive reuse is a climate mitigation and adaptation strategy. It reduces waste and emissions, conserves resources, and offers opportunities to improve climate resilience. As Martinez pointed out, adaptive reuse is important to three elements of decarbonization: reducing operating emissions through improved energy efficiency and renewable energy, reducing embodied carbon emissions by avoiding the need for new materials, and providing a strategy for sufficiency by reducing the need for added floor space. For Grosvenor, reuse is a tool for achieving sustainability commitments related to whole life carbon while maintaining a high level of quality.

Social Value Creation: Adaptive reuse revitalizes communities, preserves cultural heritage, and creates vibrant urban spaces. Adaptively reused spaces offer tenants and visitors a unique experience that speaks to a connection between the past and the future. Whether through retained historic fabric, visible traces of artwork, the patina of worn materials, or the preservation of meaningful neighborhood landmarks, the intangible value of and human response to old places cannot be re-created with new construction. Embedding social value at the core of adaptive reuse projects can enhance the quality of life and generate financial value for the developer, the neighborhood, and the city.

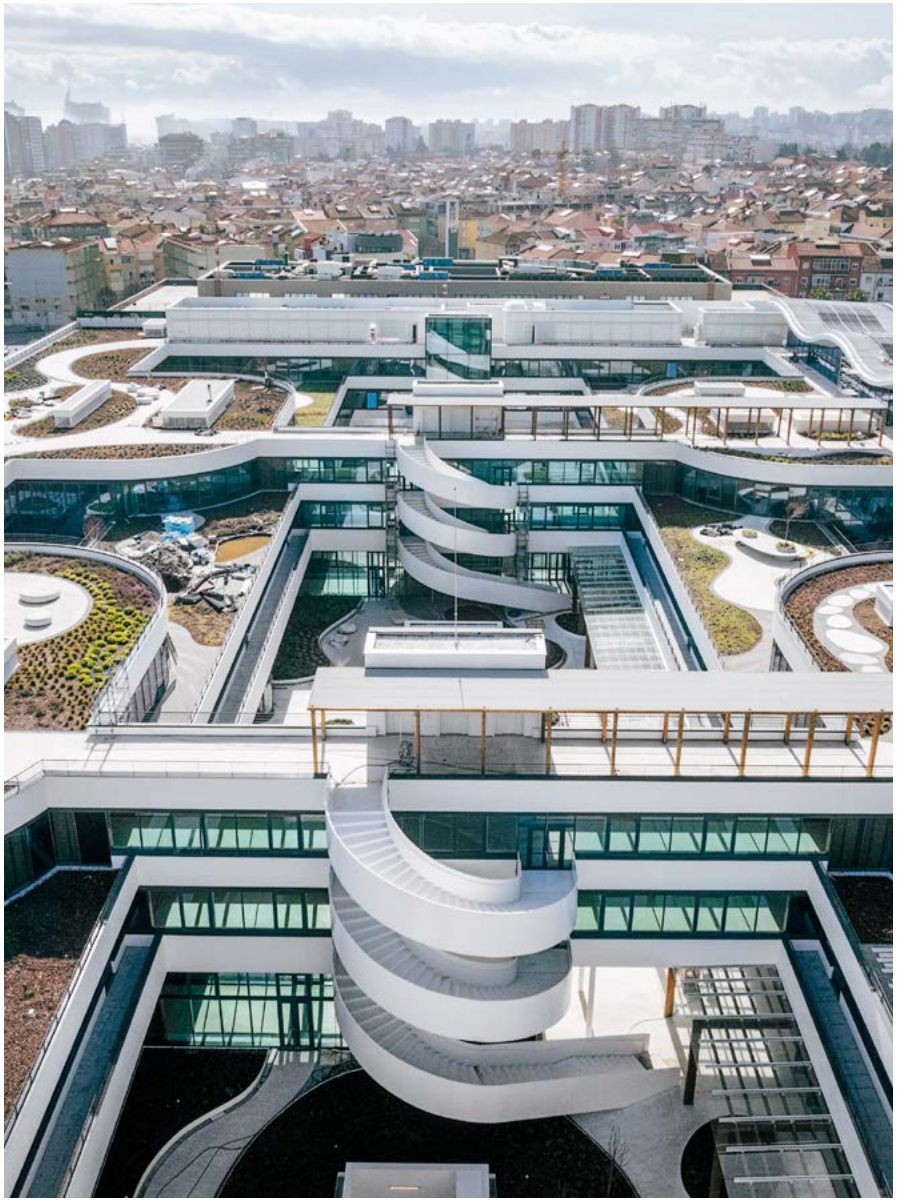
What Are the Primary Barriers?

Prevailing Mindset: Most interviewees felt the prevailing mindset in the design, construction, and development industries, particularly in the United States, still favors new construction, a barrier to scaling up reuse across the sector. This is linked to the value tenants perceive in existing buildings. For example, the value of energy efficiency and reductions in operational emissions is becoming more understood by tenants thanks to rating systems, emergent building performance scorecards, and utility costs, but there isn't yet the same understanding of or demand for embodied carbon reductions, nor are there dollar prices associated with these emissions.

Regulation: Building codes and zoning written for new construction can create barriers for converting aging buildings and infrastructure to new uses, particularly for teams that are unfamiliar with how to navigate these challenges. For example, adaptive reuse projects may require compliance with seismic regulations, life safety codes, and energy codes that are not triggered by the continued use of the existing building in its existing use.

Financial Challenges: Although adaptive reuse can save money on construction, it can also come with added costs. Due diligence is essential to understanding existing conditions and properly planning for potential costs associated with zoning and permitting, hazardous materials abatement, repairs to deteriorated fabric, and any needed structural upgrades.

Risk and Unknowns: It is relatively straightforward to build many similar new buildings; with adaptive reuse, no two buildings are the same. Every building has its own set of existing conditions and unknowns. As Timms noted, every building has "wildly different existing conditions." It's critical to understand the technical challenges and opportunities of buildings, whether built over a hundred years ago or in the last few decades.



Oriente Green Campus. (Courtesy of KPF)

What Are the Most Powerful Enablers?

Partnerships: Building partnerships and ecosystems to learn together and support adaptive reuse projects is essential. As Timms said, "It's all about partnerships. Find your ecosystem and learn together." The creative approaches and broad technical knowledge needed to successfully pull off adaptive reuse benefit from strong partnerships formed early in the process. This may include early consultation with architects who understand how to push the boundaries of transformation within the constraints of an existing building, structural engineers well-versed in arcane system types, preservation consultants who can unearth a place's past and help leverage historic value, and more.

Policy and Incentives: Governments can create enabling environments through tax abatements, tax credits, subsidies, expedited approvals, grants, and green finance. For example, the City of Boston (along with Chicago, New York, and others) offers tax abatement for developers creating new housing units in previously underused downtown office space as part of the new Office to Residential Conversion Program. In addition to financial enablers, environmental policy can also incentivize reuse. The UK Net Zero Carbon Buildings Standard supports retrofits by placing value on embodied carbon and making it more commercially appealing to make net zero claims.

Growing Data Set: The increasing availability of data and asset information, from laser scanning and modeling technologies to building performance data to geospatial jurisdictional mapping, supports adaptive reuse projects. This applies not only to the buildings themselves, but also to urban systems. As Timms described, our cities are rapidly changing. We now have "more data about how people live and use urban space, and how to reactivate spaces so people want to be there." There are also new tools, such as Architecture 2030's Carbon Avoided Retrofit Estimator (CARE) Tool, that provide easy access to whole life carbon estimations associated with adaptive reuse to inform early decision-making.

Experience: "There is a growing expertise and increased knowledge sharing between owners, designers, and construction teams, reducing the risk inherent in adaptive reuse," says Timms. She noted that the industry is learning from the large numbers of office-to-residential and other adaptive reuse projects that have been completed recently: "Everyone has gotten smarter, technology has advanced." Leveraging partnerships and data as described previously, the industry itself is adapting to practices of adaptive reuse.

Adaptive Reuse Programs and Resources

- WEF G20 Smart Cities Alliance: *Model Policy: Adaptive Reuse of Assets*
- WEF *Green Building Principles* and framework
- Architecture 2030 CARE Tool
- AIA *Guide to Building Reuse for Climate Action*
- Historic Preservation Tax Incentives
- Commercial Property Assessed Clean Energy (CPACE)

CASE STUDIES

Case Study Goals

Studying project planning, implementation, and outcomes can help develop a holistic business case for adaptive reuse. Three adaptive reuse projects are examined in depth to

- Represent commercially successful approaches to adaptive reuse across a range of geographic locations, building types, and architectural approaches;
- Explore the economic, environmental, and social benefits of adaptive reuse as a tool for urban revitalization; and
- Tell stories that illustrate how developers overcame economic and other barriers to create successful adaptive reuse projects.

Projects were selected based on a set of shared and diverse characteristics (see figures 2 and 3). All projects were required to demonstrate the shared characteristics, which were considered fundamental to meeting the study's goals. On the other hand, selected projects needed to illustrate a range of diverse characteristics to demonstrate how adaptive reuse can be approached differently based on internal and external variables. Together, these projects exemplify the potential for adaptive reuse to create financial value for developers while generating positive social, environmental, and economic value for the surrounding community.

Project information was collected primarily through interviews and questionnaires completed with the project architects and developers. Media articles, public databases, and other online sources were referenced to supplement primary information from the project teams.

SHARED CHARACTERISTICS OF CASE STUDIES

FIGURE 2. Shared characteristics required for chosen case studies, fundamental to the study's goals.

DIVERSE CHARACTERISTICS OF CASE STUDIES

FIGURE 3. Diverse characteristics of chosen case studies that demonstrate the variety of potential approaches.

Case Study Framework

Each case study illustrates a unique approach to adaptive reuse. For a holistic view of why each project was successful, information is provided about the existing architectural and economic conditions, the financial model, the architectural approach, and the environmental sustainability outcomes.

Beyond presenting each project's approach to adaptive reuse, these cases propose a novel framework to compare urban revitalization outcomes. Absent a widely accepted method for assessing the urban revitalization impacts of commercial adaptive reuse, a simple yes/no cobenefits framework was developed, informed by existing models for evaluating urban revitalization or urban regeneration. The framework investigates how each project creates positive impacts as shown by economic, environmental, and social indicators at a community scale as described below.

ECONOMIC INDICATORS

- Population retention
- Capacity of the neighborhood to stimulate investment
- Increase in neighborhood property values
- Job creation
- Local economic output
- Number and longevity of small businesses

ENVIRONMENTAL INDICATORS

- Increase in quality and accessibility of green space or biodiversity
- Improvement in neighborhood air quality
- Improvement in neighborhood noise levels
- Reduction of urban heat island effect
- Reduction of urban flooding
- Increased use of public transit or bicycle infrastructure

SOCIAL INDICATORS

- New residential units created
- Creation of sustained destinations for graduates of higher education/job training
- Community access to new amenities or services
- Access to cultural and learning opportunities
- Opportunities for volunteering or other community participation
- Support of racial and ethnic diversity of the area

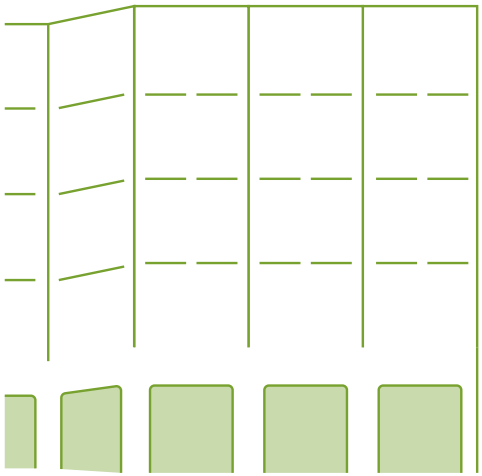
An urban revitalization profile is generated for every project based on the number of indicators present within each category, as well as its reductions in embodied carbon and avoided whole life carbon compared to new construction. The profile is not an evaluation of any project's overall success but, rather, reflects how every adaptive reuse project will contribute to urban revitalization in its own way based on the unique set of preexisting conditions, market opportunities, regulatory context, and inherent potential of the existing structure.

Oriente Green Campus. (Courtesy of KPF)

CASE STUDIES SNAPSHOT

West Bottoms Flats	Congress Square (40 Water Street)	Oriente Green Campus
Kansas City, Missouri, USA	Boston, Massachusetts, USA	Lisbon, Portugal
Original construction **1880–1920**	Original construction **1906**	Original construction **2012**
Adaptive reuse **2020**	Adaptive reuse **2019**	Adaptive reuse **2025**
Manufacturing and warehouse to market-rate apartments, microretail, and indoor/outdoor amenity space	Mixed office and retail to mixed office and retail	Retail mall to tech- and lab-enabled offices, higher education
West Bottoms Flats was the first residential development in a former industrial neighborhood. It took advantage of local and federal financial incentives to undertake a large-scale, multiphase development that catalyzed revitalization and repopulation of the district.	At a time when businesses were flocking away from the Financial District to the new ground-up Seaport District, the Congress Square development restored a historic block to its former architectural glory while adding a contemporary rooftop addition, densifying the site and bringing business back to the neighborhood.	The Oriente Green Campus tackles a prevalent outdated typology—the shopping mall—converting a massive concrete structure into a dynamic, sustainable tech hub. Light- and air-filled spaces and native landscape elements will bring up to 3,500 people to the site for education and skilled jobs.

West Bottoms Flats



SNAPSHOT

- Location: Kansas City, Missouri
- Years of original construction: 1880–1920
- Year of adaptive reuse: 2020
- Building type: Manufacturing and warehouse to market-rate apartments, microretail, and indoor/outdoor amenity space
- Overview: West Bottoms Flats was the first residential development in a former industrial neighborhood. It took advantage of local and federal financial incentives to undertake a large-scale, multiphase development that catalyzed revitalization and repopulation of the district.

HIGHLIGHTS

The Business Case: West Bottoms Flats illustrates the potential for financial reward associated with taking on the risk to develop underused properties in an emerging market. By laying the groundwork to establish a historic district and working with the jurisdiction to update the zoning code, developer MCM was able to acquire former industrial buildings at a low upfront cost and bring new housing prototypes to the neighborhood. They are now seeing the benefits in the form of steadily increasing rents, a strong population base to support new retail, and demand for higher-end units in the final development phase.

Enablers: This project used local tax abatement incentives associated with the emerging neighborhood and local and federal historic tax credits. Additionally, a public/private partnership was established to take advantage of a green infrastructure pilot program that unlocked additional funds and brought additional amenities to the project and the surrounding neighborhood.

Benefits: As the first major residential development in a former industrial neighborhood devastated by flooding more than 50 years ago, West Bottoms Flats's adaptive reuse generated economic, environmental, and social revitalization. The development catalyzed the neighborhood's repopulation, sparking broader investment and economic potential. The project's micro units support a diversity of residents and have built the base for establishing small businesses. Redevelopment of the former industrial buildings improved the environmental conditions and stormwater resilience for the broader neighborhood.

BASIC INFORMATION

- Project name: West Bottoms Flats
- Project location: Kansas City, Missouri
- Year originally constructed:
  - ◊ Abernathy Furniture Co. Building (1880) and Liberty Building (1900)
  - ◊ Bemis Bros. Bag Co. Building 921-29 & 937 Wyoming Street (1904 and 1920, respectively)
- Year of project completion: 2020
- Owner/developers, architects, and key consultants:
  - ◊ Owner/developer: Melissa M. Ferchill, MCM Company Inc.
  - ◊ Architect: BNIM
  - ◊ Historic preservation: Heather Rudge, Historic Preservation Group LLC
  - ◊ Structural: Bob D. Campbell & Co.
  - ◊ Landscape architecture: BNIM
  - ◊ Civil: Taliaferro and Browne Inc.
  - ◊ Code: FP&C Consultants KC LLC
  - ◊ Lighting design: Derek Porter Studio
  - ◊ Elevator: Kenneth H. Lemp Elevator Consultant Inc.
  - ◊ Contractor: Rau Construction Company

SETTING THE SCENE

Located in the original downtown of Kansas City, West Bottoms was founded in 1871 and served as an active stockyard and industrial area for 80 years. Devastating flooding in 1951 wiped out nearly all activity in the neighborhood, which would remain quiet for the next 40 years. After a broader exodus of residents from downtown through the mid-1900s, the city is revitalizing, with more than $4.5 billion of reinvestment in the early 2000s.

West Bottoms Flats is the first major project on the north side of the West Bottoms district. The project converted four vacant buildings in the West Bottoms North Historic District into apartments, microretail, and indoor/outdoor amenity space. Since this project, developers and residents have flocked to the area, sparking major expansion of residential, commercial, and amenity uses.

South facade of West Bottoms Flats. (Kelly Callewaert © 2020)

FINANCIAL MODEL

- Total cost of the redevelopment: $65,000,000

- Sources of funding: State and federal historic tax credits, local property tax abatement, and Kansas City stormwater pilot and Public Improvements Advisory Committee grant for streetscape improvements

Developer MCM Company Inc. was looking for scale when it found several underused historic buildings that were "quietly" for sale in West Bottoms. The neighborhood had not yet seen much redevelopment, so the properties were purchased for a competitive price, and the city offered significant property tax abatement, which made the difference for financing and the ability to set rents. Although zoning issues needed to be resolved to unlock economic development for the neighborhood, getting in early offered a financial advantage.

To unlock historic tax credits, the developer and local architects BNIM worked together to form the West Bottoms North Historic District. The historic designation unlocked the 20 percent federal and 20 percent state historic tax credits, which were critical for the project budget to pencil out. Additionally, the project secured 100 percent property tax abatement for the first 10 years, stepping down to 50 percent after that period. MCM's proven experience with multifamily adaptive reuse developments was an important factor in securing the investments needed to complete the financing for the project.

In creating West Bottoms Flats as the first residential development in the neighborhood, MCM saw an opportunity to create work-live spaces that would both create worker housing and also build up a solid population for retail in future phases. They took a risk introducing unique micro units to the market, which enabled a broader range of rent options. The micro units have remained the most popular units. They appeal to younger tenants for their sustainability value, lower utilities, and ease of furnishing the smaller living space.

MCM noted that by starting with the historic structure, they can offer tenants a higher level of quality and finish at a lower price point than in a new building. As a bonus, according to developer Melissa Ferchill, the buildings "create a very cool environment. If you're not looking for cookie-cutter, these have a lot more character."

Micro-unit apartment interior of West Bottoms Flats. (Kelly Callewaert © 2021)

ARCHITECTURAL APPROACH

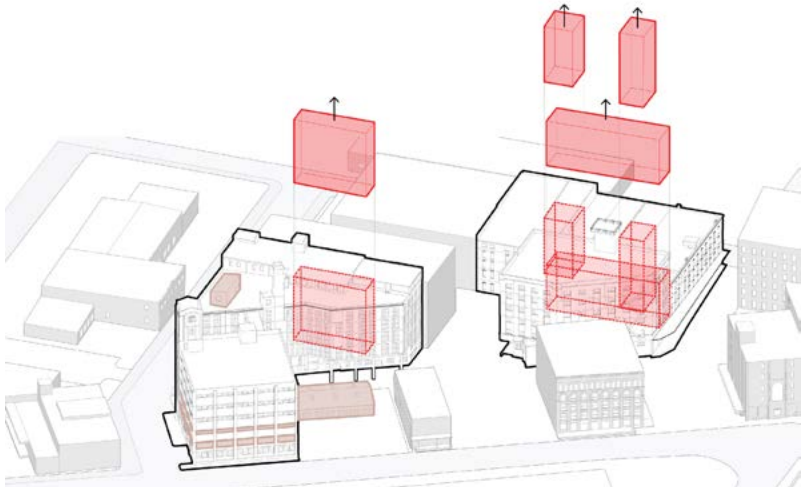
The design team approached the design with a spirit of place keeping—preserving certain characteristics and features to honor the original feeling of the buildings and neighborhood—as opposed to the place finding approach used to establish a sense of place in ground-up construction. The project's design navigated the challenge of transforming a largely abandoned industrial complex into a pedestrian-friendly, mixed-use space where residents could live and work.

The existing fabric offered many opportunities to express the buildings' distinctive character in the new spaces while retaining the neighborhood's essential historic quality.

- Historic materials—brick facades and wood-and-concrete structures—were maintained and exposed, forming the basis of the architectural palette.
- High ceilings and large windows provided beautiful natural daylight and expansive views from the apartments. All existing windows were replaced with high-performance replica units.
- Graffiti and original signage were repurposed as art throughout the spaces.
- Street art murals contributed to the building's layered cultural significance. These murals were preserved through the renovation, and new murals were commissioned to continue expanding the legacy.

The industrial use of the historic buildings had created unique conditions. The architectural design embraced these challenges to transform the warehouses for residential use.

- The deep floor plates initially designed to suit the original warehouse were not conducive to apartment units. New "light courts" were created through selective demolition to bring natural daylight and ventilation to each apartment.
- Raised floors were installed in apartments to mitigate high windowsill heights without enlarging the existing openings.
- The buildings' original entrances were elevated to allow goods to be efficiently loaded onto rail cars, which posed a challenge for accessibility. Rather than install many ramps, the loading docks were reimagined as welcoming front porches, and landscape design was used to subtly regrade up to the entry level with minimal guardrails.



Demolition diagram of West Bottoms Flats. (Courtesy of BNIM)

SUSTAINABILITY APPROACH

Architecture firm BNIM leveraged the existing building's characteristics with new architectural interventions to improve the project's sustainability.

- Where possible, existing materials were used as finishes, reducing embodied carbon and raw material use while lending unique character to each space. One example is the old sack slides that were used in the Bemis Factory. Floor slabs around the slides were infilled for safety, but the historic slides were maintained as objects in the space which became the gym. Minimizing new finishes also reduced the introduction of volatile organic compounds and other chemicals of concern into the units.
- New replica windows used low-emissivity glazing, reducing energy consumption and improving occupant comfort.
- Light wells were carved into the building to introduce natural light and natural ventilation into every apartment, contributing to resident well-being and reducing energy consumption.
- The wood beams that were removed to create light wells were repurposed throughout the project for feature walls and furniture.
- As described more in the next section, an extensive green infrastructure initiative was undertaken with the project that mitigates stormwater runoff, supports local biodiversity, and improves air quality.

Figure 4 illustrates the embodied, operational, and total carbon outcomes of this project compared to comparable new construction. The operational emissions of the adaptive reuse are code compliant and thus similar to those of standard new construction. A 60 percent reduction in embodied emissions achieved through reuse results in a 37 percent reduction in whole life carbon for the first decade of operations following the adaptive reuse project.

CARBON OUTCOME COMPARISON: WEST BOTTOMS FLATS VS. NEW CONSTRUCTION

Outcome	Project	New Construction	Reduction
Predicted annual operating emissions ($mtCO_2eq/yr$)	990*	991	0%
Upfront embodied carbon ($mtCO_2eq$)	6,533	19,300	60%
Whole life carbon over 10 years ($mtCO_2eq$)	16,433	56,503	37%

* Code baseline energy performance based on the 2012 International Energy Conservation Code with amendments.

FIGURE 4. Embodied, operational, and total carbon outcomes of this project compared to new construction.

URBAN REVITALIZATION COBENEFITS

The effects of the West Bottoms Flats redevelopment weren't limited to just the buildings but were extended to the surrounding neighborhood. As the first large-scale housing development in the area since the devastating floods of the mid-20th century, the project played a large role in reestablishing the neighborhood's population, tax base, and retail potential.

Economic: West Bottoms Flats exemplifies adaptive reuse as a catalyst for urban regeneration. By taking a risk and doing the legwork to establish a new historic district and develop the first major residential project in a disinvested neighborhood, the developers were able to leverage a low purchase price and multiple financial incentives at the local, state, and federal levels to f the project. The project is now 94 percent leased, with sustainable rent increases since the property initially opened. It brings in the highest rent per square foot in the district. The success of previous phases of development and the increasing popularity of the neighborhood have enabled the third phase of construction at West Bottoms Flats to cater to a more upscale class of renters, and there is now a solid population to support local retail in the first-floor spaces. The project sparked a surge of development, including a more than $500 million, 21-acre project by New York–based developer SomeraRoad, which is underway. The neighborhood is a success story—according to MCM, while they originally paid $7.50–$8.00 per square foot, space now trades at more than $40.00 per square foot unimproved.

Environmental: As a pilot green infrastructure project, BNIM designers partnered with the Kansas City Missouri Water Services Department to develop and integrate innovative stormwater strategies into the amenity courtyards and historic alleys. The project captures, stores, and infiltrates stormwater from the building roofs and the ground. Biofiltration zones were cut into the ground in areas with poor drainage to alleviate flooding and take advantage of the underlying soils that can absorb water very quickly, which also helps bring greenery back into a postindustrial area. The runnels form a boundary for the courtyard space and act as seating. This added element offered a win-win to the neighborhood, bringing additional funding to the project and improving the public infrastructure while acting as a placemaking amenity for the neighborhood.

In addition, the project maintained historic courtyards, which were among the few existing green spaces in the neighborhood. Pedestrian-oriented design was used to reestablish vitality in the surrounding streetscape and to heal the landscape.

Social: West Bottoms Flats has added 359 units to this Kansas City neighborhood. The creation of microapartments responded to a previously unidentified market demand, providing more affordable and minimal housing options with plenty of character. These units act as a prototype for future residential development and support a more diverse population. In addition, the complex provides open space and green space amenities for the community, reestablishes a pedestrian realm, and fosters a sense of place through murals by local artists.

URBAN REVITALIZATION ASSESSMENT

Within the urban revitalization framework, the West Bottoms Flats project demonstrates positive outcomes across all six economic indicators, three out of six environmental indicators, and four out of six social indicators (see figure 5 for a breakdown of the project's outcomes).

The urban revitalization profile of West Bottoms Flats (see figure 6) illustrates that the project was able to achieve all six of the economic revitalization indicators because of its status as the first project in what would become a successfully renewed neighborhood. The project was able to take advantage of a public/private partnership to bring environmental revitalization benefits to the once industrial neighborhood. The mix of unit sizes and price points enabled people of diverse demographics to repopulate the project.

By reusing the majority of the original structure and minimizing new materials, the project was able to reduce embodied carbon compared to new construction by 60 percent. Although energy use reductions were limited, the project still yields a 10-year total carbon savings of 37 percent compared with code-compliant new construction.

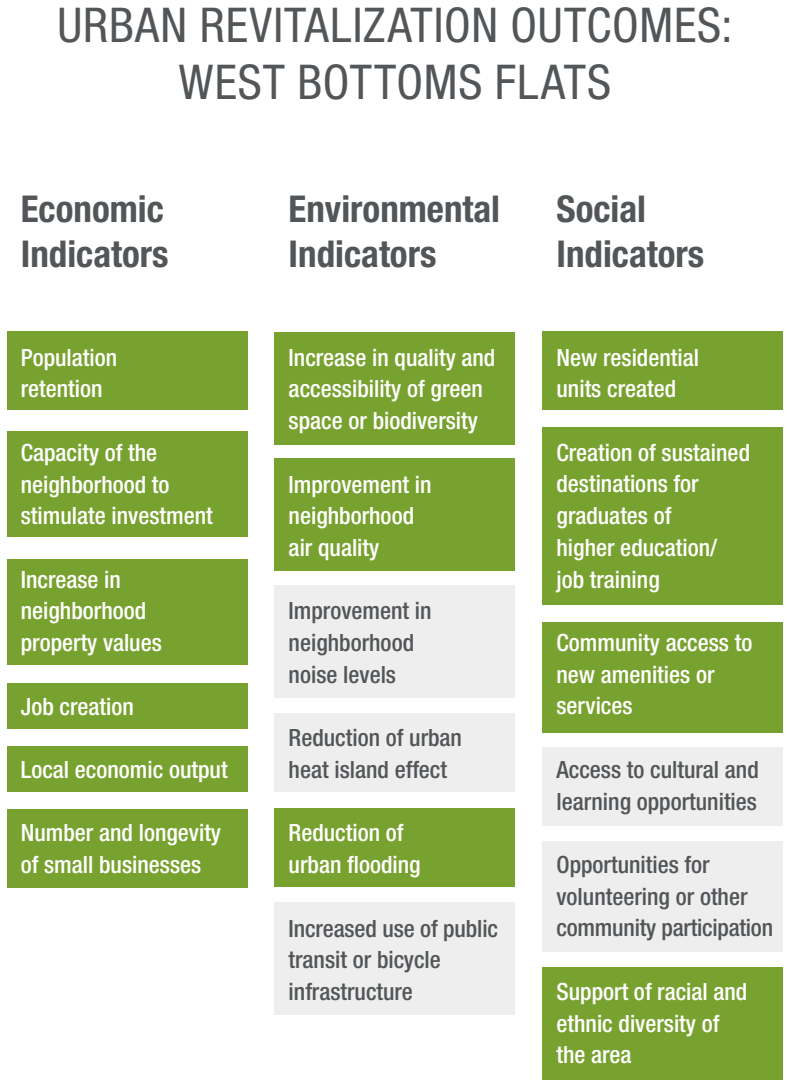


FIGURE 5. The urban revitalization assessment of West Bottoms Flats. Green boxes indicate the observed outcomes of the project.

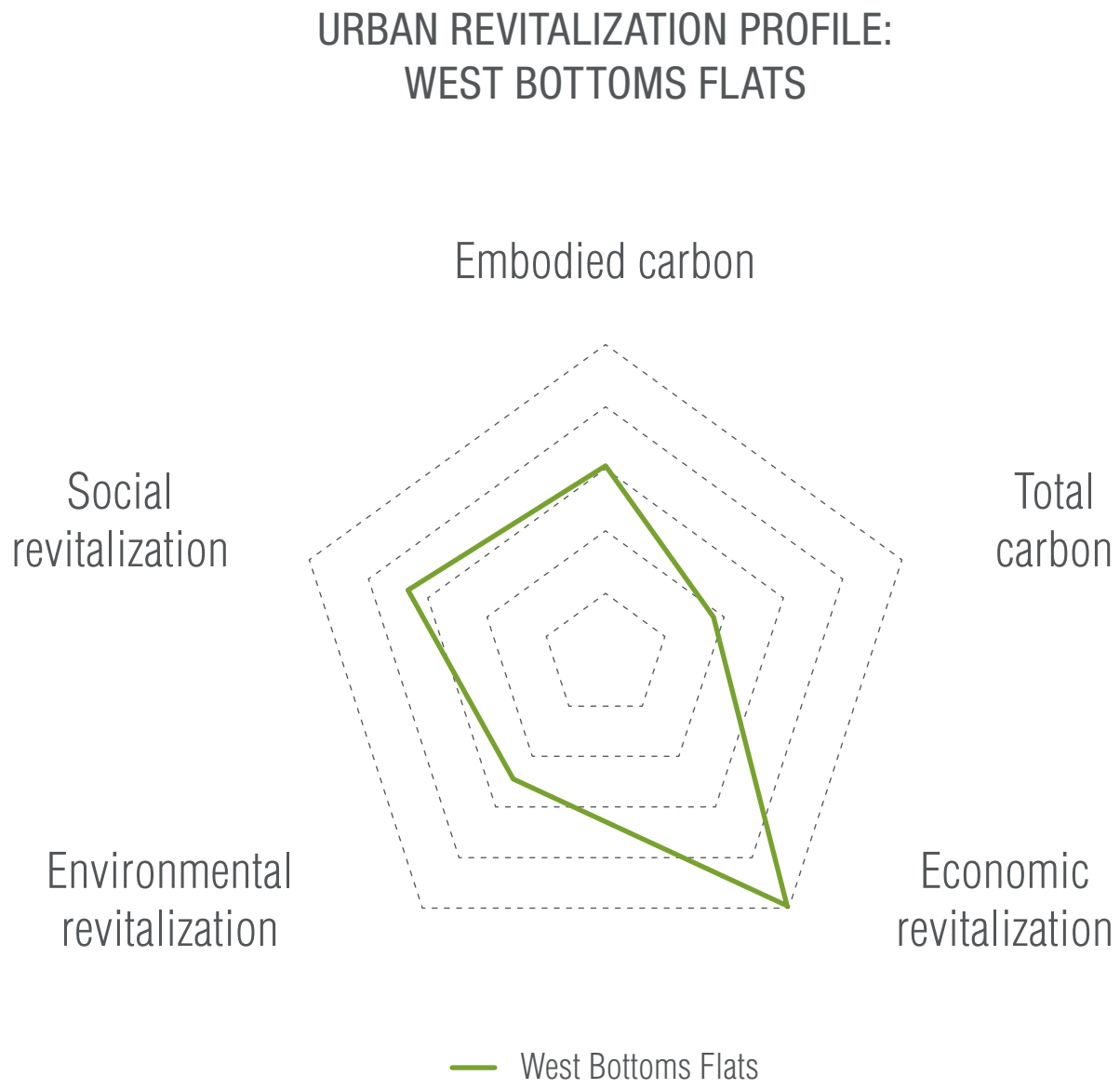
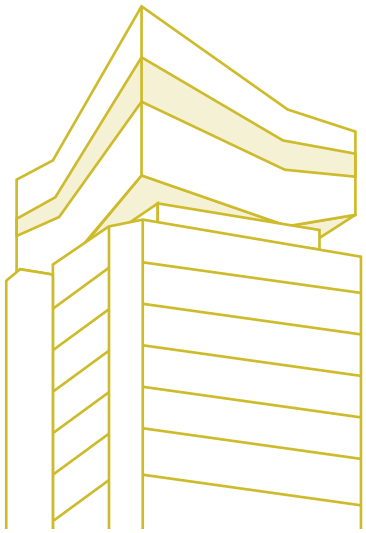


FIGURE 6. The urban revitalization profile of West Bottoms Flats.

Congress Square



SNAPSHOT

- Location: 40 Water Street, Boston, Massachusetts
- Year of original construction: 1906
- Year of adaptive reuse: 2019
- Building type: Mixed office and retail to increased-density mixed office and retail
- Overview: At a time when businesses were flocking away from the old Financial District to the ground-up Seaport District, the Congress Square development restored a historic block to its former architectural glory while adding a contemporary rooftop addition, densifying the site and bringing business back to the neighborhood.

HIGHLIGHTS

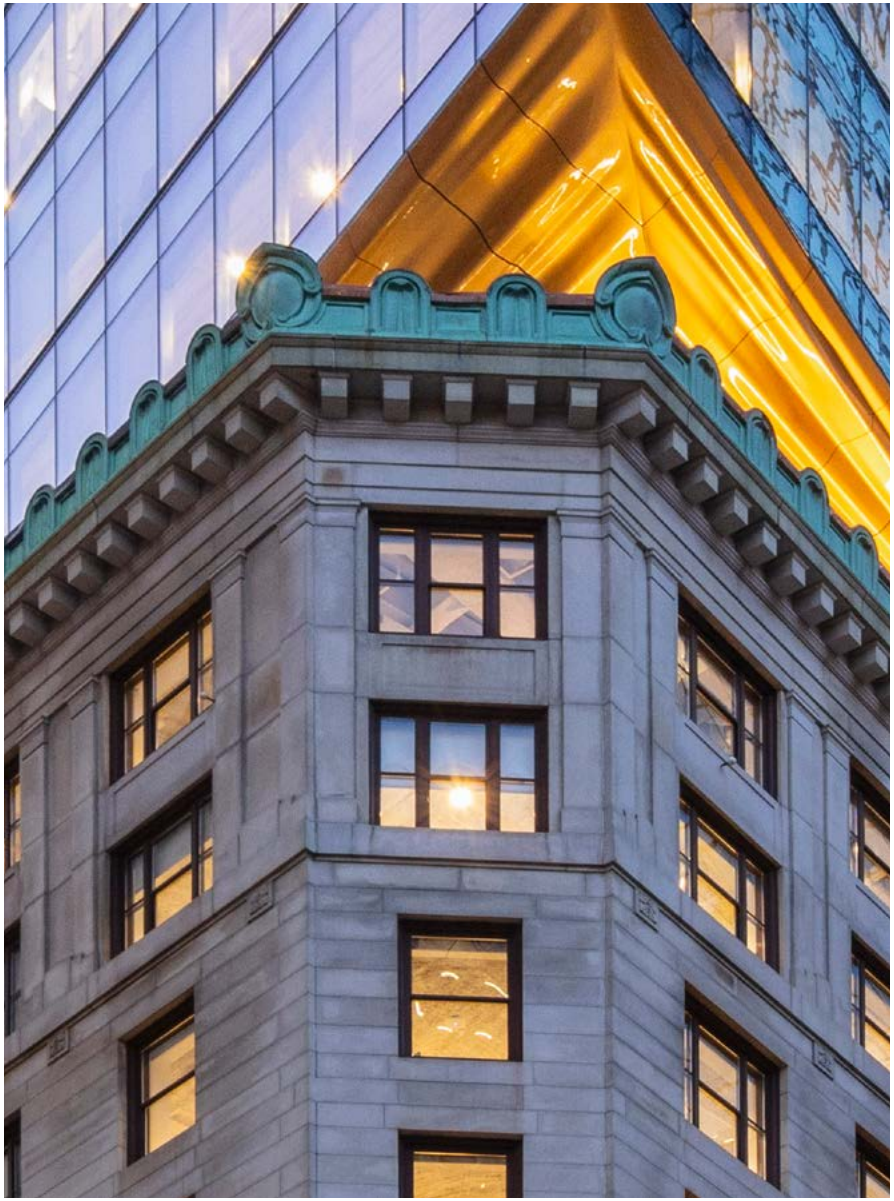
The Business Case: The Congress Square project highlights the potential of preserving historic buildings while creating high-class office and retail spaces. By preserving the existing properties at Congress Square and adding a seven-story glass addition to the top of the building, this renovation created a modern office space that preserved the cultural value of Boston's Financial District. Compared with adjacent properties, Congress Square has seen a 105 percent increase in market value over the past five years.

Enablers: Added density was key to the project's viability. Efficiencies in the interior floor plates were gained by consolidating cores, and the rooftop addition was critical both to unlocking additional square footage and to rebranding the building. The bold new design blended with the preserved historic facades introduced a new architecture to the financial district.

Benefits: Congress Square created a destination within Boston's financial district, which was in a period of declining occupancy in 2016 at the time of the adaptive reuse. This project added urban density, increased tenant occupancy, and brought new commercial entities to the area, while maintaining the neighborhood's historic character. It preserved 77 percent of the project's original structure and decreased the whole life carbon footprint of the building compared to new construction.

BASIC INFORMATION

- Project name: Congress Square
- Project location: 40 Water Street, Boston, Massachusetts (Financial District)
- Year originally constructed: 1906
- Year of project completion: 2019
- Owner/developers, architects, and key consultants
  - ◊ Developer: Related Beal
  - ◊ Architect: Arrowstreet
  - ◊ Mechanical, electrical, and plumbing engineer: Cosentini Associates
  - ◊ Structural engineer: McNamara Salvia
  - ◊ Civil engineer: Nitsch Engineering
  - ◊ Construction manager: Consigli Construction



Congress Square. (Courtesy of Arrowstreet)

SETTING THE SCENE

Located in Boston's Financial District, Congress Square sits on the northern point of Post Office Square. The property at 40 Water Street was originally constructed in 1906 and was the original home of the National Shawmut Bank. At the start of the renovation, the property consisted of three separate structures built within a 20-year period. Before the 2019 renovation, the building had occupied office space and unoccupied ground-floor retail space. The 2019 renovation included retaining 77 percent of the building's existing structure and the addition of a seven-story, 120,000-square-foot glass addition.

At the time of renovation, the Financial District was experiencing a decline in commercial tenants, with many financial and tech companies preferring the modern feel of the developing Seaport area. In 2016, many companies were moving from Boston's Financial District to the Seaport neighborhood, which was seen as a more desirable office location with new buildings along the waterfront. At the time, 20 percent of the top floors in the Financial District was vacant, and the district lost more tenants per square foot than any other area in Boston. There was an additional 850,000 unoccupied square feet in 2016 compared to 2015. The goals of this project were to preserve this historic block of buildings, create a space that would appeal to modern industries, and enhance Congress Square as a destination with access to public transportation.

40 Water Street, 1908. (Courtesy of Arrowstreet)

FINANCIAL MODEL

Adaptive reuse of Congress Square presented the financial opportunity to create a real destination in the Financial District. Although the project development team did not receive direct financial incentives for reusing the existing building and even faced some additional costs for asbestos removal and structural alterations of the historic systems, reuse of the historic structures expedited the permitting process and saved money by avoiding the need for approval from the Boston Landmarks Commission.

One hope for the project was that it would assist in leasing efforts and drive interest back into an area of the city that was seeing a decline in commercial occupancy. This has proved successful, with a 105 percent increase in the market value of the property from 2019 to 2024, compared with 10 to 25 percent increases for adjacent properties in the Financial District.

ARCHITECTURAL APPROACH

- Conditioned square footage before renovation: 308,000 square feet
- Conditioned square footage after renovation: 428,000 square feet
- Programmatic use before and after renovation: retail and office space, ground floor office space converted to retail

The purpose of the Congress Square renovation was to develop a new solution to historic preservation and urban densification that did not require tearing down the existing structure. The project preserved the existing facade and the majority of the property's structure while adding a seven-story, 120,000-square-foot glass addition to the top of the building. Together, these two design priorities provided urban density to the Financial District while preserving the heritage of the building.

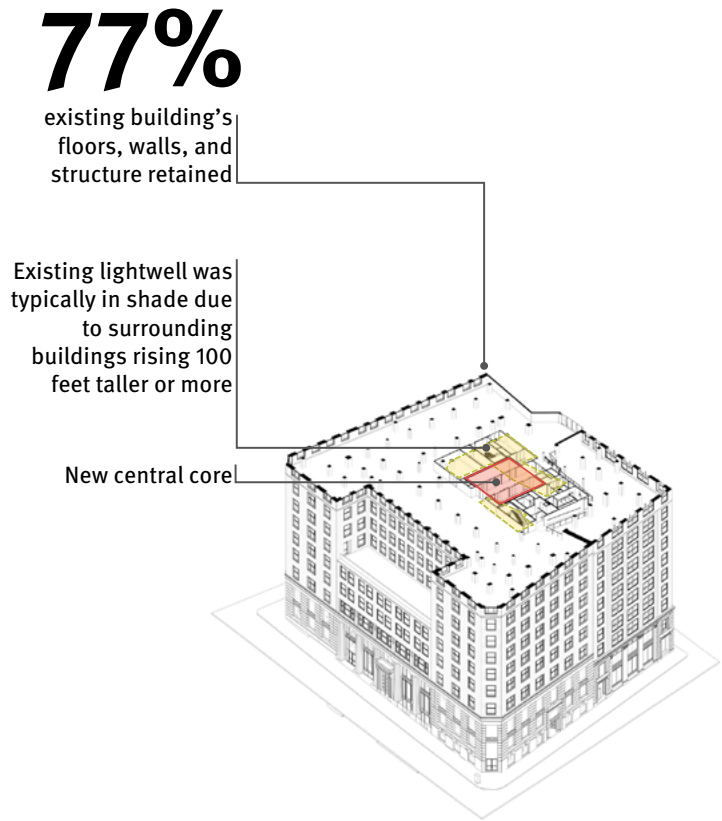
The previous development was an aggregation of three buildings that were constructed over a period of 20 years, which resulted in an inefficient space that was crowded by multiple mechanical, restroom, and elevator cores. The property's renovation removed the redundant core elements, infilled an underused light well, and replaced the eliminated features with a new central building core that provided valuable square footage. This approach densified the site and enabled 77 percent of the building's existing walls, floor, and structures to be retained while improving the building's sight lines, giving the space a more modern appeal.

In addition, previous renovations of the building had obscured the grandeur of the building's original ornate lobby ceiling with dark paint and downlighting. The ground-floor windows were screened by heavy metal grillwork and dark glazing, originally for the purpose of financial security when the building was home to the National Shawmut Bank. On the interior, the restoration used white paint and modern uplights to restore the original brightness to the space and highlight the building's elaborate lobby ceiling. On the exterior, the glazing was replaced with energy efficiency low-iron glazing and sections of the metal window screens were removed. Together, these design elements create a visual connection from the street to the historic interior and increase public access to the historic building.

MAXIMIZING REUSE

By removing the redundant core elements, and infilling an underutilized lightwell with an efficient, centralized core, valuable square feet were added and usable floors became more open with improved sight lines to attract modern tenants. In addition, over 75% of the existing building's walls, floors, and structure were retained, helping the project earn LEED Gold Certification.

The primary design challenge for the project was how to add much-needed density without negatively affecting the district's architecture. The seven-story glass addition was carefully designed to align with key historical elements of the existing architecture while providing modern office spaces. The glass panes come together at the points of the building's three original structures, including where 40 Water Street and the Monks Building meet along Congress Street and where 40 Water Street and the 1921 Devonshire addition meet along Devonshire Street.



Congress Square: 77 percent of existing building retained. (Courtesy of Arrowstreet)

SUSTAINABILITY APPROACH

The primary sustainability approach for the project was the preservation of the property's existing buildings to reduce embodied carbon emissions and construction materials. The renovation retained 77 percent of the existing floors, walls, and structures. Redundant core elements were removed, and an efficient building core was built in their place. Instead of using temporary steel for shoring during construction, the design ensured that the shoring steel could remain and be part of the building's permanent construction, further reducing materials. Compared with a newly constructed building of this size, the project achieved a 7.2 percent improvement in whole life carbon.

To reduce operational emissions, a high-performing curtain-wall enclosure was used on the glass addition, some existing window glazing was replaced with high-performance glazing, and daylight was optimized through the floor plan. In addition, LED lighting, high-efficiency boilers for heating, and energy recovery ventilation systems were installed. Together, these elements prioritize the well-being of occupants by ensuring access to daylight, improving thermal comfort, and creating outdoor workspaces. The renovation achieved a Leadership in Energy and Environmental Design (LEED) Gold certification.

Figure 7 illustrates the embodied, operational, and total carbon outcomes of this project compared to those of comparable new construction. This project was completed under Massachusetts's ambitious energy code, so this renovation and new construction would have similar levels of high energy performance. A 60 percent reduction in embodied emissions achieved through reuse results in a 35 percent reduction in whole life carbon for the first decade of operations following the adaptive reuse project.

CARBON OUTCOME COMPARISON: CONGRESS SQUARE VS. NEW CONSTRUCTION

Outcome	Project	New Construction	Reduction
Predicted annual operating emissions ($kgCO_2eq/yr$)*	1,443,395	1,443,395	0%
Upfront embodied carbon ($mtCO_2eq$)	7,952	19,881	60%
Whole life carbon over 10 years ($mtCO_2eq$)	22,386	58,291	35%

* Based on Massachusetts Building Energy Code.

FIGURE 7. Embodied, operational, and total carbon outcomes of this project compared to new construction.

URBAN REVITALIZATION COBENEFITS

Economic: During the period the Congress Square project was designed, the Financial District was experiencing a decline in office tenants, as tenants were often moving to new construction within the Seaport area of Boston. By developing a modern office space that preserved the historic character of the district, the 40 Water Street project helped to encourage tenant retention and encouraged new tenants to move to the Financial District. In addition, the Congress Square development included renovation of 68 Devonshire into a hotel by another developer, bringing economic investment and commerce into the Financial District. The space has the capacity to support up to 1,100 permanent jobs.

Environmental: The Congress Square project retained the original footprint of the three buildings. The roof was replaced with a white membrane, and the rooftop terraces are highly reflective. Together, these new light surfaces reduce the urban heat island impacts, particularly in an already existing high-density urban setting. In addition, the project does not include any on-site parking, and a new entrance was added to the north facade on Quaker Lane to increase direct access to nearby public transportation.

Social: Ground-floor office spaces were converted for retail to provide public access to the historically significant spaces and support pedestrian traffic in the area. The service lane on Quaker Lane was converted into a public access, which provides an additional entrance connected with the city's existing public transportation infrastructure. Together, these elements were intended to increase public access and exposure to this historic landmark in Boston's Financial District.

Congress Square deck. (Courtesy of Arrowstreet)

URBAN REVITALIZATION ASSESSMENT

Within the urban revitalization framework, Congress Square demonstrates positive outcomes across five out of six economic indicators, three out of six environmental indicators, and two out of six social indicators (see figure 8 for a breakdown of the project's outcomes).

The urban revitalization profile of Congress Square (see figure 9) reflects the commercial nature of Boston's Financial District. Although the project did not provide housing or focus on resident amenities, given its location, it achieves nearly all the economic revitalization indicators by bringing new jobs and businesses back to the neighborhood. The increase in market value of the property compared to new construction in the vicinity demonstrates the value of historic character and the appeal of design that blends new and old. Additionally, the existing environmental regulations of the city ensure that the sustainable performance of the project is on par with that of new construction with respect to energy use and operating emissions.

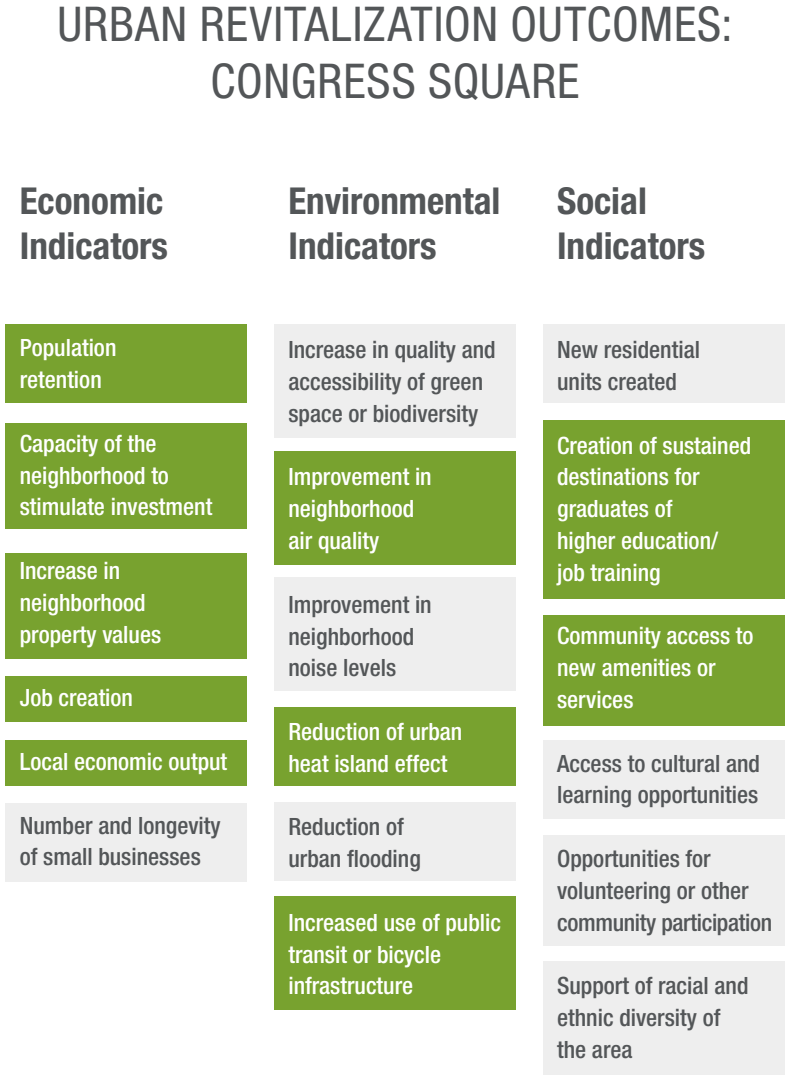


FIGURE 8. The urban revitalization assessment of Congress Square. Green boxes indicate the observed outcomes of the project.

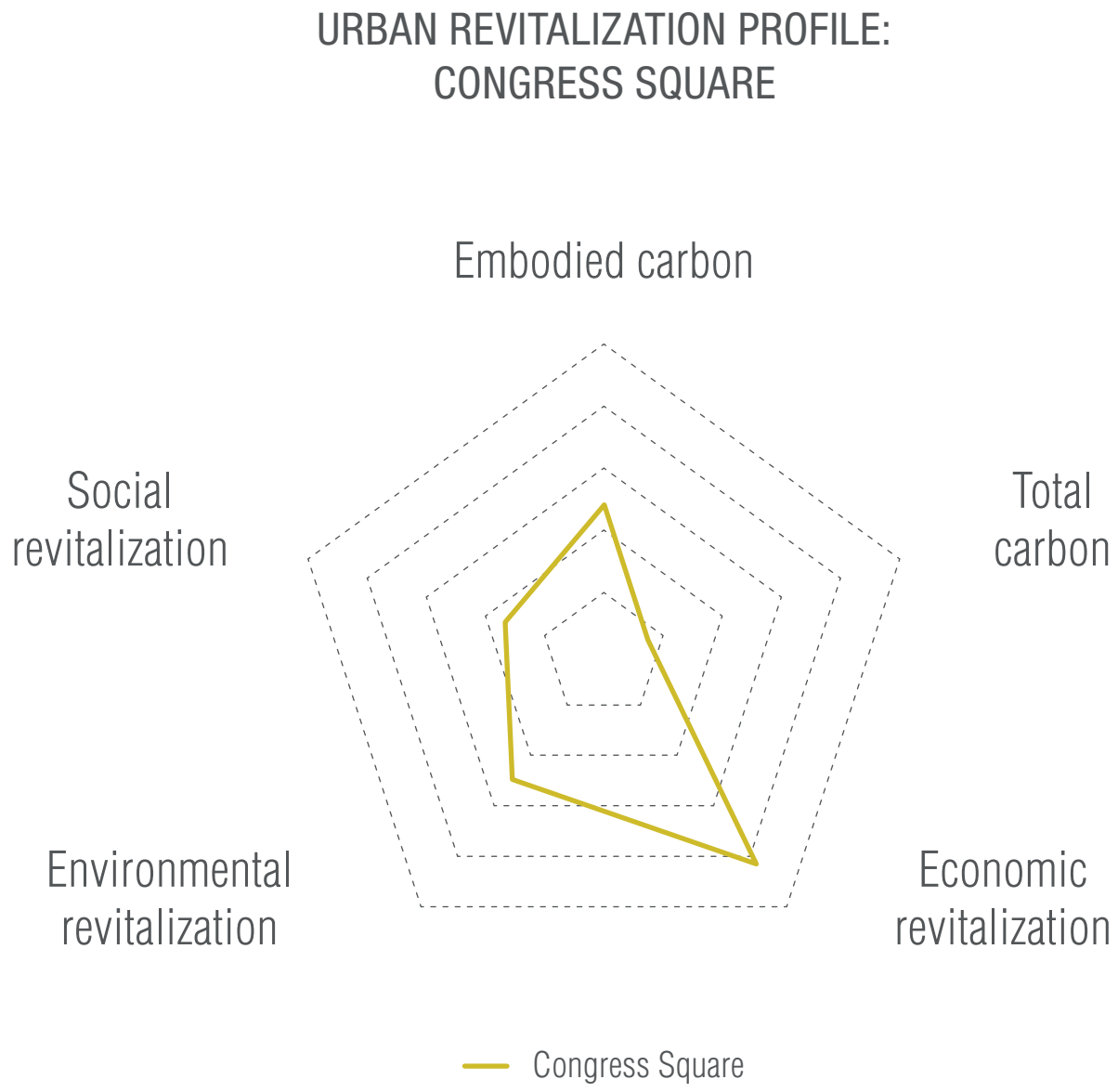
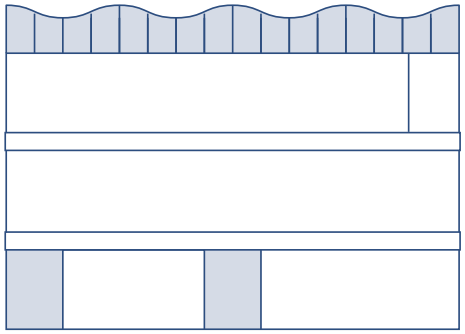


FIGURE 9. The urban revitalization profile of Congress Square.

Oriente Green Campus



SNAPSHOT

- Location: Lisbon, Portugal
- Year of original construction: 2012
- Year of adaptive reuse: 2025
- Building type: Retail mall to tech- and lab-enabled offices and higher education
- Overview: The Oriente Green Campus tackles a prevalent outdated typology—the shopping mall—converting a massive concrete structure into a dynamic, sustainable tech hub. Light- and air-filled spaces and native landscape elements will bring up to 3,500 people to the site for education and skilled jobs.

HIGHLIGHTS

The Business Case: The Oriente Green Campus had the right combination of variables to make the adaptive reuse formula work. As a previously abandoned shell of a retail mall in a neighborhood with near-zero office vacancy, both the bank and the city were highly motivated to see the project succeed. Reusing the existing structure saved money on materials and project delivery time, and the scale of the structure allowed the creation of a tech campus that had not existed in the market. The outcome is a campus of unique, human-scale spaces leased to a complementary combination of university and commercial tenants. When occupied, the campus tenants will support local retail and service businesses, creating more demand in the local real estate market.

Enablers: The municipality's support was a major factor in the project's success. The public planners wanted the building to be completed and occupied productively, and they collaborated with the development team to this end. For example, a "groundscraper" of this size would not likely have been approved for ground-up construction, but adaptive reuse made the massive existing structure more human scale and pedestrian friendly.

Benefits: The project brings significant environmental, social, and economic benefits to the local community. The more than 2,500 expected corporate occupants, along with university students, faculty, and staff, will bring economic activity to the area and stimulate further investment. The green roofs and terraces with local plantings will improve environmental conditions by reducing the urban heat island, managing stormwater, and improving biodiversity. The sense of community in the neighborhood will be supported by specially commissioned public art, educational and cultural initiatives, and partnerships with local community groups and businesses.

BASIC INFORMATION

- Project name: Oriente Green Campus
- Project location: Lisbon, Portugal
- Year originally constructed: 2012
- Year of project completion: 2025
- Owner/developers, architects, and key consultants:
  - ◊ Client: Multiusos Oriente FEIIF managed by Norfin SGOIC
  - ◊ Architects: KPF Associates and Saraiva + Associados (Architect of Record)

SETTING THE SCENE

The Oriente Green Campus is in the Moscavide neighborhood, a historically industrial area near the River Tagus. The project is part of a broader revitalization of Parque das Nações, originally developed for the 1998 World Exposition, into an innovation district and tech hub. Located near the Moscavide train and metro station, the Lisbon Portela International Airport, and a police and fire station, the unoccupied existing building was well-placed relative to local amenities but was cut off from the center of urban activity.

Designed as a retail mall, the original construction was abandoned before project completion. The unfinished structure sat vacant for years, creating a liability for the city and a lost opportunity for the community. In a market with high demand for office space, this adaptive reuse project activates the site and breaks down what had been a stark edge between the site and the urban amenities.

Oriente Green Campus prior to adaptive reuse project. (Courtesy of KPF)

FINANCIAL MODEL

According to Orion, the private equity group behind the Oriente Green Campus, they pursued the project because it had all the necessary factors for a sound financial investment. Because the site was abandoned, it could be acquired from the bank at a reduced cost, and the city provided permitting flexibility to encourage development. Factors such as very low office vacancy in the area, proximity to amenities, and a chance to offer unique space types and sizes in the local market made the project commercially viable.

The existing concrete structure was one of the project's greatest assets. It had floor-to-floor heights, column grid size, and structural capacity to easily accommodate a change of use. Reusing most of what was already there and avoiding the need for extensive structural upgrades substantially reduced the time to market, as well as reducing construction costs and bringing spaces online quickly enough to respond to market demand. Additionally, less than 10 percent of the construction costs went toward the building structure, compared with 20 to 25 percent for a typical new construction project.

Another inherent opportunity lay in the existing structure's scale. Whereas it is highly unlikely that the city would have permitted such a large office development as new construction, the adaptive reuse of this groundscraper created a new campus all in one building. Half of the space has already been leased to a university, while the other half is subdivided into a series of leasable commercial spaces. This synergy of uses has been a draw to tenants; students bring energy and continuous activity to the campus, while corporations bring jobs and training opportunities.

The project also demonstrates that economic prosperity and environmental sustainability go hand in hand. In addition to the money saved on mechanical systems by using passive ventilation and on structure through reuse, the green credentials of the project have been a major asset in the ability to lease the spaces. As the first LEED and WELL Platinum building in Lisbon, sustainability was a real differentiator.

Oriente Green Campus. (Courtesy of SPACESANDPLACES)

ARCHITECTURAL APPROACH

The primary design challenge of the Oriente Green Campus adaptive reuse was to transform an abandoned mall with good bones but no character into a jubilant, natural light- and air-filled space for innovation. An approach of subtraction and sculpting was applied to convert a building closed off to its natural surroundings to one that promotes occupant connection to the outdoors through daylight, natural ventilation, and unique views from each space. The design blurs boundaries between formal and informal spaces to create cutting-edge workplaces, provide spatial diversity, and emphasize occupant well-being.

The existing concrete structure was robust and flexible, creating a blank slate for the new architectural vision. The building was opened up by removing partitions and opaque facade elements and, most notably, cutting large new courtyards into the space. Despite the need for some structural reinforcements, working within the existing structural grid, keeping rooftop addition structure lightweight, and avoiding alterations that would require upgrades to the foundation effectively exploited the existing building to minimize construction duration and costs while achieving a remarkable transformation.

The result is a series of spaces organized around courtyards and terraces, all connected by a horizontal circuit and vertical circulation hubs, which effectively break down the monumental, monolithic building into human-scale, humane spaces. The outdoor areas, planted with local greenery, play an important role in the connection of occupants to their natural surroundings.

Oriente Green Campus. (Courtesy of SPACESANDPLACES)

SUSTAINABILITY APPROACH

The design approach at the Oriente Green Campus focused on enabling passive performance in response to the mild climate of Lisbon. With high floor-to-ceiling dimensions and a lot of building perimeter, the existing structure lent itself to modifications that support natural daylight, passive ventilation, and access to the outdoors throughout the space. The project is targeting LEED Platinum, WELL Platinum, and WiredScore Platinum certifications.

Energy and Carbon: The project is predicted to have energy savings of more than 37 percent, achieved through a number of strategies, including the following:

- Optimized thermal insulation of the roof and walls
- Exterior shading to minimize solar gains and glare
- Natural ventilation that will supply clean air for about 35 percent of the year
- High-efficiency lighting
- Roof-mounted photovoltaic panels

Figure 10 illustrates the embodied, operational, and total carbon outcomes of this project compared to comparable new construction. This project uses all-electric systems and has a contract for 100 percent renewable energy from the local utility, resulting in net zero annual operating emissions. A 58 percent reduction in embodied emissions achieved through reuse of the building's carbon-intensive concrete frame results in a 70 percent reduction in whole life carbon for the first decade of operations following the adaptive reuse project.

CARBON OUTCOME COMPARISON: ORIENTE GREEN CAMPUS VS. NEW CONSTRUCTION

Outcome	Project	New Construction	Reduction
Predicted annual operating emissions ($kgCO_2eq/yr$)	0	1,703,280*	100%
Upfront embodied carbon ($mtCO_2eq$)	17,375**	41,454**	58%
Whole life carbon over 10 years ($mtCO_2eq$)	17,375	58,486	70%

* Calculated from baseline construction using the Climate Bonds Initiative Calculator.

** Embodied carbon numbers include building structure and enclosure as modeled by KPF.

FIGURE 10. Embodied, operational, and total carbon outcomes of this project compared to new construction.

Occupants' physical and mental well-being was a focus of the design, from spatial organization down to materials selection. Strategies included the following:

- Access to the landscaped outdoor spaces
- Daylight access and views to the outdoor from interior spaces
- Dedicated rooftop gardens for food production
- Architectural finishes including ceilings, flooring, and adhesives using more than 90 percent low-emitting materials
- Advanced ventilation design, such as particle filtration and interior cross-contamination prevention, with enhanced source control and monitoring
- Architectural design and signage to encourage mobility and outdoor space use

The project achieved a 50 percent reduction in water use through efficient plumbing fixtures, rainwater collection, and a graywater reuse system. Smart water metering of the main system and subsystems will support future water use reduction and management, helping to target and resolve any issues that arise in the system through use.

URBAN REVITALIZATION COBENEFITS

Economic: The project is anticipated to play a significant role in bringing new economic activity to the neighborhood. Innovation districts such as this bring together people of diverse backgrounds and life stages to foster the exchange of ideas and spark collaboration. The academic side will bring students from Lisbon and abroad to the site, while the corporate side will employ more than 2,500 professionals. This influx is anticipated to create substantial demand for new housing, as well as new small businesses from cafes and supermarkets to pharmacies and laundromats. The increase in foot traffic and added demand for housing, retail, and hospitality are expected to drive further investment in the area, contributing to long-term economic growth and resilience.

Environmental: Oriente Green Campus contributes to the ecosystem restoration and climate resilience of its neighborhood. The project includes nearly 6,900 square meters of green roofs and terraces planted with native or adaptive species, which support biodiversity, manage stormwater, and mitigate urban heat island effect. Light-colored, low-absorption materials were also selected for outdoor pavement to further reduce urban heat island effect. The rainwater collection system retains stormwater on-site, reducing runoff and mitigating flooding in case of extreme weather events. Outdoor lighting minimizes light pollution to the surrounding areas through the use of reduced-intensity and downward-facing installations.

Social: The project has focused on community well-being through the design and construction process and expects to deliver many additional social revitalization benefits as the spaces are occupied. The developer engaged the local community through the course of design and construction, including by hosting artistic and musical events in the building and commissioning new artwork curated by Underdogs (Cultural Affairs), a cultural platform for local artists. The property managers plan to continue to engage community through events and workshops; they are currently establishing relationships with local businesses and institutions to support awareness campaigns, donation drives, and volunteer opportunities. Additionally, the project will support the attraction and retention of a skilled workforce in the area; there are already conversations underway to form partnerships between university and business tenants on the site, enabling pathways for long-term professional development of occupants.

URBAN REVITALIZATION ASSESSMENT

Within the urban revitalization framework, the Oriente Green Campus is anticipated to demonstrate positive outcomes across six out of six economic indicators, five out of six environmental indicators, and four out of six social indicators (see figure 11 for a breakdown of the project's outcomes).

The urban revitalization profile of Oriente Green Campus demonstrates the breadth of impact achieved by activating the large abandoned existing building to create improved economic, environment, and social conditions in the neighborhood. As shown in figure 12, efforts by the development team to engage the local community created cultural and community participation opportunities beyond what may typically result from commercial and higher education uses. Additionally, by both reusing the majority of the structure and using renewable energy in the building, the project achieves a substantial total carbon reduction in the critical near term.

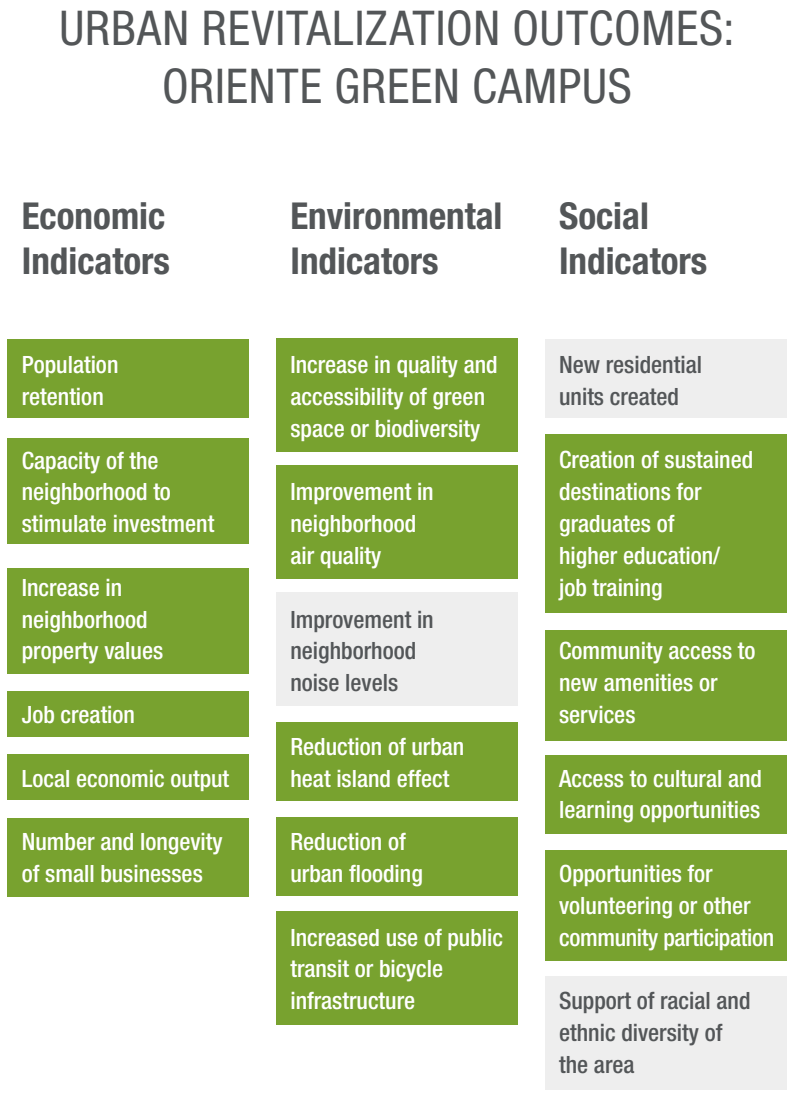


FIGURE 11. The urban revitalization assessment of Oriente Green Campus. Green boxes indicate the observed outcomes of the project.

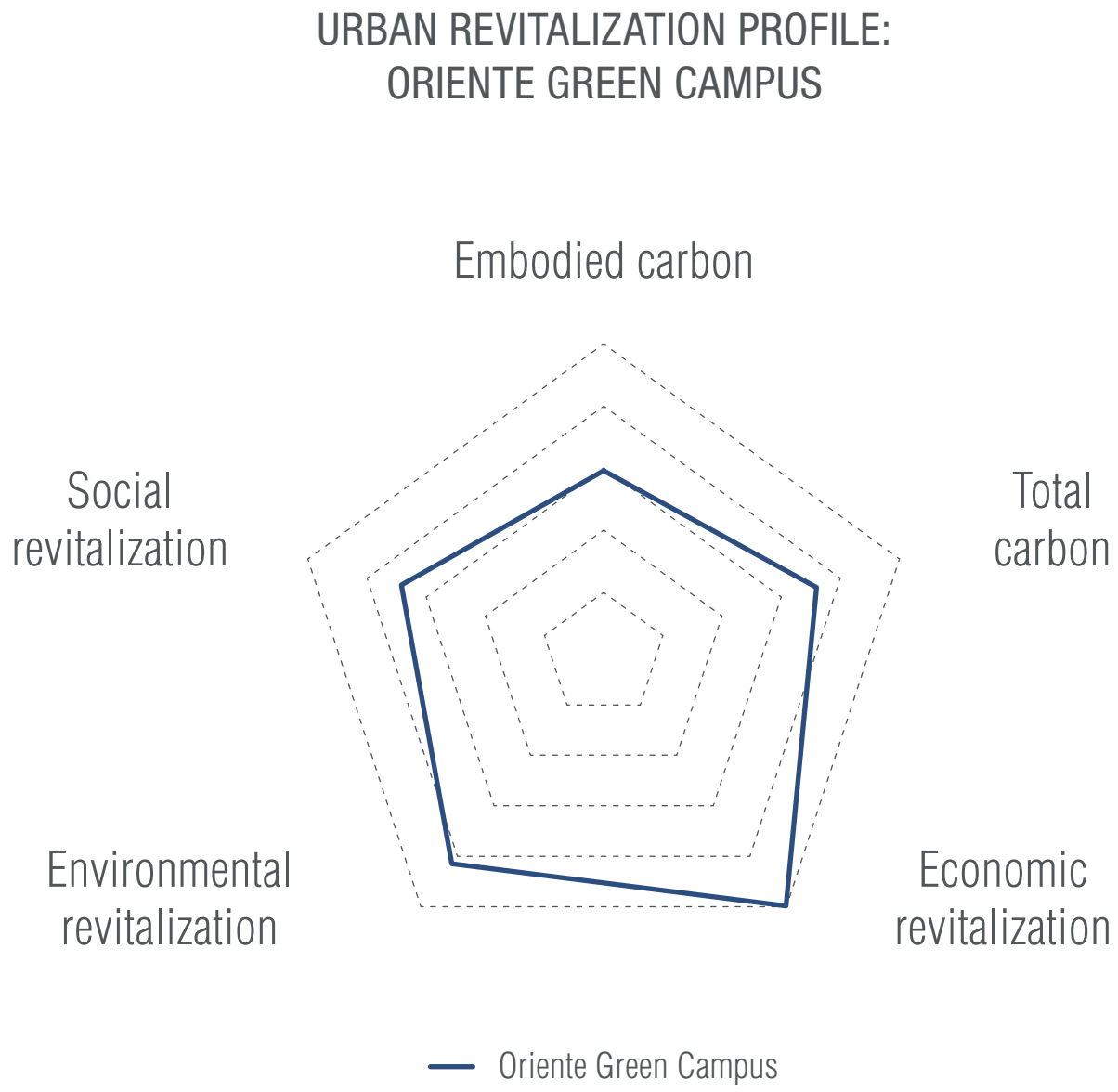


FIGURE 12. The urban revitalization profile of Oriente Green Campus.

Case Study Synthesis

The urban revitalization profiles of the three case studies, when overlaid (see figure 13), demonstrate that no single set of outcomes defines adaptive reuse success. Each project responds to the opportunities presented within the specific context of local markets, existing building conditions, community needs, and regulations.

All three projects demonstrate successful outcomes in most, if not all, economic indicators. This reflects the fact that, in each case, dramatic improvement of the economic vitality of the neighborhood and value of the property were necessary conditions for the economic viability of the projects. Oriente Green and West Bottoms Flats achieved all six indicators because the pre-existing buildings were dramatically underused. In contrast, Congress Square started with a higher economic value before the renovation, and so the urban revitalization impact was less dramatic.

The environmental indicators of the three projects reflect both the pre-existing conditions and the design approach. For example, Oriente Green Campus took an architecturally transformative approach that repaired the detrimental environmental impacts to the neighborhood created by the large, vacant building through interventions including extensive rooftop plantings that mitigated stormwater runoff and urban heat island. Congress Square, in contrast, had a limited site and rooftop with which to improve the environment beyond the building.

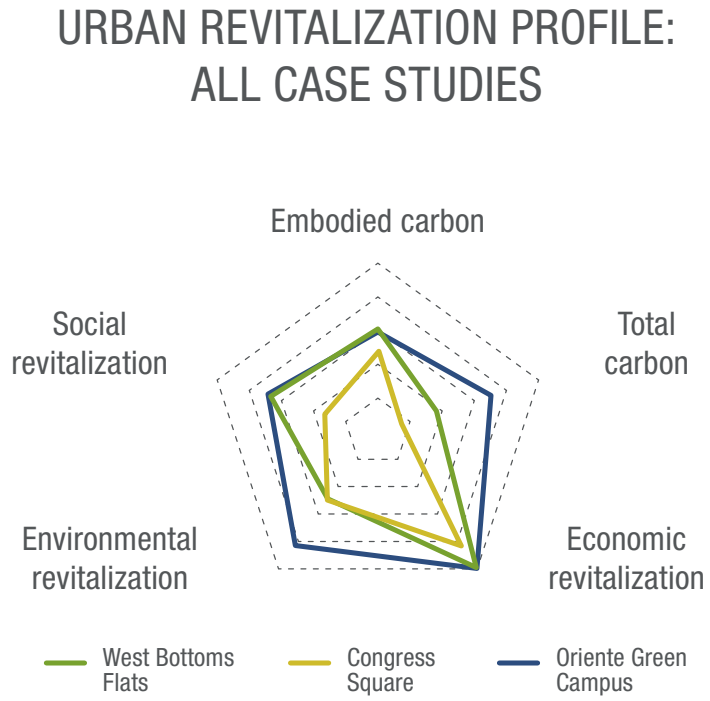


FIGURE 13. Urban revitalization spider chart illustrating the overlaid profiles of the three case studies.

The social revitalization achieved by each project was perhaps the most place dependent. At West Bottoms Flats, social benefits were created by introducing affordable pilot housing units into the emerging market and supporting growth of a diverse population. At the Oriente Green Campus, the social benefits were created not only through the inherent use or reuse of the building, but also by active engagement with the community through programs and activities.

While it is challenging to directly link urban revitalization and business outcomes, these projects demonstrate a cycle of positive influence. An individual project supports urban revitalization, and that revitalization creates conditions generating a stronger development environment and more financial value for a specific property and for future developments in the neighborhood.

Each case study shows substantial reductions in embodied carbon compared to new construction (see figure 14). All three projects avoid embodied carbon emissions by reusing most of the existing structural systems and, in the case of West Bottoms Flats and Congress Square, building facades. They fall within 50 to 75 percent reduction in embodied carbon compared to new construction typically seen in the industry. These embodied carbon reductions, which occur mostly upfront in the buildings' life cycles, are particularly important given the time-value of carbon and the urgency for climate action.

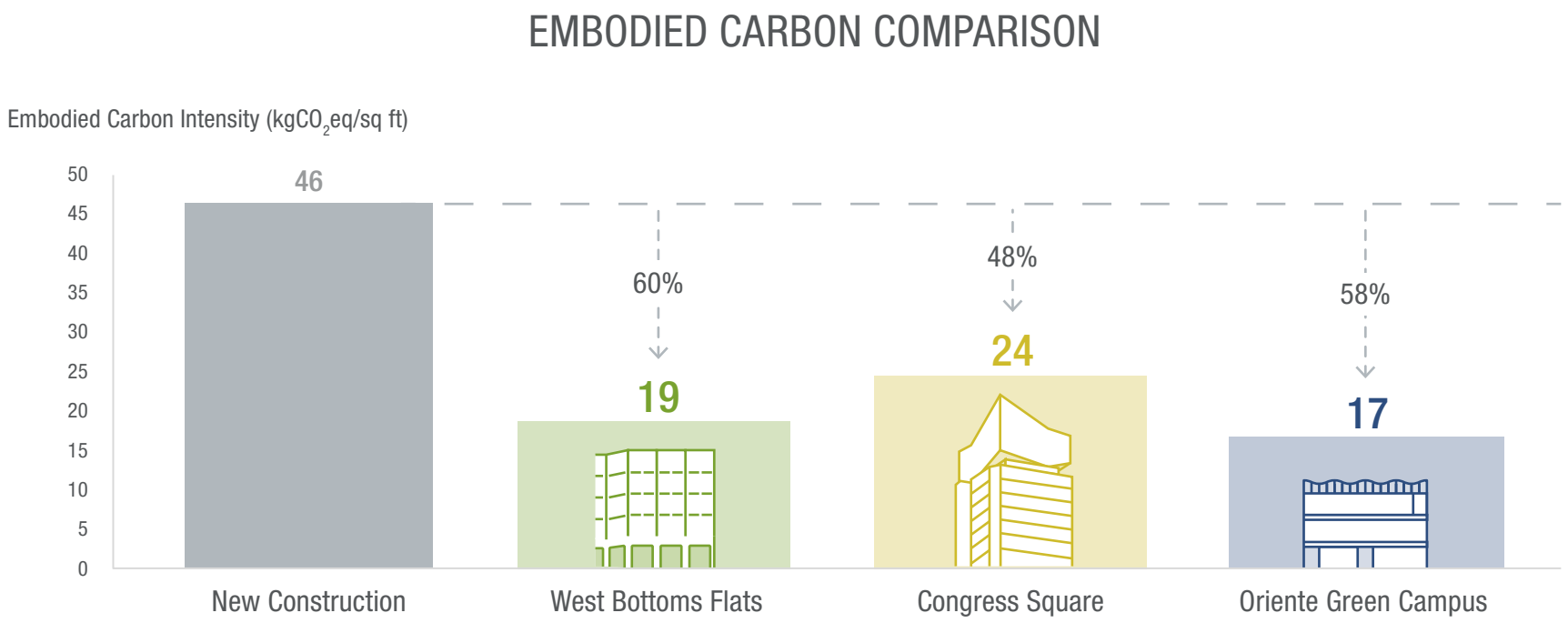


FIGURE 14. Embodied carbon comparison chart indicating avoided emissions of each case study project compared to typical new construction.

The total embodied and operational emissions of each project over 10 years of operation reveal the importance of energy efficiency and clean energy in adaptive reuse (see figure 15). Although Oriente Green had higher embodied emissions than the other two projects, it is powered by completely decarbonized energy sources, leading to lower whole life emissions.

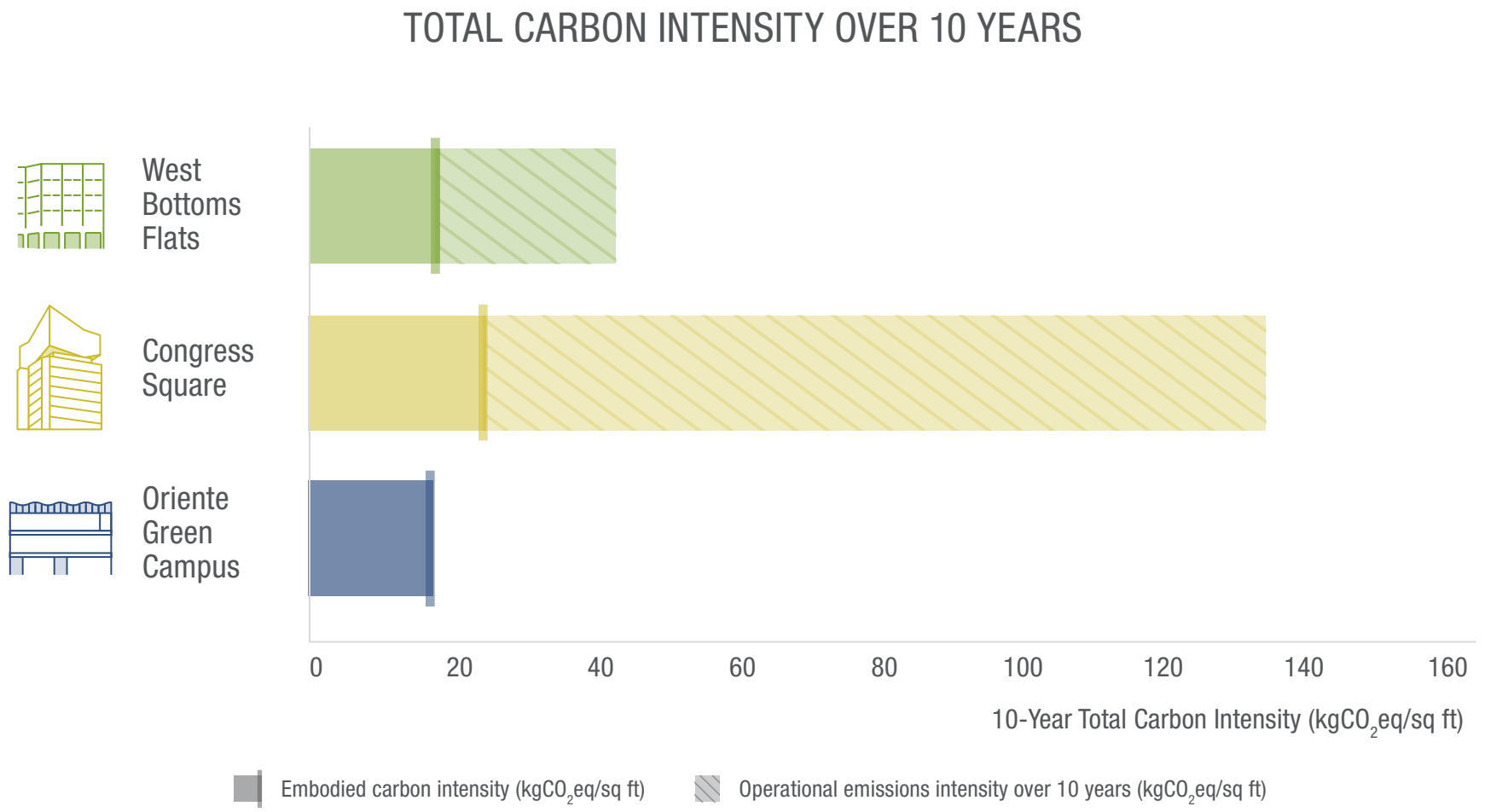


FIGURE 15. Total embodied and operational emissions of each project over 10 years of operation.

CONCLUSIONS

Actionable Guidance

Rely on Experience:

If new to adaptive reuse, build a team to fill your experience gap. Whether a project involves applying for historic tax credits or purchasing a vacant building, working from the beginning with architects and engineers who have a deep portfolio of such work will minimize risk by helping avoid common pitfalls. This includes knowing what existing conditions to look for (think hazardous materials and structural systems), understanding how to navigate regulatory complexities such as historic tax credits, and creating and conveying a vision of transformative potential.

Participate in Policymaking:

Developers have a role to play in creating enabling environments that support adaptive reuse. The development community needs to come together with policymakers and financers to participate in shaping policies and incentives that represent what they need to facilitate adaptive reuse in urban settings. By taking a collaborative approach to local zoning, historic districts, and other policy mechanisms, developers can help unlock the support needed to take on adaptive reuse.

Tell the Story:

Existing buildings and adaptive reuse projects each have a unique story to tell. Thoughtfully crafting this narrative will capture the imagination of investors, tenants, and the community, amplifying the success of the project.

Work with the Building, Not Against It:

Most buildings have transformative potential. Deep understanding of the existing conditions, structural capacity, and ecological context creates a solid foundation from which to intervene architecturally in subtle or dramatic ways. There is often more leeway than imagined to add stories, cut in courtyards, or transform a building's image if the existing foundations and materials are respected. For example, using timber for rooftop additions can enable the addition of several stories without creating costly and time-consuming structural upgrades. Keep in mind that historic tax credits or other financial incentives may introduce requirements or restrictions to the adaptive reuse approach.

Key Findings

- The developers who contributed to this report all stated that when making the case for adaptive reuse, some benefits can't be captured through metrics. This makes it challenging to definitively prove the financial benefits of reuse and highlights the multivalue decision-making process of real estate development.

- It is impossible to capture the economic value created through urban adaptive reuse without understanding the holistic TBL outcomes. There is no single financial metric that makes the business case for adaptive reuse. Rather, it is the spectrum of environmental benefits, positive social outcomes, unique architectural spaces, alignment of corporate values, broader economic revitalization, and financial returns on investment that make up the full business value of adaptive reuse.

- The environmental benefits of adaptive reuse rest on the avoided embodied carbon emissions of reuse and the potential to reduce operational emissions through energy efficiency and renewable energy. More information is needed to establish high-quality benchmark data on the whole life carbon of adaptive reuse.

- Adaptive reuse is a flexible real estate solution that can offer value in many contexts. The three case studies illustrate that regardless of location, architectural type, or building age, new value can be breathed into old buildings through creative approaches to design and financing.

- Place-based approaches are key to success. In addition to the local market forces that determine the success of any development, it is important to identify locally available financial or policy incentives, prepare for local regulatory reviews and requirements, and understand the community values associated with existing buildings.

- It takes a team. Each case study project was based on a transformative vision for what the existing buildings could become. Generating and realizing these visions were a testament to experienced teams who understood how to assess existing conditions, identify the potential within existing structures, and embrace the challenges and opportunities of the existing buildings to create truly unique spaces.

Adaptive reuse represents a substantial opportunity within commercial real estate. Many factors contribute to success: the right existing building for the new use, a transformative vision for the future, an experienced professional team, financial incentives, and compelling, human-centered storytelling. When these factors come together, adaptive reuse builds on the embodied value of existing buildings to the benefit of developers, investors, and communities, demonstrating how what's old is new in today's and tomorrow's built environment.

APPENDIX

URBAN REVITALIZATION OUTCOMES: A SUMMARY

FIGURE A1. A comparison of the urban revitalization outcomes of the three case studies.

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