USCM-AIA Disaster Risk Reduction & Resilient Cities Report

How Regenerative Design Can Help America's Mayors

Presented by the American Institute of Architects

In Partnership with the US Conference of Mayors

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THE UNITED STATES CONFERENCE OF MAYORS

AIA

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Report produced by Overmountain Advisors LLC

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Foreword

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The United States Conference of Mayors is proud to join with the American Institute of Architects to share this report on disaster risk reduction and regenerative design.

America's mayors are on the front lines of preparing for, responding to, and recovering from floods, wildfires, extreme heat, storms, and other increasingly costly and disruptive weather events. As these risks grow in frequency and severity, city leaders need practical strategies that not only strengthen resilience, but also help communities emerge safer, healthier, and better prepared for the future.

By aligning the built and natural environments and addressing whole interconnected systems, a regenerative approach can reduce risk, improve public health, strengthen infrastructure, and support local economic vitality.

For cities, this means investing in solutions that do more than withstand disasters. Regenerative design strategies go beyond harm reduction to restore ecosystems, reduce underlying vulnerabilities, and create connected, inclusive and resilient communities.

This report highlights the leadership of mayors and architects who are working every day to protect lives, strengthen community bonds, and build systems that can thrive amid uncertainty.

I hope it serves as a useful resource for mayors and helps advance policies, partnerships, and investments necessary to build resilient cities and shift our mindset from simply minimizing harm to creating lasting social, environmental and economic benefits for all.

"

Tom Cochran
CEO and Executive Director,
The United States Conference of Mayors

A Letter from the AIA President

I took on the role of President of the American Institute of Architects because I felt called to serve: to help shape a better world through regenerative design, for my family and for the generations that will inherit it. As the son of immigrants who escaped conflict in their home country, I feel a deep sense of responsibility to act in times of crisis and I believe we are in a serious crisis. We are all in the same storm, and I felt compelled to bring my unique perspective and experience to this leadership position.

My architectural practice is rooted in regenerative design and resilience. I have walked countless closed roads littered with debris – from post-Hurricane Maria in the US Virgin Islands to post-Super Storm Sandy New York and New Jersey. While the driver of disruption varies, the community response is always similar: to come together around one another, protect the most vulnerable, save as many lives as possible, rebuild as quickly as possible, and try to understand what they could have done differently and better. From that experience, I have seen a wide range of preparedness and of resulting impacts.

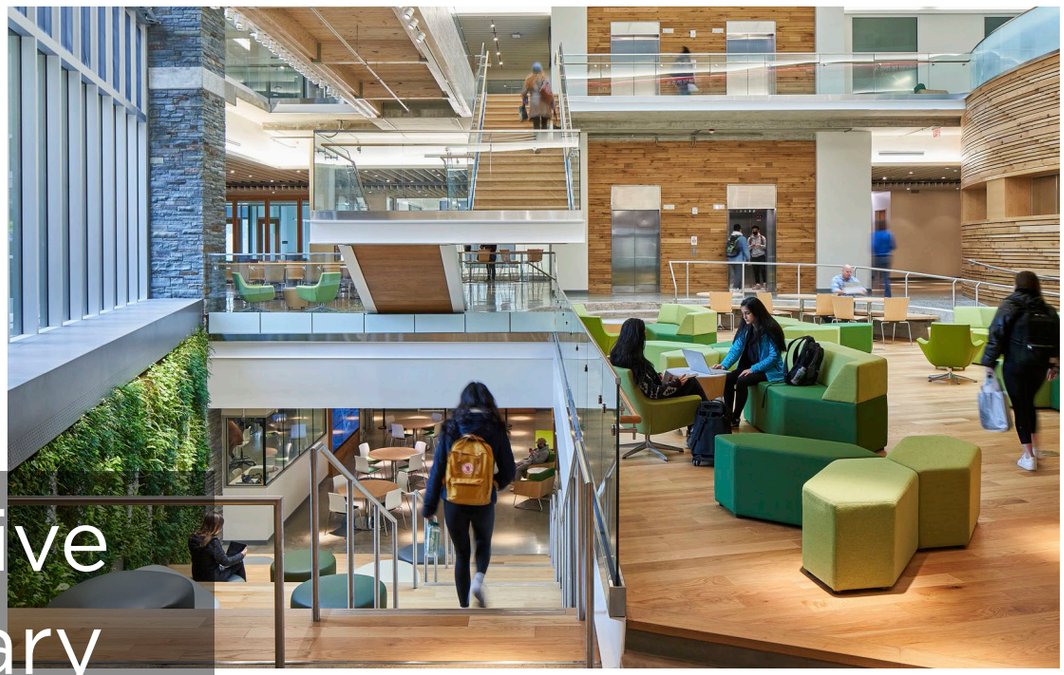
Disasters don't discriminate. They don't know where the boundary of the best school district is located. They don't care about home values. They have no regard for GDP. They come in many forms, including heat stress, water scarcity, food insecurity, flood risk, wildfires, and more. Our approach is relatively simple, but the complexity is in the relationships and the details:
Assess the hazards today & tomorrow.

- Analyze the site
- Engage and plan with the community
- Align with government & funding programs
- Design the site and buildings
- Build the project

My term as President of the AIA is focused on sharing these lessons and inspiring our community of architects, the stewards of the built environment, to work with mayors and other community leaders to deploy regenerative design across the United States. We must do this. Regenerative design is healing holistically, rather than just treating symptoms. It repairs the earth with every action you take. It folds in culture, place, history, and scientific examination. Understanding who people are as we embark on our work and how we relate to the ecosystem we rely on becomes the foundation of our design.

When you ask communities that have invested heavily in regenerative design and resilience about how they can afford to invest so much, everybody says the same thing. They answer the question with a question: "What is the value of one human life?"
I was always taught that if you see something going wrong, you have to stand up. It doesn't matter how insurmountable it may seem. You have to fight that dragon. Leadership can't wait.

Illya Azaroff, FAIA
2026 President
The American Institute of Architects



Executive Summary

Universities of Shady Grove Biomedical Sciences & Engineering Education Facility in Rockville, Maryland by Cooper Carry and Lake|Flato Architects. Photo by Keith Isaacs.

Mayors across the United States confront a wide range of complex and interconnected challenges with few easy answers; regenerative design offers an approach that successfully balances competing social, economic and environmental demands.

Regenerative design is an emerging approach to designing buildings, cities, and other complex systems to make measurable improvements in the quality and resilience of the built and natural environments. It goes beyond resilience or sustainable design, which aims to reduce harm and works toward net-positive contributions to social, environmental, and economic outcomes.

The AIA's five pillars of regenerative design are:

- **Whole Systems Thinking**: Design with Abundance
- **Maximize Carrying Capacity**: Supporting biodiversity and integrating the local ecosystem
- **Spirit of Place**: Aligning social, environmental, and economic needs
- **Active Renewal**: Incorporating resilience and self-sufficiency
- **Evolve and Adapt**: Promoting discovery, measurement, and public knowledge

This report explores case studies of buildings that demonstrate these pillars of regenerative design to guide policy and strategy at the city scale. This report also offers financial and policy recommendations that may help promote regenerative development.

Challenge 1: Affordable Housing.

Regenerative Design Case Studies: Pacific Landing — Santa Monica, California; Architect - Patrick Tighe Architecture; and Bud Clark Commons — Portland, Oregon; Architect: Holst Architecture

Summary: These projects outline the importance of incorporating social and ecosystem services into affordable housing to improve stability and build social infrastructure for self sufficiency of the residents in addition to the self sufficiency of the building in an emergency.

Challenge 2: Civic Anchors and Social Cohesion

Regenerative Design Case Study: Credit Human Headquarters — San Antonio, Texas

Architects: Kirksey Architecture and Don B. McDonald Architects

Summary: This project shows how cooperative business models are going beyond addressing basic needs, such as banking, to invest in the quality of the public realm and bring people from all backgrounds together around a common purpose.

Challenge 3: The Politics of Place

Regenerative Design Case Study: UC San Diego North Torrey Pines Living and Learning Neighborhood

Architects: HKS and Safdie Rabines Architects

Summary: UC San Diego made a concerted effort to engage the community in developing a regenerative mixed-use neighborhood, but it still faced strong opposition until an agreement was reached that gave residents a meaningful voice.

Challenge 4: Climate Resilience and Disaster Preparedness

Regenerative Design Case Study: Sponge City — Hoboken, New Jersey

Summary: After suffering catastrophic flooding from Superstorm Sandy in 2012, Hoboken, New Jersey, turned to systems thinking to provide more effective strategies for stormwater reduction, storage, and eventual discharge. This led to reduced damage during future events and much faster recovery after them.

Challenge 5: Transportation and Transit-Oriented Regeneration

Regenerative Design Case Studies: John W. Oliver Transit Center — Greenfield, Massachusetts

Architect: Charles Rose Architects

Summary: The first net-zero energy transit center in the United States is located in a small rural town at a transit crossroads, houses a county government office, and serves as a resilience hub for citizens. In the process, it also turned much of a previously paved site into a native meadow.

Challenge 6: Artificial Intelligence

Regenerative Design Case Studies: ORNL Automatic Building Energy Modeling (AutoBEM) — Oak Ridge, Tennessee, and Transforming Office Towers into AI Hubs and Urban Data Centers — HOK Data Center Study

Summary: While artificial intelligence and the data centers that power it are causing considerable anxiety, a researcher in Oak Ridge, Tennessee, leveraged data from a smart grid in Chattanooga, Tennessee, to model every building in the United States. The utility then used that information to model investments in distributed energy resources, which are key to meeting AI's needs while keeping energy costs low.

After each case study, we explore financing strategies and policies that have helped expand the use of regenerative design in cities across the United States.

Mayors are more important today than ever before in the history of this country. By working with architects to embed regenerative design in the fabric of cities, they can better meet the needs of current residents while ensuring that future generations will thrive in the same city.

The Case for Action

A CONVERGENCE OF CRISES AND OPPORTUNITIES

As America's mayors think about the issues keeping them up at night, they encounter a complex set of interconnected, societal, fiscal, technological, natural, and physical systems that all affect one another.

When waves align, their amplitude is magnified. Such is the case when mayors are confronted with simultaneous and compounding challenges. A housing shortage is exacerbated by natural disasters and compounded by public animosity and inflation.

Mayors and architects see a nationwide housing shortage of millions of units. First-time homeownership is at a record low. Home prices have risen more than 50% since 2020.[1] More than 770,000 individuals are unhoused.[2] Meanwhile, developers face an array of challenges: financial roadblocks (inflation, interest rates, escalating construction and labor costs); social roadblocks (neighborhood opposition to density and new development); and administrative challenges (out-of-date zoning codes and slow permitting processes).

2024 was the hottest year on record. At least 568 deaths and $182B in natural disaster damage[3] were incurred by large, small, urban, and rural communities all across the country. While some of these costs were covered by insurance or government disaster relief programs, these supports often fail to cover the full economic cost of a disaster. Ultimately, the costs of preparing for these events, responding to them in real time, and recovering are borne by past and future taxpayers, premium payers, and those directly impacted by the disasters.

The nation's civic infrastructure is grossly underfunded in nearly every community. Libraries struggle to remain open. Schools make impossible tradeoffs between teacher salaries and deferred maintenance on aging buildings. Parks and recreation funding is slashed, along with youth activities. Yet these spaces are where we come to know one another and build relationships across socioeconomic and cultural boundaries.

Systems such as zoning, planning, building codes, permitting, environmental regulations, design review boards, historic preservation, and public hearings were originally developed to enable thoughtful planning and to protect people from the worst consequences of unregulated development. Instead, these processes have increasingly led to paralysis. Too often, a nostalgic vision of an idealized past collides with a community's present and future needs, and with an optimistic, inclusive vision for the future. Vocal individuals often oppose any new development. Sometimes this is based on real potential for negative consequences, including higher housing costs, cumulative health impacts, increased traffic, increased flooding, and more. In other cases, opposition focuses on misconceptions, such as the view that housing values are negatively affected by proximity to rental units. In any case, the tools meant to protect communities are sometimes abused to prevent change. The resulting failures then determine the shape and experience of cities, through their buildings, transportation systems, infrastructure and the connective tissue between these elements.

Many cities are dominated by car-centric transportation, snarling areas of high growth in intractable traffic and leaving lower growth areas with acres of empty surface parking. Car ownership (along with driver's licenses and insurance) has become a key determining factor of upward mobility. Overbuilding of roadways and parking lots has led to inefficient transportation and an array of human health and environmental emergencies: intense heat from parking lots and roadways, unmanaged stormwater runoff, and vehicle emissions that clog the air.

All of these challenges are now joined by a new, rapidly moving technological disruption: the rise of highly capable Artificial Intelligence. AI is increasingly enabling incredible new technologies, like advanced robots and autonomous vehicles, that increase productivity but also displace human workers. AI tools empower a new generation of entrepreneurs, who can launch a new billion-dollar app from vibe-coding on the weekend, putting entire industries under extreme pressure. The growing impact of AI across industries is already starting to disrupt education and workforce development programs that have taken decades to build.

This report examines these challenges through the lens of Regenerative Design. This methodology integrates the needs of the built environment and financial system with those of the natural environment and human wellbeing. This approach can help mayors solve multiple challenges simultaneously. This report will further explore ways that architects, policy-makers, and financiers have delivered creative solutions that close loops, build new relationships, and, most importantly, create resilient systems to withstand the intense pressures of our time.

The Mayor's Window

Mayors are on the front line facing the massive societal upheavals of our time. They also have a unique power to lead, convene, inspire, and, most importantly, get impactful work done in ways leaders at other levels of government cannot. Like mayors, architects build powerful coalitions of stakeholders, including community members, developers, lenders, allied design professionals, and tradespeople. They organize these stakeholders around a vision for a project that balances competing interests and builds something stronger together.

Mayors are like the visionary architects of their city. They help communities articulate and prioritize their needs, work within regulatory boundaries, push for changes when needed, assemble teams of subject-matter experts to address critical systems, and engage with many disparate partners to bring their vision to life.

There is a saying that if you want something fast and cheap, it will be of lower quality. And if you want something fast and high quality, it will be expensive. On a project, there are essential tensions between cost, speed and quality. The challenge that lies before mayors and architects is how to optimize across all three. The key to this is creativity. Integrated project delivery is a regenerative design approach that formally engages all the stakeholders at the outset of a project. It aligns financial incentives with decision-making and builds in accountability. Another tool is leveraging creative financing that attracts non-traditional sources of finance or revenue. Historic preservation grants, property-assessed clean energy, energy savings performance contracting, and other tools have emerged as critical components of the capital stack for regenerative design projects.

> **"Mayors ultimately shape the future of their city."**
>
> **- Illya Azaroff,** President
> American Institute of Architects

While the current Congress and President have disrupted funding for a wide range of important programs and projects, cities are seeing some funding begin to flow in from federal agencies to local projects. Some new funding opportunities are becoming available as the dust settles from federal restructuring and reductions in force. Those still in the federal workforce are working hard to make the most of the remaining funding programs that can assist our nation's communities.

Mayors, working closely with their governors have developed new and innovative ways to attract both new investment from incumbent industries and foreign direct investment. Where politics has driven conflict, investment has brought local, state, and federal interests together. From resilience banks and green banks to state energy finance institutions and climate-related insurance incentives, new blended capital structures are increasingly making it feasible to monetize measurable environmental improvements and resilience investments. Many cities rely on local or national philanthropic support for capital investments and the operations of critical community services, but philanthropy is undergoing its own systemic upheaval. A new generation of trustees is taking over and questioning their role and the nature of philanthropy. Trust-based philanthropy, participatory grantmaking, multi-year unrestricted funding, mission-related investment, and program-related investment are all seeing exponential growth in their deployment. Other foundations are sunsetting, spending their entire principal over a set period to deploy capital at a pace that meets today's urgency, but with an expiration date on their existence. While these sector changes present risks to current funding, they also present opportunities to co-develop new funding streams to address municipal challenges.

Mayors who stack these emerging funding streams can amplify the efforts of their local businesses and nonprofits, focusing them on strategic investments with compounding impact.

Five Pillars of Regenerative Design

The American Institute of Architects identifies five interconnected pillars that underpin the practice of regenerative design:

- **Whole Systems Thinking**: Design with Abundance
- **Maximize Carrying Capacity**: Supporting biodiversity and integrating the local ecosystem
- **Spirit of Place**: Aligning social, environmental, and economic needs
- **Active Renewal**: Incorporating resilience and self-sufficiency
- **Evolve and Adapt**: Promoting discovery, measurement, and public knowledge

The University of Washington's Foster School of Business, located in Seattle, Washington. Photo by Tim Griffith.

Buildings consume a tremendous amount of natural resources, from the raw materials, energy, and embodied carbon used to construct them, to the energy, water, and materials used to operate them. Architects can limit and even reverse these impacts by shifting from a mindset of doing less harm to one of positively contributing to the net balance of these systems. This shift has tremendous potential to improve the environment, as well as the social and financial performance of buildings and cities. No project is perfect across all five pillars. Site conditions, community priorities, relative abundance or scarcity of particular resources, and other factors will inevitably lead to tradeoffs, and local communities will prioritize pillars that best align with their goals.

Pillar #1: Whole Systems Thinking: Design with Abundance

Regenerative design is fundamentally focused on moving from an extractive mindset to an abundance mindset. In nature, all loops are closed. Everything that we think of as waste, is actually a feedstock for another organism. The leaves of an oak tree, after converting sunlight to energy for growth for a season, feed the soil for the next generation of trees and dozens of other species in the process.

Rather than fighting the heat from the sun, why not use it to sustain life? Rather than forcing rain water directly into storm drains, asking how can we use it for water buildings need to consume before it replenishes aquifers? Rather than using virgin materials from halfway around the world, with tons of embodied carbon, can we use reclaimed materials from another nearby building?

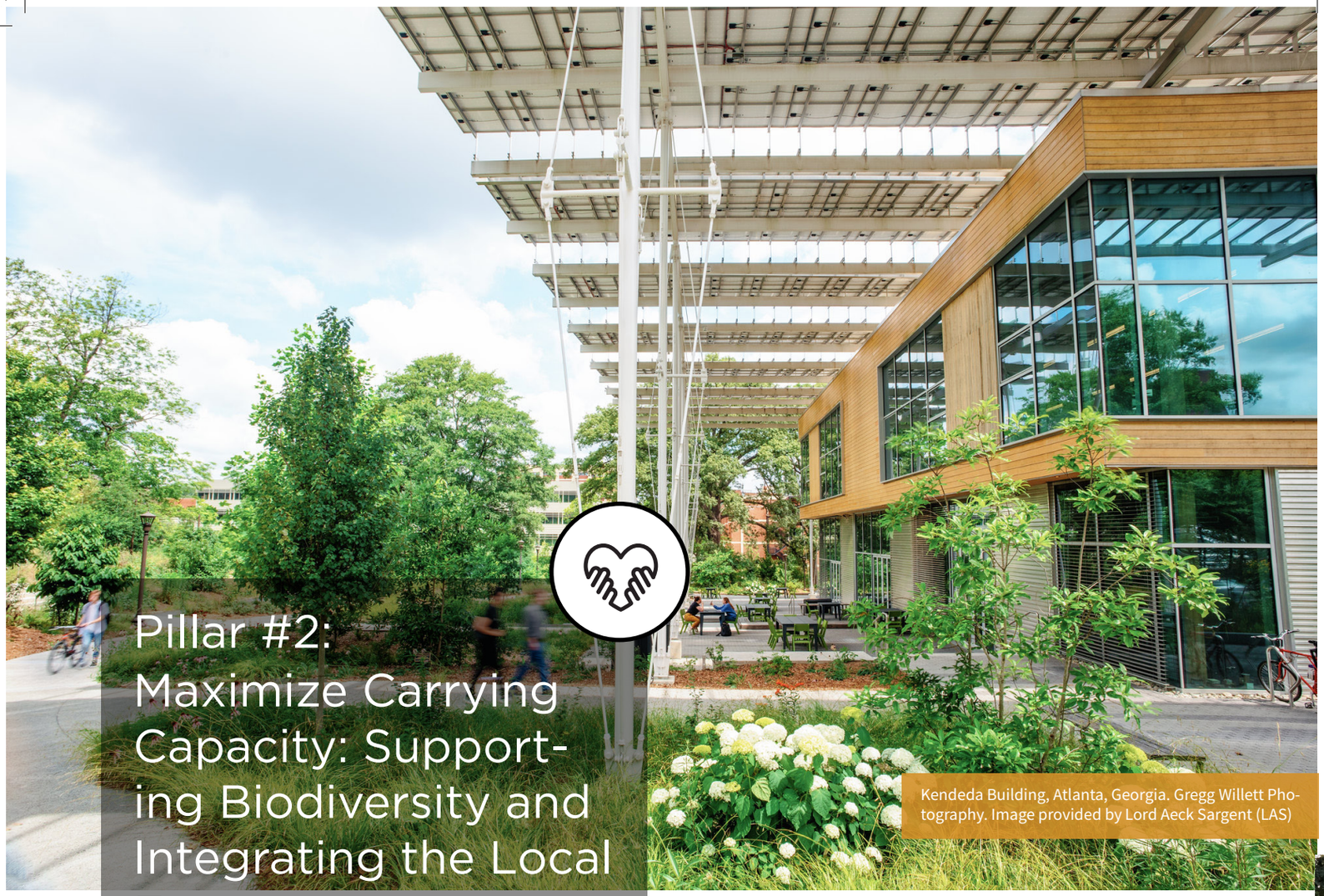
Regenerative design is not just about offering the cure of reducing resource consumption, it goes beyond to heal ecosystems and the people that inhabit them. It draws the circle of required resources: energy, water, and materials, as tight as possible around the project site and reframes challenges as opportunities.

Some strategies include:

- Building performance standards for new buildings and benchmarking of existing buildings.
- Eliminate barriers to deploying infrastructure that closes energy, water, and resource loops, such as allowing on-site water treatment, expediting on-site solar permitting and interconnection, and providing commercial composting facilities.
- Develop incentives for buildings to surpass code minimums on stormwater retention, water conservation, and energy efficiency.
- Work with municipal utilities or state regulators and IOUs to ensure that firm dispatchable distributed resources are appropriately valued.
- Adopt deconstruction ordinances and stand up municipal materials reuse banks.
- Allow and incentivize district-scale resource sharing, like thermal loops between buildings, district energy systems, shared stormwater infrastructure.

"The US is expected to add 217 GW of distributed energy resource capacity through 2028, the equivalent of the entire US coal fleet[4]."

- Wood Mackenzie



Kendeda Building, Atlanta, Georgia. Gregg Willett Photography. Image provided by Lord Aeck Sargent (LAS)

Pillar #2: Maximize Carrying Capacity: Supporting Biodiversity and Integrating the Local Ecosystem

Regenerative design calls for a reframing of the relationship among the human, built, and natural environments. Often, nature is cast as something external that is controlled, protected, or mitigated. Regenerative design sees people and buildings living in and contributing to the ecosystem, enabling and encouraging biodiversity, providing habitat, and building relationships.

There have been five mass extinction events in the Earth's 500-million-year history. These are defined as the widespread and rapid decrease in global biodiversity. The World Resources Institute's Millennium Ecosystem Assessment, estimates that extinction rates are between 100 and 1,000 times the background extinction rate[5], and there is concern that we are in the midst of the sixth mass extinction.

To avoid the most catastrophic outcomes and continue to meet residents' needs, cities must build differently. Rather than destroying habitat, installing impervious surfaces that raise ambient temperatures and prevent water from refilling aquifers, buildings and landscapes must be designed to repair ecosystems. Regenerative design understands that buildings exist within an ecosystem and must be an engaged, active partner rather than dominating or subjugating.

Regenerative design requires moving from measuring success purely based on project economics for buildings and Gross Domestic Product (GDP) at the city or country scale which only measures consumption, to consider Gross Ecosystem Product (GEP), which measures the value of goods and services that ecosystems contribute to human well-being.

Ecosystem services are quickly becoming an asset class in international banking and finance. Communities that quantify and value GEP will be positioned to leverage these emerging financial tools as they become available.[6]

Exterior view of the Wagner Education Center in Seattle, Washington. Photo by Nic Lehoux.

INTEGRATING LOCAL ECOSYSTEMS: KEY STRATEGIES

Restore brownfield sites.
Rather than building on preexisting greenfield sites, restore brownfield sites that damaged the air, water, and soil. Improving negatively impacted sites is more important than a low-impact design on a previously undeveloped site.

Plant, plant, plant!
Increase the total surface area of vegetated area compared to before the building was built.

Consider geographical context.
Plant only native plant species and consider what food and habitat plantings can provide to the local ecosystem.

Reuse your runoff.
Collect and use rainwater on site, and allow it to infiltrate back into the ground rather than run off into stormwater systems, which can lead to further downstream stresses, such as sewer overflows.

Consider the birds!
Use bird-safe glazing to ensure birds don't fly into the building because of mirror-like reflections of the sky.

Prioritize protection.
Permanently protect high-conservation-priority land.

Davis Center, Bar Harbor, ME, 2026. Photo by Trent Bell.

Pillar 3: Spirit of Place: Aligning Social, Environmental, and Economic Needs

The process of balancing social, environmental, and economic needs is often described as the triple bottom line. When someone asks, "How will this affect the bottom line?," they are asking about the ultimate net financial impact, positive or negative. The triple bottom line maintains a focus on financial, but adds environmental and social impacts so that fully informed decisions can be made. Another way to understand the triple bottom line is that it values people, planet, and profit.

Regenerative design is about moving beyond reducing negative outcomes and moving toward positive outcomes for all three. Instead of doing less harm and losing less money, architects look for solutions that actually improve social, environmental, and economic conditions simultaneously.

Regenerative development centers on the well-being of the people who inhabit the building and the ecosystem in which it exists. Projects like Credit Human's headquarters help fulfill a mission dedicated to promoting the health of its staff, the financial success of its members, and improving the environment by sequestering more carbon than was emitted during the building's construction and operation.

"Roughly $6 is saved for every $1 invested in mitigation.[7]"

-National Institute of Building Sciences

"Every $1 not invested in disaster resilience today can cost communities up to $33 in lost future economic activity[8]."

--US Chamber of Commerce and Allstate Insurance

Every dollar spent on development is a vote for something. Thinking about how money is spent, and which communities benefit from development, is key to building virtuous cycles. Great projects begin well before pen meets paper. Community engagement is critical and must begin as soon as possible to explore the needs, concerns, and fears of residents and other affected stakeholders. In the best cases, these conversations lead to tangible outcomes that evolve with the project and provide guaranteed, structural benefits to the community.

One key to ensuring that social and environmental impacts are considered in a project's financial model is to include costs that extend beyond the project boundaries. Development that generates incremental tax revenue is often seen as a good thing. However, as you develop further from existing infrastructure, the incremental cost of serving the building with roads, housing, power, water, sewer, schools, waste service, etc., can exceed the revenue the property generates in taxes. Similarly, the direct and indirect costs of siting and building a new landfill in the future should be considered in the cost-benefit analysis of an expanded recycling or composting program.

Strategies:

- Proactive recruitment of women and minority owned bidders and local small businesses for the scope of work and creative ways to incentivize their selection (If bidders are too small or inexperienced, finding ways they can partner with more established and experienced contractors can help).
- Co-located services like child care or transit.
- Zero-displacement development; and
- Require a living wage for workers on the project.

Meetings take place in a vegetated atrium at the net-positive energy and water Stanley Center for Peace and Security by Neumann Monson Architects in Muscatine, Iowa. Photo by Cameron Campbell.

Pilar #4: Active Renewal: Incorporating Resilience and Self-Sufficiency

From wildfires and flooding to heat waves and hurricanes, few cities have been spared from natural disasters. Simultaneously, technology makes us increasingly reliant on constant access to electricity for health and safety, including communication and medical devices. According to the National Institute of Building Sciences, roughly $6 is saved for every $1 invested in mitigation.[7] The indirect cost of not preparing is much steeper, according to a recent report from the US Chamber of Commerce and Allstate Insurance, "every $1 not invested in disaster resilience today can cost communities up to $33 in lost future economic activity[8]."

Regenerative design is the pathway to disaster risk reduction. Strategies related to resilience and self-sufficiency can be deployed before an event, during an event, or in recovery, following an event. In each phase, regenerative design considers the physical, social, and economic infrastructure needed to adequately address the seven community lifelines identified by FEMA: Safety and Security; Food, Hydration, Shelter; Health and Medical; Energy; Communications; Transportation; Hazardous Materials and Water Systems. Communities that have uninterrupted access to these lifelines not only survive but thrive during recovery.

During disasters, social cohesion and civic infrastructure are critical to ensuring that neighbors know where to go and who needs help getting there. Regenerative buildings with self-contained energy, water, and waste systems in accessible locations allow communities to have safe and secure spaces during a disaster.

The recovery phase after an event can be a disaster in its own right. From preventing waterborne diseases to looting, regenerative design can support local relief efforts. Furthermore, it is essential to ensure that reconstruction not only replaces what existed but also builds back better and adapts to the new normal.

Strategies:

- Integrate on-site renewable energy and battery energy storage for islandable self sufficiency.
- Provide systems for on-site water collection, treatment, and storage.
- Ensure the elevation of buildings (or critical systems) is above the 1,000-year floodplain, or mitigation strategies to prevent flooding.

Pillar #5: Evolve and Adapt: Promoting Discovery, Measurement, and Public Knowledge

Regenerative design promotes self-proliferation and expansion. Therefore, the final pillar of regenerative design focuses on spreading the seeds of wisdom and inspiring others to share in the lessons learned. Buildings, like cities, are not static objects fixed in time. They and their occupants learn, evolve, and grow with time and changing needs. Strategies or systems that made sense may need to be adapted or removed entirely. Regenerative design requires measuring what matters and ensuring that those lessons are applied to future projects.

Students attending The Foster School of Business, at Washington University. Photo by Tim Griffith.

The design of modern high-performance buildings involves financial modeling, energy modeling, carbon accounting, and other advanced analysis. These tools are increasingly equipped with artificial intelligence, making them faster and easier to use. They are not, however, infallible. When the Institute for Market Transformation launched the City Energy Project and empowered the first cohort of cities to adopt benchmarking, they found some projects recognized as high-performing in design were not high-performing in practice. This kind of transparency, while potentially embarrassing, leads to real learning and accountability. When we measure what matters, it becomes possible to improve project outcomes and shape policy decisions.

At the city scale, new tools are emerging to deploy digital twins to model the potential impact of policy interventions. AutoBEM, a platform developed by Oak Ridge National Lab, produces an investment-grade energy audit for every building in the United States. Singapore leveraged a digital twin, Virtual Singapore, for scenario planning around potential natural disasters.

Regenerative design relies on continuous improvement and feedback for designers, city leadership, building occupants, and the general public.

STRATEGIES:

- Include certifications like LEED, Energy Star, Passive House, WELL Buildings, and Living Building Challenge in RFPs for public projects and provide incentives for private projects that achieve certification.
- Leverage platforms such as Energy Star Portfolio Manager, Arc Skoru, Measurabl, or GRESB for ongoing data analysis.
- Recognize architecture firms that participate in the AIA 2030 Commitment who report their portfolio performance through Design Data Exchange.
- Work with your local AIA chapter to adopt green construction codes and energy, carbon, and water benchmarking ordinances that collect and share building performance data.
- Work with local Realtor organizations and utilities to automate the inclusion of utility data and blower door testing data in residential MLS listings.

AIA Framework for Design Excellence and the COTE Top Ten Awards

Several of the following case studies illustrate how deploying regenerative design strategies can offer solutions at varying scales to some of the challenges that keep mayors up at night. These case studies use the American Institute of Architects Framework for Design Excellence to measure the performance of a project across 10 areas:

- Integration
- Community
- Ecology
- Water
- Economy
- Energy
- Wellness
- Materials/Resources
- Resilience/Adaptability
- Learning/Performance Feedback

Based on their high level of achievement across these categories, projects are recognized with the AIA Committee on the Environment (COTE) Top Ten Award. While each project has different priorities, they represent the best of regenerative projects across the country. These projects reflect the diversity of cultures and climates of the communities and ecosystems in which they are built. Dating back to 1997, this program provides a library of inspiration for a wide range of project types: from housing to schools and office buildings to libraries.

To see the entire directory of COTE Top Ten Award winners, visit https://www.aia.org/design-excellence/awards/cote-top-ten-award.

Challenge 1: Affordable Housing

CHALLENGE STATEMENT

Affordable housing and homelessness are at the heart of all other challenges mayors face. Shelter is the most essential and basic need that underpins the rest of human life. Almost all cities are struggling with several challenges simultaneously, which together lead directly to pervasive homelessness. These include, but are certainly not limited to:

- An influx of people and not enough housing units, leading to supply shortages and price increases.
- Stagnating wages and rising unemployment, inflation, and interest rates.
- Gentrification, or involuntary displacement.
- Short-term vacation rentals reducing otherwise available housing inventory.
- Addiction and mental health crises make it difficult for some residents to find and keep housing.
- Local funding to close the gap left by deeply cut federal funding.
- Overly restrictive land-use regulations that are difficult to change.

As every mayor knows, there are no easy or fast solutions to these layered, complex, and interconnected problems. While there are no 'silver bullets', some cities have found success in a mix of interventions that make material improvements in housing affordability.

REGENERATIVE DESIGN CASE STUDIES

Pacific Landing — Santa Monica, California — 2024 COTE Top Ten Award; [9]
Architect - Patrick Tighe Architecture

Few places in the world face affordable housing challenges as difficult as those in Santa Monica, California where the average monthly rent is $3,200 and over half of residents in the county are cost-burdened.[10] In 2018, the City of Santa Monica used their Housing Trust Fund to help the Community Corporation of Santa Monica purchase an abandoned gas station with the intention of turning into affordable housing. With a Walk Score of 91 and Bike Score of 92, the location was ideal but the site was a contaminated brownfield. Community Corp. stacked $12M from the City of Santa Monica, and $19.5M in low-income housing tax credit equity to build the project, which was completed and opened in 2022 with 37 apartments, 100% affordable for households between 30% and 80% of area median income. It was explicitly designed to serve people living with disabilities and preference was given to applicants who live or work in Santa Monica with a focus on participants in job-training programs.

According to Community Corp.'s executive director, a ground-floor coffee shop leased at below-market rates to a minority-owned business was incorporated in part to address concerns from neighborhood residents who initially opposed the development. In addition, Community Corp.'s Resident Services program provides free after-school tutoring and educational programs for children, adult literacy and workforce-development workshops, onsite exercise and physical/mental health referrals, community gardens, arts workshops, emergency preparedness training and a resident helpline. Many of these wrap-around services were informed by their Resident Leadership Council which provides tenants a formal voice in community decisions.

Regenerative Design Pillar #3: Aligning Social, Environmental, and Economic Needs: Pacific Landing restored a brownfield site to create a 37-unit low-income housing opportunity for the cost-burdened Santa Monica community.

The project is 100% electric and has a 40kW rooftop solar array paired with battery energy storage that offsets 37% of the building's electricity use and provides resilience. The roof terrace not only captures storm-water to prevent runoff, it also includes fruit trees and herb gardens for use by the residents. In addition to the 2024 COTE Top Ten Award, Pacific Landing received LEED Platinum certification and was featured by HUD as a national case study in Sustainable Housing among other local, state and national awards.

Pacific Landing, a 37-unit affordable multifamily housing project sitting atop a restored brownfield site. Photo by Chuen Wu. Patrick TIGHE Architecture

"Affordability is no longer a challenge facing only the lowest-income households; it affects renters and homeowners, families with young children, seniors on fixed incomes, working professionals, small business employees, and longtime residents. Projects like Pacific Landing help us meet the need while protecting our environment and providing resilience during disasters"

— Illya Azaroff, FAIA, 2026 President

Regenerative Design Pillar #5: Promoting Discovery, Measurement, and Public Knowledge: Bud Clark Commons was the subject of a longitudinal Medicaid study, sharing best practices for supportive housing.

Bud Clark Commons — Portland, Oregon — 2014 COTE Top Ten Award[11]

Portland, Oregon, is another community facing severe housing shortages, with 658 homeless per 100,000 residents according to the same Brookings Report. Bud Clark Commons exemplifies how regenerative design of the building and site can support the transition from homelessness to permanent supportive housing. This 107,000 SF building, designed by Holst Architecture for Home Forward, the Housing Authority for Multnomah County, Oregon, was completed in 2011 and has since been held up as a best practice in its effectiveness. Three discrete programs exist in the same facility: On the north side is a walk-in day center for anyone, with support services including a barbershop, hygiene center, counseling, mail, computer, library, and medical; on the west side is an entrance to a 90-bed temporary shelter; and on the south side, residents in the process of becoming housed can access 130 apartments with bedbug-proof furniture and closets that double as bike-racks

The design uses biophilia, the practice of providing views and direct access to nature, as part of a trauma-informed approach to foster a sense of calm. Using this approach, the building was designed with view corridors to ensure a feeling of safety.

The design uses natural ventilation, turning off the heat when windows are open, and a heat recovery ventilator to distribute fresh, conditioned, and filtered air throughout the building. By tailoring separate HVAC systems to the needs of these discrete spaces, and by using passive design (sunlight and natural ventilation) and super-high-efficiency walls and windows, the designers minimized the building's heating demands. Combining this with solar hot water heating reduced utility costs and allowed more money for operating innovative programs. This multi-HVAC design, the first of its kind in Portland, also prevents the spread of tuberculosis and other airborne diseases.

In this case, the housing authority chose to locate this new facility in Old Town, a neighborhood that was already experiencing an influx of unhoused people.

This approach tested the idea of providing a continuum of care at a central location rather than across fragmented shelters. The facility sat at the edge of the rapidly gentrifying Pearl District and thus was not universally supported. While there is an ongoing tension between providing services where unhoused people currently live and adding to the concentration of poverty, if services are spread over several neighborhoods, it becomes difficult, if not impossible, for unhoused residents to access them efficiently.

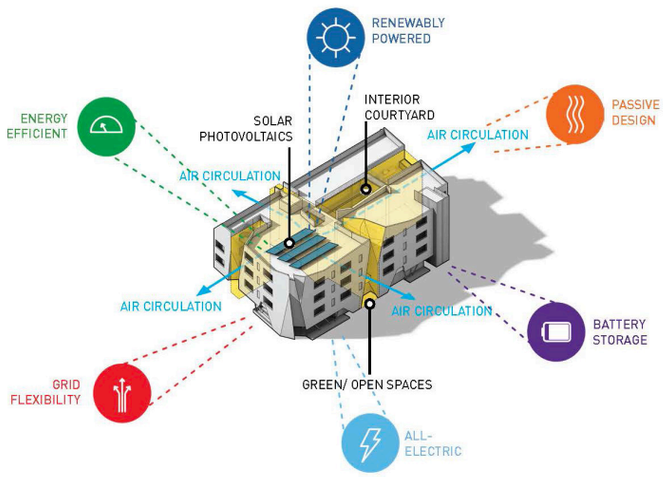
From a financial perspective, the project has been a huge success. According to a 2016 longitudinal study, Medicaid healthcare costs dropped from $2,000/month to $899/month, and 80% of residents maintained stable housing after 12 months and then beyond 2 years[12]. The approximately $33,000 per year energy and water savings reallocated to services is the equivalent of "32,850 meals a year" per an ASHRAE case study[13]. Nearly 15 years since its completion, Bud Clark Commons remains a key piece of Portland's critical infrastructure that helps transition the unhoused to permanent supportive housing.

POLICY PLAYBOOK

- **Adopt zoning reforms, such as form-based codes** to allow increased density and simplify plan review and permitting processes. Further information: Chicago Metropolitan Agency for Planning and the Form-Based Codes Institute
- **Develop financial and land-use incentives to encourage mixed-income housing**, and avoid concentrating poverty in disadvantaged neighborhoods. Montgomery County, Maryland's Moderately Priced Dwelling Unit (MPDU) Program offers affordable rental units in neighborhoods with strong schools, low crime, and good employment access. Further Information: Opportunity Insights
- **Support the establishment of Community Land Trusts (CLTs)** with public land and back tax property disposition, acquisition funds, tax incentives, operating support, and zoning incentives. Houston Community Land Trust Program provides permanent affordability for qualified families. Further information: Grounded Solutions Network CLT Models.

FINANCING STRATEGIES

- **Low-Income Housing Tax Credits (LIHTC) and State Housing Trust Funds** were leveraged by Pacific Landing to achieve 100% electric operations. Further Information: Enterprise Community Partners LIHTC Toolkit
- **Private activity bonds backed by localized real estate asset portfolios** were used by Home Forward to aggregate capital for Bud Clark Commons. Further Information: CDFA Bond Finance Resource Center
- **Philanthropic mission-related investment and program-related investment** can contribute to affordable housing projects, especially with wrap-around services. Further Information: Mission Investors Exchange and the Ford Foundation



Pacific Landing has a measured Energy Use Intensity (EUI) of 7.1 kBtu/sf/yr, an incredible 46% reduction in energy, not including the on site rooftop solar which generates 37% of the buildings electricity. Diagram Credit: Patrick TIGHE Architecture; Copyright: Patrick TIGHE Architecture

Challenge 2: Civic Anchors and Social Cohesion

CHALLENGE STATEMENT

One architectural artifact that most people can easily identify in large and mid-sized cities across the country is the Carnegie Library. These landmark buildings were among the largest private investments in social infrastructure in the history of the United States. Their patron, Andrew Carnegie, despite his well-documented faults, gave away 90% of his wealth[14]. This scale of investment in the commons is hard to imagine today when Forbes reports that the 2024 Forbes 400 list gave away less than 6% of their combined net worth[15].

Today, mayors across the country are increasingly forced to make difficult decisions about capital investments and deferred maintenance in the buildings that once anchored daily life in the United States. This includes libraries, schools, community centers, recreation buildings, and other places where people once came to know others from outside of their circle of friends. Fewer and fewer opportunities exist for this kind of relationship-building. When these kinds of spaces are sustained or newly developed, they bring immense benefits to communities that are difficult to put in monetary terms.

As Eric Klinenberg writes in Heat Wave and Palaces for the People, How Social Infrastructure Can Help Fight Inequality, Polarization and the Decline of Civic Life, "it is not the disaster itself that kills people; it is the social condition of isolation and institutional abandonment following a disaster that becomes most deadly."

As trust erodes in government and corporations, the public spaces of the city remain a key bastion of civic life. It is in well-designed and managed city spaces that we can still see people gathering for a concert in a park or at a farmers' market. When public spaces are provided and designed well, they bring people together in ways that can transcend politics and socioeconomic barriers.

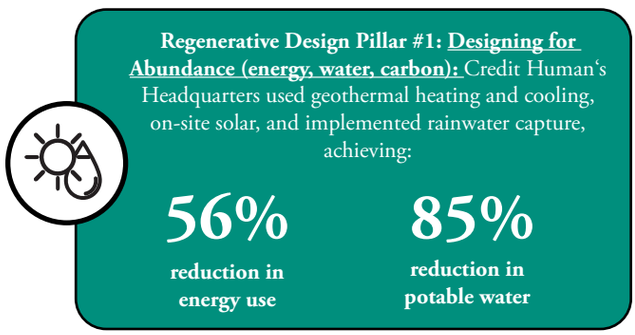
Credit Human Headquarters, Kirksey Architecture, Don B. McDonald Architects | San Antonio, Texas. Photo by Dror Baldinger

REGENERATIVE DESIGN CASE STUDIES

Credit Human Headquarters — San Antonio, Texas — 2025 COTE Top Ten Award[16], Architects - Kirksey Architecture and Don B. McDonald

The Credit Human Headquarters in Texas provides an example of combined social, financial, and physical infrastructure under a business model that was invented during a time of historic economic stress and continues to provide critical services to those in need.

Credit unions, a type of cooperative bank, trace their history back to a mayor in Germany in the late 1800's, Friedrich Wilhelm Raiffeisen, who was struggling to protect impoverished farmers and villagers from loan sharks. Credit Human started with 12 members in 1935 and now has over 250,000 members served by 25 Financial Health Centers in Texas and Louisiana guided by a belief that "people and the planet matter more than profits[17]."



" When we look at this building and realize that it's going to use 90% less water, it's going to use about as much water as a family of four, you know, that's incredible. That is beyond water conservation. That is water security."

- Anita Ledbetter, Executive Director, Building San Antonio Green

Their headquarters is emblematic of that belief. The carbon-negative design started with member and public spaces on the first floor, including their Financial Health Center, which serves members with banking and personal finance services, coaching, a flexible meeting and coworking hub, and a restaurant.

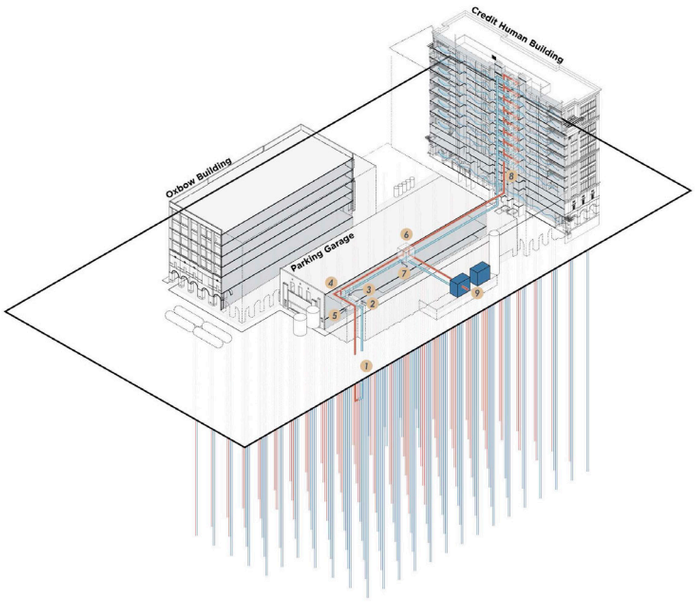
Similarly to how Credit Human uses a pool of member capital to serve its members, the building uses 150 geothermal wells to heat and cool the building efficiently, offsetting all of the heating needs and 40% of the cooling needs[16], saving both energy and water. Both of these are critical resources in San Antonio, which often experiences drought and saw power outages and fatalities during Winter Storm Uri in 2021 when ERCOT forced rolling blackouts[18]. At this building, 2.6 million gallons of rainwater and air-conditioning condensate are collected in underground and rooftop tanks for non-potable uses, including one 54-foot tank repurposed from the historic Pearl Brewery. Credit Human installed solar panels on the roof of their headquarters and most of their 25 branch locations, making it one of the largest commercial solar projects in San Antonio. On-site solar meets 40% of the annual electricity demand for the 12-story building.[16]

Credit Human applies regenerative design to both its business model and its building, bringing people from all backgrounds together to build a more sustainable life. Cooperative business models like this are on the rise for exactly the same reasons that Credit Human started: to provide affordable and reliable crucial services to the local community.

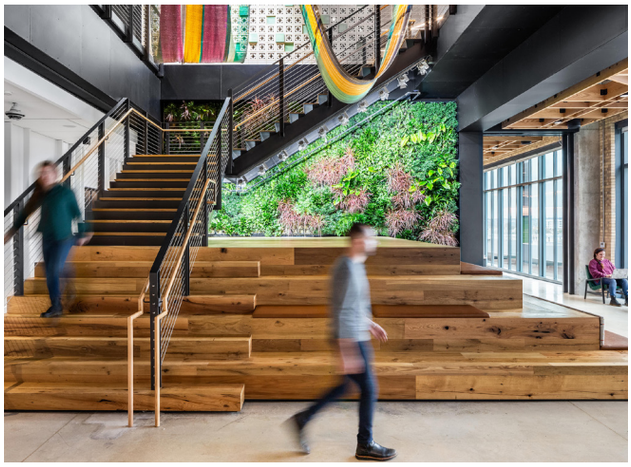
POLICY PLAYBOOK

- **Write regenerative design requirements into public development mechanisms** including requests for proposals, tax increment finance, payment in lieu of taxes, and other common public incentives for development (using the AIA Framework for Design Excellence). The Chicago Sustainable Development Policy requires sustainable and energy-efficient design for TIF-funded developments (https://www.chicago.gov/city/en/sites/sustainable-development-policy/home.html) .

- **Design community buildings to be neighborhood anchors.** Expand public schools, branch libraries, or other civic buildings into full-service community learning centers that co-locate wrap-around services like health, dental, vision, and mental health clinics, day care, and adult workforce development facilities and offer group programming to build community. Further Information: Cincinnati Community Learning Centers



Credit Human's Headquarters uses geothermal heating and cooling. Diagram credit: Kirksey Architecture and Don McDonald.



Regenerative design bringing natural elements into indoor environments to reduce stress and fatigue, also known as biophilic design. Photo by Casey Woods.

FINANCING STRATEGIES

- **Municipal Green Bonds and Social Infrastructure Bonds** offer large-scale funding for civic improvement projects that align with climate goals, environmental impact, and meet safeguards. $8.1 trillion dollars has been allocated as of 2025[19]. Further Information: Climate Bonds Initiative

- **Elective Pay (Direct Pay)** allows governments and nonprofits to receive direct payment for the 48E Investment Tax Credit or Production Tax Credit. While the eligibility of solar expires in July of 2026, other technologies like battery energy storage and geothermals can still benefit for several years. Further Information: (https://www.irs.gov/credits-deductions/elective-pay-and-transferability)

- **Energy Performance Contracting** is used by public entities across the country to fund energy investments in civic infrastructure paid for with savings. Partner with licensed architects and ensure transparency, along with third-party measurement and verification of savings when working with Energy Saving Companies (ESCOs). Further Information: Environmental Protection Agency Performance Contracting and Energy Service Agreements

Challenge 3: The Politics of Place

CHALLENGE STATEMENT

Cities across the United States have seen a rise in loud and aggressive voices resistant to any change in the status quo. A majority of people in an area may agree that there is a clear need for affordable housing, energy and water infrastructure, a sports and entertainment district, or other highly visible projects. However, as soon as a site is identified, the fear of potential negative externalities, both real and perceived, drives some citizens to oppose these projects. For mayors and architects alike, the result is familiar: projects get stalled, costs rise, and communities are left feeling upset and unheard. Often, the project is never built at all.

Opposition to new development is built on a century of well-placed skepticism. Early in the 20th century, cities adopted tools like zoning codes to separate industrial impacts from neighborhoods. Unfortunately, these same tools were used to enforce racial and economic segregation. Decades later, as these tools also failed to prevent widespread pollution and the cumulative health impacts (as seen in regions like "Cancer Alley" in Louisiana), environmental reviews were layered on to provide greater protection. But the cure led to other diseases, and these tools also became barriers to the very things that communities needed most: affordable housing, upgraded infrastructure like wastewater treatment plants to eliminate combined sewer overflows, and civic projects that bring people together.

Regenerative design provides some of the most powerful antidotes to community opposition through engagement, long before a new project takes place. Formal structures like a Community Benefits Agreement (CBA) and informal efforts like community design charrettes provide opportunities for neighbors to express their fears and needs. When cities and developers engage the community early and often, and share power and decision-making on critical projects affecting a community, it can turn opposition into openness and, in some cases, community support. As Nathaniel Smith with the Partnership for Southern Equity shares, "Change moves at the speed of trust."

North Torrey Pines Living and Learning Neighborhood was the largest project UCSD had every developed. Photo by Tom Harris.

REGENERATIVE DESIGN CASE STUDIES

UC San Diego North Torrey Pines Living and Learning Neighborhood — San Diego, California — 2023 AIA COTE Top Ten Award[20], Architects - HKS and Safdie Rabines

In 2016, the University of California, San Diego, launched the UC Student Housing Initiative with a design-build competition. The institution, which is known for its research on climate science and leadership on climate action, needed an expansion to provide student housing and additional classrooms. The plan called for not just a few buildings, but a whole new neighborhood. The North Torrey Pines Living Learning Neighborhood was planned to include three residence halls housing 2,048 students at below market-rate, two academic buildings, eight general assignment classrooms, administration offices, underground parking, and public amenities. The neighborhood was envisioned as a complete package, exemplifying regenerative design in every way.

Beyond the development-specific regenerative design features, the University began community engagement before it commissioned architects HKS, Safdie Rabines Architects, and OJB Landscape Architects. The challenge was to demonstrate "density done well" by leveraging evidence-based design. For UC San Diego to meet its enrollment goals in the midst of a severe housing crisis in

which seemed out of place to several neighborhood groups. HKS, Rabines, and team began with surveys and interviews, building on previous community engagement work. The Craft Center, a general public-facing program that closed in 2012, emerged as a community priority and was included in the project.

However, the initial outreach was not enough to prevent opposition to the project and a lawsuit from La Jolla Shores Association (LJSA) and the Blackhorse Farms Homeowners Association. The HOA had concerns about "endangered species, traffic, greenhouse gases [and] wastewater," but added, "There are likely other places on the campus where a project of this density could be located." They weren't opposed to the project; they were opposed to it going in their backyard.

A year later, a settlement was reached. According to the La Jolla Light newspaper, "representatives of the Blackhorse Homeowners Association and the La Jolla Shores Association will join UC San Diego's Community Advisory Group to ensure continued close collaboration between the university and the community." The combination of structural inclusion of the community voice and continued communication addressing the neighborhood's specific concerns settled the dispute and allowed the related Theatre District, a future phase of the same development, to move forward.[21]

The final project delivered an 81% reduction in measured energy use intensity, a 47.5% reduction in potable water use, managed 43.2% of stormwater on-site, and doubled the amount of planted area on the site. So, in addition to providing housing over 2000 students, it added habitat for birds and pollinators as well. After measuring the building's actual performance over a year, a triple-bottom-line cost-benefit analysis found a net present value of $611,363,600 over a 30-year time frame.

Regenerative Design Pillar #3: Aligning Social, Environmental, and Economic Needs: UC San Diego integrated elements like the Craft Center based on community feedback and invited neighborhood leaders to serve on their Community Advisory Group to inform future development.

Pictured above is a courtyard at NTPLLN where faculty and residents alike can spend time in the well-vegatated outdoors. Architect: HKS Architects, Inc. and Safdie Rabines Architects. Project Location: San Diego, California Photographer: Tom Harris

POLICY PLAYBOOK

- **Allow more projects to be permitted quickly and require fewer variances for elements that support regenerative design**: Overhaul building department administrative workflows to rapidly grant permits for projects that meet key community objectives. Best-Practice Example: San Diego "Express" Building Permitting (https://www.sandiego.gov/development-services/permits/timeline and https://www.sandiego.gov/development-services/quicker-processing-opportunities).

- **Engage community stakeholders about adopting Use By-Right Development policies**. Initiate a formal, city-wide public engagement process to consider Use-By-Right and streamlined permitting for projects that align with city priorities. The East Billings Urban Renewal District (https://billingsbird.com/wp-content/uploads/2023/04/EBURDCodeAdopted.pdf) project extensively engaged community stakeholders and revitalized an aging industrial area by utilizing a hybrid form-based code, Tax Increment Financing (TIF), and streamlined, by-right permitting . Further Information: HUD Regulatory Barriers Clearinghouse (https://www.hud.gov/hud-partners/state-and-local-best-practices)

FINANCING STRATEGIES

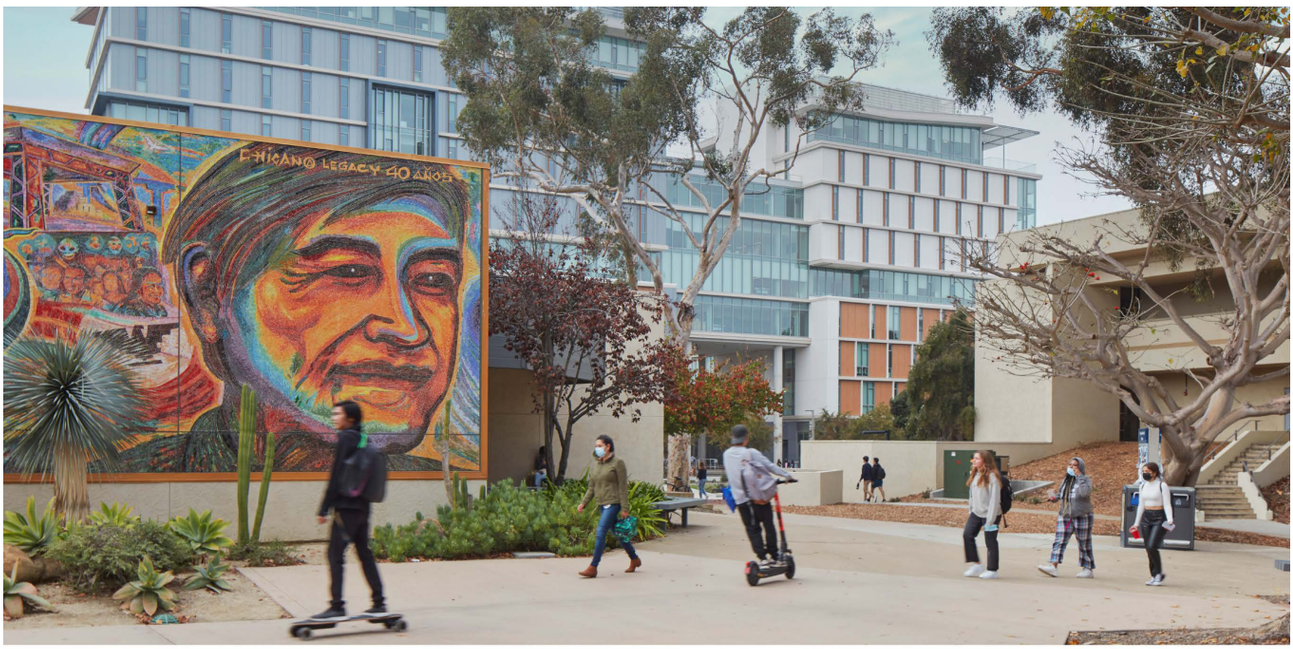
- **EPA Brownfield Grants paired with state brownfield tax credits and Tax Increment Financing (TIFs)** for the remediation of contaminated sites can help revitalize historically disadvantaged communities. Further Information: Congress for New Urbanism (Chattanooga, Tennessee)

- **Community Investment Trusts (CITs)** allow residents to buy small, loss-protected shares in local commercial real estate. Further Information: Mercy Corps Buy Back The Block (Portland, Oregon)

- **Public-Nonprofit Partnerships**: Local government collaborations with nonprofits and faith groups can be highly effective. For example, YIGBY, or Yes in God's Back Yard, has developed a series of financing instruments for churches with substantial land ownership to work with private developers to build affordable housing while also improving their own economic sustainability. Further Information: Shelterforce

"UC San Diego is a champion in our community for practicing what they preach, developing entire neighborhoods like North Torrey Pines that meet both their and our goals for reducing impacts on the environment while still providing the housing and facilities they need to grow. Their process for engaging the neighborhoods surrounding their campus to inform and direct development plans is a template for responsible development and ensures that projects protect the interests of the community."

— **San Diego Mayor Tod Gloria**



The North Torrey Pines Living and Learning Neighborhood invites the community in to public spaces including a wide range of affordable dining options as well as reviving The Craft Center, a public facing amenity that had previously closed. Photo by Tom Harris.

Challenge 4: Climate Resilience and Disaster Preparedness

CHALLENGE STATEMENT

Climate disasters are the new normal. 2024 was the hottest year on record. Second place? 2023. Third place? 2025. According to a study published in Science in 2021, a person born in 2020 compared to one born in 1960 will likely experience 7.5 times as many heat waves, 3.6 times as many droughts, 3 times as many crop failures, 2.8 times as many river floods, and twice as many wildfires in their lifetime[22].

With the frequency and severity of these events increasing, broad community-engaged resilience plans are critical both for buildings and for cities. These start with hazard and vulnerability assessments and stakeholder engagement, followed by land use reforms, strategic tax and financing incentives, and the development of green infrastructure to naturally buffer water and heat. If critical infrastructure and buildings can't be relocated or elevated, strategic hardening of those assets may be necessary.

Regenerative projects can be cooling or heating hubs, or community centers where neighbors can charge devices, refrigerate medicines, find potable water, and use sanitary toilets. After a disaster, regenerative design also means building back better than before. It is essential to ensure that the built environment evolves and adapts like a stream bank adjusting to a new bend in the river. Regenerative projects should be sited strategically across communities to ensure sufficient access to neighbors in need.

Regenerative Design Pillar #4: Resilience & Self-Sufficiency: Hoboken, New Jersey's Sponge City uses green infrastructure to delay flooding, store flood water that does infiltrate the city, and then discharge the water back into the Hudson River.

REGENERATIVE DESIGN CASE STUDIES

Sponge City — Hoboken, New Jersey

Hoboken, New Jersey, suffered catastrophic flooding from Superstorm Sandy in 2012. After suffering $110 million in damages[23] and taking months to recover, the city adopted the "Sponge City Approach" and began adopting guidelines from local and global standards to create a master plan including LEED, CDP-ICLEI, Jersey Water Works, and Sustainable Jersey. They adopted a new vision statement, "A sustainable and resilient Hoboken will be an environmentally, socially, and economically healthy and equitable community that allows future generations of residents to meet and exceed our quality of life." They also committed to ensuring it would never happen again.

The Sponge City Approach, developed with support from the OMA Rebuild by Design Team, focused on coastal flooding, rainfall flooding, drinking water, energy and communications, land use and green building, transportation and parking, natural resources, and waste management using a systems thinking approach to disaster risk reduction.

This planning led to the city engaging Starr Whitehouse, OLIN, AECOM, and other supporting firms to integrate regenerative design in the new Harborside Park, Northwest Resilience Park, and Southwest Resiliency Park, all critical elements in the flooding management masterplan. Using parks as a defense mechanism for flooding involves delaying runoff with green infrastructure, letting initial rainfall infiltrate, then storing excess water in underground detention tanks, which then discharge the stored stormwater once the storm event subsides.

After the planning process, the city moved into investment and implementation in tiered priorities:

Priority 1 involved developing new regulatory mechanisms, considering zoning changes, redevelopment areas, and implementing new financial incentives.

Priority 2 focused on the implementation of blended green and gray infrastructure.

Priority 3 focused on strengthening communication and local partnerships, including a guidebook for business owners and homeowners.

The use of regenerative design practices including green infrastructure, policy, and community engagement led to real disaster risk reduction.

The result? When Storm Ophelia landed in September 2023, the new system collected 1.4 million gallons of rainwater and reduced the recovery time to one day.

Virtual Singapore — Digital infrastructure for resilience planning

Similarly to Hoboken, Singapore suffered catastrophic flooding in 2011, which led to the development of the world's first national-scale digital twin[25]. Through a partnership with the National Research Foundation, the Singapore Land Authority, and GovTech, Virtual Singapore enables simulations of flood, energy, and traffic scenarios before disasters happen. This allows the city to test policy and action plans virtually before investing and deploying them. The model combines a subsurface digital twin with real-time data integration and is agency-wide, providing ready access to the ability to test various scenarios as new risks are identified.

Regenerative Design Pillar #4, Resillience & Self-Sufficiency: Singapore developed a national digital twin for scenario planning for disaster preparation and response.

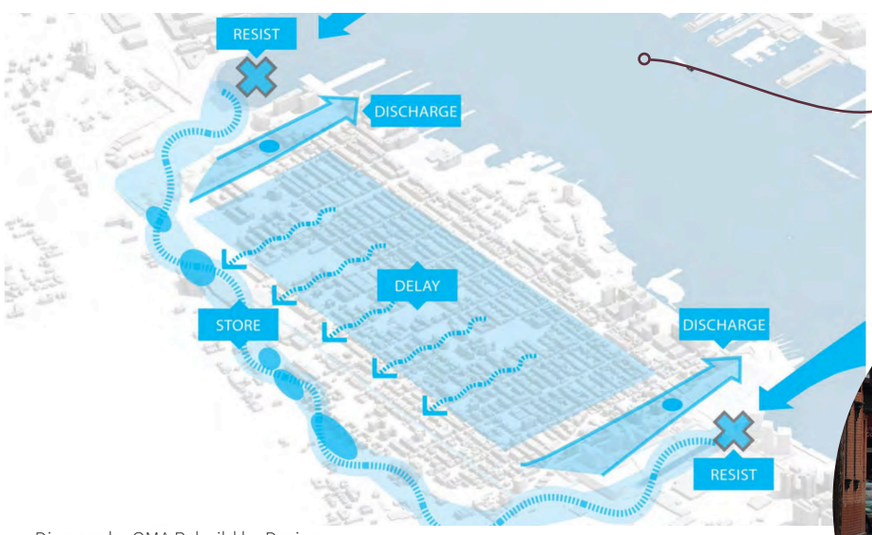


Diagram by OMA Rebuild by Design

Hoboken's comprehensive water management strategy for disaster risk reduction

Flooding in Hoboken, NJ after Superstorm Sandy in 2012. Photo by Alec Perkins

"I remember a time when storms like this would paralyze our city for days. Streets would become rivers. Cars would be totaled. Families and businesses would be left to deal with the mess on their own. That's no longer the case, and that progress didn't happen by accident. It happened because we made smart, forward-thinking investments."

— Mayor Emily Jabbour

POLICY PLAYBOOK

- **Develop a comprehensive resilience and recovery plan** that requires regenerative design for new development, major renovation, and disaster recovery as part of FEMA's Long-Term Community Recovery Framework. Further Information: Greensburg, Kansas built back green after disaster
- **Develop Equity-Centered Community Resilience Hubs**: Upgrade existing trusted community facilities into multi-functional hubs. Wilmington's Teen Warehouse Center (https://teenwarehouse.org/) integrates after-school services with resilient energy technologies.

Northwest Resiliency Park, Hoboken, NJ. Image courtesy of OLIN and Iwan Baan.

Southwest Resiliency Park, Hoboken, NJ. Image courtesy of Starr Whitehouse. Photo by Francine Fleischer.

FINANCING STRATEGIES

- **Green banks and infrastructure banks** are purpose-built financing entities at the state, regional, or municipal level that structure loans, loan guarantees, tax-exempt bonds, credit enhancements, and other instruments to provide low-cost capital for regenerative infrastructure. Further Information: Coalition for Green Capital
- **Environmental Impact Bonds** (EIB) and other pay-for-success financing mechanisms help reduce risk while funding critical infrastructure to address common needs like resilience. Further Information: Quantified Ventures
- **Advanced market commitments from government buyers** for new clean technology and climate technology can help underwrite project finance. Further Information: New York City Housing Authority Sustainability Agenda

Challenge 5: Transportation and Transit-Oriented Regeneration

CHALLENGE STATEMENT

From potholes to traffic, mayors hear about few things more than transportation. This stands to reason as the US Bureau of Labor Statistics Consumer Expenditure Survey estimates households spend $13,318 per year on transportation. This comes right after housing as a percent of total expenditures for a family. When mayors consider how these out-of-pocket expenses impact families and how little of this money stays in the local economy, the need for regenerative strategies becomes evident.

And while transportation ranks second among consumer expenses, it is the single largest sector of greenhouse gas emissions, contributing around 28%. The same zoning systems that discourage diverse housing options also require residents to own a car. Unfortunately, with increasing gas prices, the lack of affordable new and used cars, the high cost of insurance, and high interest rates, owning a car has never been further out of reach.

Beyond the economic and environmental costs, the human cost of car-centric urban planning continues to increase, with nearly 40,000 fatalities in 2024 alone, according to the National Highway Traffic Safety Administration.

Transportation is also closely tied to upward mobility in much of the United States. Access to public transit, especially when it enables a shorter commute, is closely associated with improved job accessibility, educational attainment, and overall upward economic mobility.

With this in mind, incentivizing transit-oriented development is one of the single most powerful levers cities have to reduce vehicle-miles-traveled. The more dispersed a given population is, the harder it is to serve them with anything other than individual vehicles. Increasing density, developing multi-modal solutions, and building in EV charging infrastructure are key regenerative design solutions for transportation.

"The only way to get to net-zero is by integrating mechanical and electrical engineering into the conceptual design phase. It's a fundamentally different way of designing a building."

- Charles Rose, Architect

Regenerative Design Pillar #4: Supporting Biodiversity and Integrating the Local Ecosystem: The John W. Olver Transit Center transformed an asphalt parking lot into 42% native meadow in addition to the new building.

The John W Olver Transit Center in Greenfield, Massachusetts balanced the programmatic needs of a transit center with the community needs for an county government office and with the natural need for native grassland. Image courtesy of Charles Rose Architects. Photo by John Linden.

REGENERATIVE DESIGN CASE STUDIES

John W. Olver Transit Center — Greenfield, Massachusetts — 2023 AIA COTE Top Ten Award[26], Charles Rose Architects

The first net-zero energy transit center in the United States sits at the intersection of bus lines, Amtrak rail, and an office for the Franklin County government. Beyond providing easy access to multiple modes of transportation, the 24,000 square foot John W. Olver Transit Center serves as a resilience hub. The project transformed an 81,000 square foot empty and fully paved brownfield lot into a space that is 42% covered by a meadow and a woodland ecosystem, which is planted with 100% native species.[26]

Regenerative design was deployed in every phase of the project. Charles Rose Architects engaged the community through a wide range of strategies, including very early project goal setting, which helped determine that the project would "support social, physical, and mental well-being for all its residents at all stages of life. The community reviewed and critiqued programming and design decisions as the project was developed.

Because the building is both a multi-modal and ADA accessible transit hub and a county office, it is a perfect place to host community meetings serving a wide range of citizens than would otherwise be unable to attend.

On-site energy generation includes a 98kW rooftop solar array and a waste biomass boiler. These serve a geothermal heat pump that uses chilled beams and energy recovery systems to maximize energy efficiency.

Because of the quality of the mechanical system, the facility was one of the first to reopen after COVID shutdowns, demonstrating the importance of incorporating air quality into resilience planning. The building also serves as a cooling center and emergency operations center. Future plans include adding battery energy storage to leverage the solar panels and enable fully off-grid resilient operations.

Even with these many features and impressive performance achievements, the project came in 38% below benchmark cost and 21% under the original budget. [26]

The John W. Olver Transit center doubles as a resilience hub in the event of emergencies. Image courtesy of Charles Rose Architects. Photo by John Linden.

The interior incorporates natural materials with expansive views of the native grasslands added to the site. Image courtesy of Charles Rose Architects. Photo by John Linden.

POLICY PLAYBOOK

- **Support Transit Oriented Development with a holistic strategy**: Establish Transit Oriented Development plans that connect communities and support sustainable urban development. Best Practice Example: Phoenix Transit Oriented Communities Framework (https://www.phoenix.gov/administration/departments/pdd/growth-infrastructure/transit-oriented-communities.html)

- **Engage in community discussion to reduce or eliminate parking minimums**: Launch formal city initiatives to remove outdated mandatory parking minimums in transit-adjacent zones. Further Information: Parking Reform Network Policy Cookbook (https://parkingreform.org/resources/cookbook/)

- **Expand public and curbside EV charging infrastructure** following best-practices seen in a number of cities. The Los Angeles region currently leads the nation on the deployment of public and curbside EV charging infrastructure. Further Information: Case Studies: City Public & Curbside EV Charging Strategies ; May 2025 Report on Los Angeles Zero Emissions Vehicle Plan.

FINANCING STRATEGIES

- **Joint Transit-Agency Real Estate Development Capital**: Mayors can form financial partnerships with regional transit authorities to co-develop public land surrounding transit hubs, as well as air rights to turn the land-value transit creates into a funding stream. Further Information: Transit-Oriented Development Institute

- **Coordinating with the Federal Transit Administration** to secure matching federal funding for transit projects and transit-oriented development remains a reliable and critical component of transit finance. Further Information: Federal Transit Administration

Challenge 6: Data Centers & Artificial Intelligence

By observing models in the United States (~98%), this particular case study displayed a brilliant use of AIA's Focus Pillar #5: Promoting Discovery, Measurement, and Public Knowledge.

CHALLENGE STATEMENT

No technology in human history has seen the rapid growth in its user base that artificial intelligence has achieved. UBS reported that ChatGPT acquired 100M active users within two months of launching[27]. Compare that to 9 months for TikTok, 2.5 years for Instagram, 4.5 years for Facebook, and around a decade for Netflix. The only thing that compares to the voraciousness of AI's growth is its appetite for power. Sam Altman testified before the US Congress that the price to compute is converging with the price of electricity[28]. Most of that electricity, somewhere between 60%-90%, goes directly to processing, and the rest goes mostly to cooling. For traditional data centers, that's more like 50%-50%.

Few people have a better perspective than architects on the impact of technology on the built environment and workplace. Over the past several decades, architecture went through a similar upheaval as other industries are now experiencing with the growth of AI. This began when hand drafting shifted to computer-aided design and then just as rapidly to building information modeling (BIM). Each of these new technologies significantly changed how architects design buildings and produce construction documents. The result? A net increase in architects per capita through both transitions!

The productivity gains from CAD and BIM did not result in a smaller workforce. Rather, architects produced more work, at less cost, for more people. The job title of Drafter declined, and new, higher-value, and more specialized roles emerged, like BIM Coordinator and Sustainability Specialist. In some ways, automation in architecture helped pave the way for regenerative design because architects saved time and could use that time to consider higher-level design challenges.

Mayors have certainly seen some of these productivity increases for knowledge and communication staff. Some may be experimenting with things like AI-enabled permit review (please meet with your local AIA chapters about this!), or with multilingual services in departments that would never be able to afford an interpreter.

In the future, we will see massive changes in fields like healthcare, law, and education, and eventually further expansion of robotics and highly-automated vehicles. To support the growth of AI, architects are already seeing massive growth in two areas – data centers and the resulting demand for energy .

When considering if there may be a bubble in AI infrastructure development, it is important to recall that 95% of the fiber infrastructure installed during the dot-com bubble was dark: it was not contracted and was not actively used. It was installed speculatively, and while eventually it would be used, the revenue did not arrive fast enough to cover the debt service. Compare that to today, when hyperscalers are actively contracting more data center usage than there are chips to fulfill. They are oversubscribed, for now, and the size, location, and concentration of data centers moving forward will be an open question.

REGENERATIVE DESIGN CASE STUDIES

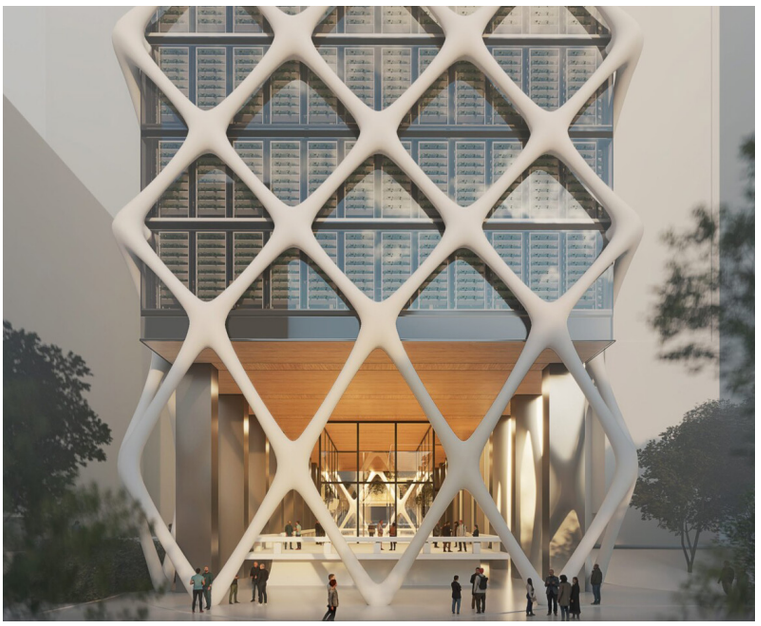
ORNL Automatic Building Energy Modeling (AutoBEM) — Oak Ridge, Tennessee, and Chattanooga, Tennessee[29]

Dr. Joshua New, a researcher at Oak Ridge National Laboratory, has hypothesized that with enough publicly available information, including satellite imagery, aerial imagery, street-view imagery, public building and parcel databases, weather, and prototype building libraries, a supercomputer using machine learning and artificial intelligence could predict building energy use for 98% of the buildings in the United States[29]. After building the model, ORNL partnered with EPB to test it. EPB is a municipally owned utility in Chattanooga, Tennessee, which pioneered the deployment of high-speed fiber optic communication on top of its electrical grid to increase reliability and to diversify its business model. They now offer the fastest internet in the world to every electric customer in their service territory.

By having access to the highest quality interval data in the United States, ORNL was able to prove that its model was

sufficiently accurate to underwrite investments in distributed energy resources. EPB then leveraged the digital twin to model a range of potential distributed energy investments for its customers that allowed the utility to not raise rates even when its wholesale rates increased.

Using AI tools like these, generation and transmission utilities can begin to value dispatchable distributed energy resources, otherwise known as Virtual Power Plants, as much as traditional power plants. Distributed Energy Resources can include buildings equipped with solar and energy storage as well as smart appliances and building control systems that allow effective demand response. Accurately valuing and using distributed resources spread across the built environment enables better use of existing grid capacity and accelerated deployment of more distributed energy to help meet growing energy demand from data centers as well as the electrification of buildings and transportation. Increased grid capacity from distributed energy resources avoids the need to build as many new traditional power plants, avoiding new fossil energy emissions and bringing health and environmental benefits. This additional grid capacity also enables new industrial development with the resulting economic benefits. AI can be used to help produce solutions to the very problems it creates.



Rendering of an office tower converted to a mixed-use data center and urban farm. Image courtesy of HOK.

By converting waste-heat and condensate to edible material for hydroponic agriculture, this case study undoubtedly illustrates AIA's Focus Pillar #2: Supporting Biodiversity and Integrating the Local Ecosystem.

Transforming Office Towers into AI Hubs and Urban Data Centers — HOK Data Center Study

Peter Choi, AIA, principal designer for HOK's San Francisco studio, recently led a study on converting vacant commercial real estate that is unsuitable for residential use. The published study explores transforming these properties into combined data centers and urban agriculture sites, creating a symbiotic system where each facility benefits from the other's waste. Choi and team observe that the value of commercial buildings is directly associated with the quality of tenant amenities. And while traditional amenities are commonly found, few truly differentiate. Firms are racing to build more reliable, secure, and low-latency AI infrastructure that provides a competitive edge without exposing the firm to security risks. The best practice for agentic AI has been isolated air-gapped systems in which the AI is unable to pull from outside sources.

Meanwhile, we see increased public opposition to massive data centers in more and more remote locations, jumping ahead in interconnection queues, and bringing in temporary on-site power that produces more carbon and other emissions than the grid baseline. The opportunity to leverage already built physical and power infrastructure and do so in a building that shares the data center's requirement of reliable electricity even during a blackout provides a cost-effective and resource-efficient regenerative design solution.

HOK further incorporated regenerative design by considering how waste heat and water used for cooling data center chips might be reused for hydroponic agriculture. Condensate from closed-loop cooling systems on servers is harvested for irrigation, while repurposed heat goes beyond mitigation and generates a net positive environmental impact.

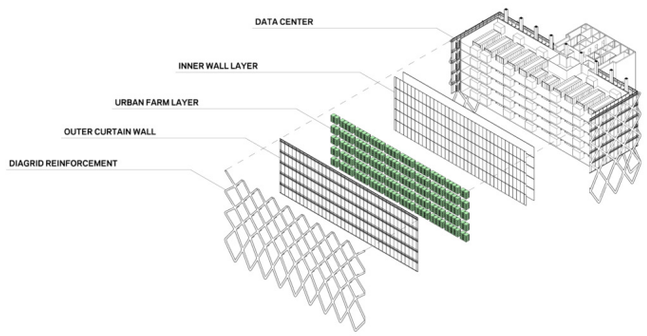
POLICY PLAYBOOK

- **Community Benefit Agreements with regenerative design incorporated**: Require all data center developments to execute legally binding Community Benefit Agreements that weave regenerative targets, workforce requirements, and other city priorities into the project's permit approval. The recent City of San Jose Agreement with PG&E unlocks data center growth while providing community benefits. (https://www.sanjoseca.gov/Home/Components/News/News/6865/4765). Additional Information: Community Benefits Agreement Resource Center; WRI Database of Community Benefits Frameworks Across the US.

- **Use local authority and collaborate with state regulators** to shape data center development that meets local environmental, energy and community priorities. Use zoning authority to direct sensible siting and require clean energy usage, water efficiency, and limits to noise and emissions. Work with state regulators to require that data centers have load flexibility, pay for their energy generation and infrastructure costs, improve grid reliability, and use new clean energy. Pine Island / Goodhue County, Minnesota worked with State regulators, Xcel Energy and Google, to establish a best-practice data center project, including 1900MW of new clean energy and advanced energy storage. Further Information: Climate Mayors: Data Centers and the Climate Landscape.

- **Require waste-heat reuse.** Heat recovery can cut a data center's power demand 10-30% while supplying district heating. Virginia's HB 323 (2025) is the first U.S. law advancing data-center heat reuse (mapping facilities to potential heat users), and New York's Utility Thermal Energy Network Act enables the district-energy systems that make it possible.

- **Speed Deployment of Microgrids, Renewables and Energy Storage to boost Resilience**: Fremont's Critical Municipal Facilities Project deployed solar power and batteries to 30 public safety facilities to provide resilience and backup power during outages. Requiring data centers to have load flexibility themselves and to make distributed capacity investments helps prevent future electric rate increases. (https://avaenergy.org/from-the-ceos-desk/energy-resilient-municipal-critical-facilities/)



Exploded axonometric diagram of office building conversion to mixed use data center and urban agriculture. Image courtesy of HOK.

FINANCING STRATEGIES

- **Commercial Property Assessed Clean Energy (C-PACE) Programs**: Use long-term property tax assessments to supply developers with 100% upfront capital for sustainability and resilience retrofits. Further Information: PACENation Resource Center.

- **Value capture and host fees**. Capture data-center value through host fees, energy, or compute taxes, and revenue-sharing earmarked for city affordability and resilience, conditioned on performance. Notable Example: Henrico County, VA - Turning Data Center revenues into affordable homes.

> *"Mayors and their citizens are right to be wary of AI. In Chattanooga, our answer is to put it to work for affordability — partnering with Oak Ridge National Laboratory and EPB to run our grid smarter and keep costs down for residents. That's how I think cities should approach this, and it's what I'm advocating on the U.S. Conference of Mayors' technology committee."*
>
> — Tim Kelly, Mayor of Chattanooga, TN

Mill 19 by RIDC and designed by MSR Architects and TEN x TEN as photographed by Corey Gaffer.

Call to Action

Regenerative design is a process of healing interconnected systems rather than curing specific symptoms. If we focus on solving narrow problems, they continue to resurface year after year. If we take a holistic view, we can solve multiple problems simultaneously with a single investment. Cities, like buildings, are sets of interconnected systems that rely on one another. They are not separate from the ecosystem in which they exist, they are necessary contributors to it.

AIA 2026 President Illya Azaroff refers to the "five wisdoms" in his regenerative design work: Engaging with Humility, Embracing with Respect, Sustaining with Aloha, Healing with Forgiveness, and Serving with Integrity. These principles are also hallmarks of great mayoral leadership.

Mayors who act proactively, well before the inevitable storms ahead, will help their communities move from surviving to thriving.

KEY POLICY RECOMMENDATIONS

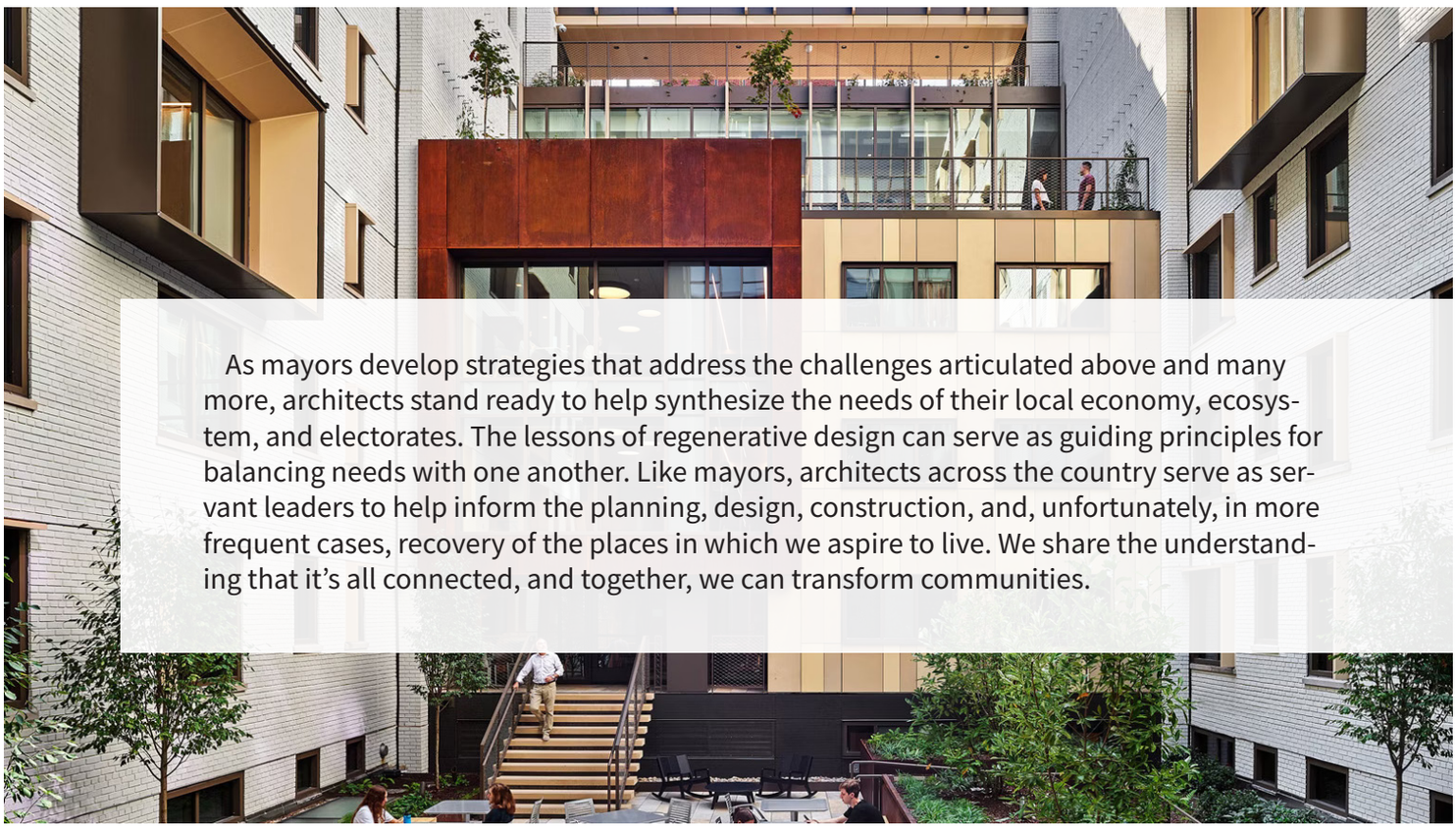
As we consider policies that can help enable more regenerative development like the case studies we have reviewed, a handful stand out as particularly worth consideration:

- Use the Just Communities / stakeholder engagement protocol to build trust before and during large-scale development or resilience planning.
- Develop comprehensive resilience and recovery plans to ensure that the city has policies and procedures in place to reduce the impact of disasters and build back better.
- Incorporate the AIA Framework for Design Excellence into city RFPs and incentive programs.
- Design and build resilience hubs to be trusted facilities in the community, especially those that serve youth, vulnerable communities, or provide wrap-around services.
- Adopt land use, zoning, and building code reforms to encourage the use of regenerative design strategies.

KEY FINANCING TOOLS

A consistent barrier to regenerative development is a perceived lack of financing options for some of the non-traditional building elements, like stormwater mitigation and energy storage. Below are a handful of some of the most impactful and creative strategies from the case studies that can be explored to make regenerative buildings bankable.

- At the UN Biodiversity Conference (COP15), nations adopted the Kunming-Montreal Global Biodiversity Framework which includes a core goal to double investment in ecosystem services and to disclose risks.[6]
- Environmental Impact Bonds/Pay-for-success: Structure financing that pays investors only when projects hit measurable outcomes like multi-system cost savings, health gains, ridership, and flood reduction.
- Community Land Trusts and Regenerative Cooperative Startup Support: Invest in community ownership of basic needs, affordability is improved while improving environmental quality.
- Virtual Power Plants / Distributed Energy Investment: Advocate for utilities to value distributed energy resources appropriately that perform as reliably and at a similar scale as traditional power plants.
- Advanced Market Commitments and Pooled City Procurement: Leverage the purchasing power of cities by making binding purchasing commitments based on clear performance specifications that are identical in multiple cities creates clear demand pull and underpins project finance for the emerging solution.



As mayors develop strategies that address the challenges articulated above and many more, architects stand ready to help synthesize the needs of their local economy, ecosystem, and electorates. The lessons of regenerative design can serve as guiding principles for balancing needs with one another. Like mayors, architects across the country serve as servant leaders to help inform the planning, design, construction, and, unfortunately, in more frequent cases, recovery of the places in which we aspire to live. We share the understanding that it's all connected, and together, we can transform communities.

The Renovation of Thurston Hall by VMDO Architects in Washington, DC (Photo: VMDO Architects | Alan Karchmer Architectural Photography)

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