Market One and the Stanley Center: Approaches to Decarbonization in Historic and Nonhistoric Buildings

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Fig. 1. Market One, 130 East Third Street, Des Moines, Iowa, built 1901 and rebuilt 1919, east façade. Photograph by Integrated Studio, 2015.

Adaptive reuse projects require unique approaches that unlock the potential for radical decarbonization.

Reuse is an effective strategy to draw down carbon impact.

While building new may offer greater flexibility in carbon management, it ignores the inherent embodied carbon savings of preserving existing structures.

This article uses two adaptive reuse case studies—Market One in Des Moines, Iowa, and the Stanley Center for Peace and Security in Muscatine, Iowa—to examine how projects with radically different preservation needs can achieve decarbonization goals. Market One utilized both state and federal Historic Tax Credits (HTCs) and achieved Leadership in Energy and Environmental Design (LEED) Platinum certification.[1] The Stanley Center transformed what was once an important community hub into one of the most sustainable buildings in the world, and is on track to achieve Living Certification through the Living Building Challenge (LBC), one of the world's most rigorous building certification programs, emphasizing true regeneration rather than merely minimizing harm.[2] Both projects have been recognized with the American Institute of Architects (AIA) Committee on the Environment (COTE) Top Ten Awards, architecture's highest award for sustainable design excellence, which honors "innovative projects integrating exemplary performance with compelling design."[3] Market One was recognized in 2021, while the Stanley Center was recognized in 2025.[4]

While the projects employed different strategies to achieve overall decarbonization, they began with the same key strategy: reuse. Reusing existing buildings advances sustainable outcomes before work has even begun, through embodied carbon savings. Fundamentally shifting perspectives on reuse as a decarbonization advantage is key to preserving more historic structures and to creating a more sustainable and culturally enriched future.

Background

Market One. Nestled in Des Moines' Market District, Market One, a warehouse that formerly housed the Advance-Rumely Thresher Company, sits between two former railroad tracks (Fig. 1). Originally built in 1901, and rebuilt in 1919 after a fire, the building functioned as a storage and repair warehouse for agricultural threshers and tractors. The tracks were used to offload and ship materials through large wooden doors on either side of the building until it was sold in 1966. With its industrial heyday long past, the Market District had become a disinvested neighborhood by the late twentieth century. In the 2000s, following fresh investment in revitalizing the adjacent East Village, the Market District was targeted for development.

The City of Des Moines' 2010 Master Plan envisioned reinvestment in the Market District. It proposed a neighborhood with multimodal transportation, including an Amtrak stop, housing, a large civic park, an anchor civic building, and an outdoor market square to drive shopping, business, and trade. But that vision was far from reality. The city needed an initial investment to kickstart the intended growth. In 2012, Blackbird Investments, a private real estate developer, identified the Market One building as the ideal candidate to spark reinvestment. The company saw Market One as an opportunity to establish a standard for redevelopment, preserving the essential industrial character of the Market District while creating a sustainable design language that set a high bar for future redevelopment. The adaptive reuse concept planned to utilize existing warehouse floors one through three as office space, the basement for mechanicals and storage, and the existing freight elevator overrun to access a new amenity: a roof deck. The project also set ambitious decarbonization goals, including achieving net-zero energy, obtaining LEED Platinum certification, and using both state and federal HTCs. However, historic preservation that also advanced sustainable design would require balancing these occasionally competing priorities. The Market One project, completed in 2014, sought to maintain its historic integrity and cultural heritage while also decarbonizing its operations.

Fig. 2. Stanley Center for Peace and Security, 304 Iowa Avenue, Muscatine, Iowa, built ca. 1963 to 1971, east façade and main entry. Photograph by Integrated Studio, 2023.

Stanley Center for Peace and Security. The Stanley Center for Peace and Security began as the Musser Public Library in Muscatine, Iowa (Fig. 2). Located in the heart of downtown, the original turn-of-the-century Carnegie Library building had long since been torn down due to sinking foundations and replaced with a larger, sturdier structure. Though valued for its ability to provide community resources, the building, circa 1963 to 1971, was not architecturally or culturally remarkable.

In 2018, the library moved to a new location. After years of vacancy and unsuccessful city auctions, the Stanley Center for Peace and Security—a global nonprofit focused on the issues of climate change, nuclear weapons, and mass atrocities and violence—recognized the property's potential to be transformed into a sustainable hub for its headquarters.[5] The Stanley Center vetted both greenfield and existing sites and ultimately decided on the library site after reflecting on the impact that reusing the building could have on the community. Shortly after settling on the former library site, the organization's goal of pursuing the LBC came into focus, as it sought to make a positive impact beyond the project itself. The adaptive reuse of the former library would seek Living Certification while creating both private and collaborative work and gathering spaces for the nonprofit, supporting employee recruitment and advancing the organization's mission. Not only did the former public library give the Stanley Center the opportunity to have a greater impact within its community, but by reusing the building's original structure, the project was able to reduce the carbon emissions associated with the organization's new headquarters radically. The project, completed in 2023, is currently Ready-designated and poised to begin its twelve-month LBC performance period.[6]

Fig. 3. Stanley Center for Peace and Security, courtyard created by selective removal of existing building volume to increase daylighting, reduce operational costs, and provide outdoor program space. Photograph by Integrated Studio, 2023.

Beginning with Reuse

Both Market One and the Stanley Center—while different in their approaches—started with an important decarbonization element: reuse.

Starting any reuse project with a building audit is a key first step in decarbonization. A building audit provides a categorized summary of the in-situ resources and structure, serving as a basis for developing strategies to maintain and reuse as much of the existing material as possible. The audit, focused on minimizing environmental impact through reuse, also naturally lends itself to preserving heritage. An audit can help identify materials and elements that could be transformed or used differently. The audit process is similar to a historic conditions assessment, but with the added charge to keep or reuse as much as possible, even if that means materials are not reused directly in the project or lack significance. This effort goes a long way toward keeping materials and items that could be reused out of the landfill.

By starting with existing structures, both projects significantly reduced embodied carbon emissions. Market One reused over 97 percent of the original building by retaining or repurposing existing materials.[7] Likewise, the Stanley Center reused 95 percent of its original building's mass.[8] Creating a new building from scratch requires the extraction, manufacturing, transportation, and construction of new materials, each step introducing additional carbon emissions. Simply put, reuse put both projects on a strong trajectory toward decarbonization.

Working toward decarbonization does not require keeping everything. Both the Market One and the Stanley Center projects developed strategies for removing parts of the buildings to meet programmatic needs. However, they also prioritized retaining as much of the existing structures as possible, thereby limiting wholesale demolition. Market One removed portions of the interior floor and structure to accommodate a code-required egress stair, keeping it concealed from the exterior of the historic building. The Stanley Center removed approximately 5,000 square feet of interior space to create an outdoor courtyard (Fig. 3).

Where possible, materials removed were salvaged and reused throughout the project.

Both projects salvaged elements in creative ways, finding them another life. Market One reused original but obsolete freight elevator gates as spatial dividers in tenant fit-out spaces, and the Stanley Center donated a variety of surplus casework and furniture to local organizations in need. These examples may not have happened without an early strategy focused on maximizing reuse.

Historic vs. Nonhistoric

While both projects began with the principle of reuse, constraints around historic and cultural integrity added complexity.

Market One pursued HTCs, requiring the project to focus on essential preservation elements identified in the National Park Service (NPS) Part One application, including the building's well-preserved architectural significance as an example of the work of the notable local firm Proudfoot, Bird and Rawson, as well as its role in illustrating Des Moines' historically dominant position in the marketing of agricultural implements. The design team had to begin by considering where energy could be saved. The Secretary of the Interior's Standards for Rehabilitation constrain energy-saving approaches by specifying the treatment of existing façades and volumes of space.[9] Per the standards, character-defining elements and contributing areas of significance must be preserved.

The east and north façades, constructed of brick and limestone throughout, along with the original wooden double-hung windows and the building's structure—a mix of load-bearing masonry, cast-iron columns, and heavy timber—were identified as character-defining. Therefore, adding any exterior thermal envelope was not feasible, as it would fundamentally alter the building's appearance. Alternatively, adding thermal improvements to the interior of the load-bearing walls would not only change the character of the interior warehouse and manufacturing spaces, where the brick was almost exclusively exposed, but would also raise concerns from a technical standpoint. Specific guidance related to preserving the remaining historic windows also limited the approach to improving the thermal envelope (Fig. 4). While these standards created additional constraints, they did not prevent the project from achieving decarbonization goals.

The Stanley Center, by contrast, was not required to follow historic standards. Rather than using Part One of an NPS application to guide the design approach, Neumann Monson Architects began with place-based inspiration and research to determine what the completed project would look like. Using the LBC and its seven petals—Place, Water, Energy, Health & Happiness, Materials, Equity, and Beauty—as a framework for discussion, the client, community members, and design team explored topics of past and present, such as ecological conditions, historical events, community icons, cultural references, and themes of biophilia.[10] Through community and historical research, it was clear that the building's form, design, and materials were not of cultural or historical importance. Thus, the design team could improve the thermal envelope from the exterior, following best practice, without concern for losing significant elements of the building.

Although both projects involved older buildings, they took different approaches to historic status. The HTC process naturally highlights historic and cultural aspects of buildings that should be carefully considered during design. While the Stanley Center may not have qualified for HTCs, its clear significance was revealed through a holistic design approach that considered all aspects of the built and natural environments, including cultural and historical narratives. Both Market One and the Stanley Center were worthy of reuse, yielding significant carbon savings.

Fig. 4. Market One, north-façade windows before and after restoration. Original double-hung wood sash windows were removed, refurbished, and reinstalled. Photographs by Integrated Studio, 2015.

Fig. 5. Stanley Center for Peace and Security, interior work and gathering spaces, showing the transformation of the existing structure while maintaining the integrity of the original building. Photographs by Integrated Studio, 2023.

Reducing Operational Carbon

Reuse alone was not enough to decarbonize the projects. Market One, in particular, faced challenges in maintaining historic integrity while reducing energy use. While the Stanley Center had more flexibility in modifying the building, it still required innovative approaches to achieve the LBC (Fig. 5).

Building envelope. One of the main challenges presented by Market One was its building envelope. Because of the NPS standards and Market One's exposed, character-defining, load-bearing masonry walls, adding cladding to the outside of the building was not feasible. However, best practice is to add thermal layers to the exterior, where temperature and humidity fluctuate; this method ensures that the dew point and moisture fall to the exterior of the conditioned space, allowing them to be wicked away to the outside. While adding thermal layers to the interior is possible, moisture could become trapped inside the wall, creating issues and degrading the wall's structure through freeze-thaw cycles. Neumann Monson decided to avoid adding thermal insulation as a conservative approach, both to limit the thermal properties of the walls and to maintain the historic exposed brick inside and out. This posed an energy-use challenge. The absence of

Fig. 6. Stanley Center for Peace and Security, building envelope transformation, showing the existing brick structure retained with a new thermally insulated rainscreen applied directly to minimize carbon impact. Photographs by Neumann Monson Architects, 2023.

Fig. 7. Market One, interior fit-out, showing efficient mechanical systems and preserved historic volumes; the VRF system eliminated large ductwork, thereby maintaining the original spatial qualities. Photographs by Integrated Studio, 2015.

a thermal envelope facilitated substantial heat transfer, resulting in higher energy demand. To reduce the total operational carbon footprint, the design team needed to offset the higher energy costs elsewhere.

The Stanley Center, by contrast, was nonhistoric and therefore did not require the same level of envelope preservation. While the building had significant mass, it lacked any meaningful thermal insulation. The design team created an ideal envelope as part of the redevelopment by adding a thermally insulated, wood-clad rainscreen to the existing brick façade. By adding the air barrier directly to the existing brick, utilizing it as the sheathing, the team kept much of the existing building in place, minimizing the carbon impact of replacing the building's exterior (Fig. 6). The 5 inches of continuous Rockwool insulation and a thermally modified wood cladding on top of the new weather membrane visually transformed the existing walls while increasing energy efficiency by an average R-value of 25.

Efficient mechanical, electrical, and plumbing (MEP) Systems. Recognizing that Market One had a less efficient envelope, the design team focused on the building's MEP systems, whose efficiency was critical given the envelope's poor performance. A more efficient system could lower operational carbon emissions. While strategies that maximized daylighting by locating enclosed spaces toward the middle of the floor plates helped reduce lighting loads, planning for an all-electric system was the first step in MEP decarbonization. Further efficiency was accomplished through a ground-source variable refrigerant flow (VRF) system, high-efficiency energy recovery ventilator (ERV), 18 deep geothermal wells, and 676 solar photovoltaic (PV) panels. The VRF system enabled efficient heating and cooling of the Market One building despite its lack of a thermal envelope and delivered conditioning to spaces without the need for large ductwork. This was an essential strategy for maintaining the original historic volumes of the warehouse and manufacturing floors (Fig. 7). Small refrigerant piping delivered the required heating or cooling to units located above ceilings or within casework near the perimeter. Larger mechanical equipment, such as the ERV that worked in tandem with the geothermal wells, was placed in the basement, where it was not visible. The highly efficient mechanical system made up for the lack of envelope insulation.

Because the Stanley Center was already saving energy through its improved envelope, the MEP system priorities shifted to efficiently meeting the interior operational loads. Like Market One, the Stanley Center was also all-electric and used a VRF system with a state-of-the-art, efficient dedicated outdoor air system. This system integrated with the envelope to minimize site energy use intensity (site EUI), particularly in the challenging Midwest climate. While still in the process of being commissioned, 12 months of metered data through October 2024 indicated that the site EUI was approximately 22 kBtu/sf/year before renewables, a significant reduction from the baseline of 86.27. These mechanical systems had greater placement flexibility, as maintaining historic character was not a concern. Careful placement of the large equipment on the roof minimized visibility without using valuable PV space. The northwest corner of the roof was a suitable area for setting equipment from both service-distribution and viewshed perspectives, and it was also in the shadow of a neighboring 11-story apartment building.

By reducing operational carbon emissions wherever possible and electrifying mechanical loads, the projects were well-positioned to benefit from incorporating on-site renewables to further reduce overall carbon emissions.

On-site renewables. On-site renewable energy would be necessary for Market One to achieve the ambitious net-zero energy goals set forth as part of the project. The project's historic elements added complexity to this requirement, as the placement of on-site renewables was required to comply with historic standards. The design needed to strike a balance between preserving the historic and aesthetic integrity of Market One and ensuring sufficient on-site renewables to meet energy needs.

The solution involved the thoughtful placement of solar panels. Around 566 panels were installed above the building's car park as an open-air structure on a separate lot across the street, visually unrelated to the historic building yet a clear display of renewable energy generation within the up-and-coming district (Fig. 8). Another set of panels was placed on Market One's rooftop, hidden from street view by the building's brick parapets and low-slope roof. They did not alter the structure's historic appearance; from ground-level views, it is not apparent that Market One has solar panels. This careful placement of what was, at the time, one of Iowa's largest private solar-generation systems—approximately 222 kilowatts—helped reduce the building's operational carbon footprint without compromising the historic and cultural significance of Market One. The building ultimately fell short of its original net-zero goal, likely due to expanded programmatic use of the basement level as additional office space. However, even with the program expansion, it achieved a net energy use intensity of 22.7 kBtu/sf/year, a 75 percent reduction relative to the AIA 2030 commitment baseline.[11]

The Stanley Center incorporated a system of on-site renewables that enabled net-positive energy operations. Unlike Market One, solar canopies could be added directly to the building. The roof was a natural location for solar generation, where most of the PV panels were placed. However, the roof alone was insufficient to accommodate all required panels, and the existing urban site posed a challenge for on-site renewable energy placement, with limited space for ground-mounted systems. Consequently, bifacial solar arrays were extended beyond the roof boundaries to form canopies that not only provided weather protection but also expanded rainwater collection and visibly demonstrated how the building was powered while increasing energy production.

Fig. 8. Market One, solar photovoltaic panels located on the rooftop and car-park canopy across the street to preserve the historic structure's appearance while providing renewable energy. Photograph by Neumann Monson Architects, 2020.

In both historic and nonhistoric adaptive reuse projects, the space required for renewables will remain a challenge, particularly on tight urban sites. Strategies such as off-site generation, network-based installations that leverage neighboring buildings, and creative solutions to expand the available site area should be considered early in the project approach. The Market One project accomplished this goal by purchasing a lot across the street, while the Stanley Center utilized solar PVs that extended beyond its roof; both projects demonstrate strategies to expand space for needed renewables.

Material selection. Beyond reusing as much as possible, finding the right balance of where to make an impact was key to the approach to new materials in both projects. In addition to the typical considerations of durability, cost, and appearance, both projects selected new materials to support visual storytelling, maintain healthy environments, and advance decarbonization.

Market One focused on selecting materials that were durable and honest in expression—minimizing coatings—and placed less emphasis on the specific carbon intensity of each material. The finish and material palette were inspired by the historical information provided in the NPS Part One application. Kept minimal, dark industrial metals, glass, and wood at the Market One building tied the new finishes to its industrial past without attempting to rewrite its history. Approximately 16.9 percent of materials by cost were sourced within 500 miles of the site, and more than 35 percent of new materials were manufactured with recycled content.[12] While many new material decisions were driven by design and durability rather than carbon impact, the design team also found ways

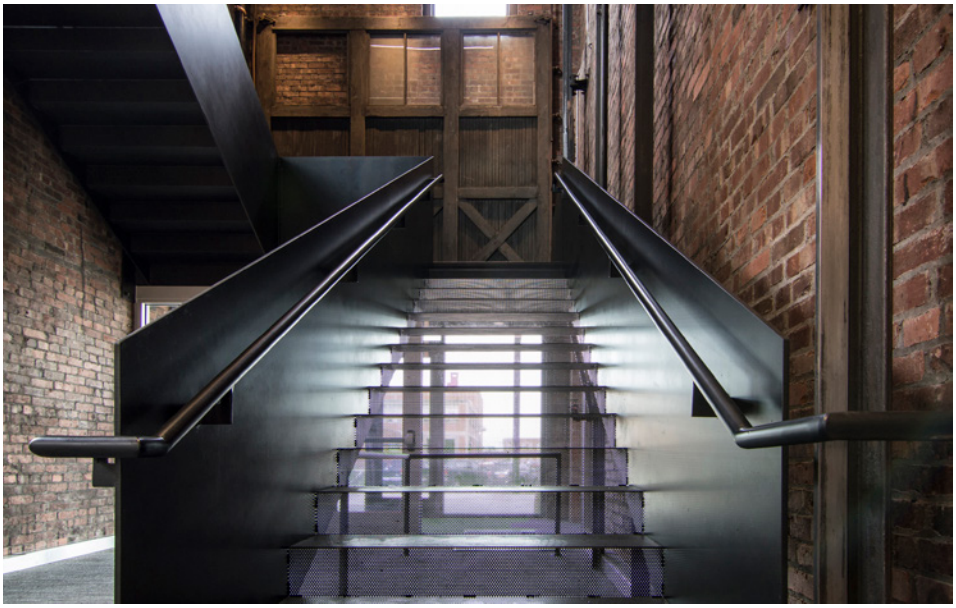

Fig. 9. Market One, interior stair created within the former freight elevator shaft, incorporating a perforated steel stair with the fixed-open freight door to retain historic character. Photograph by Jared Heidemann Photography, 2015.

Fig. 10. Stanley Center for Peace and Security, interior view highlighting local materials and finishes inspired by regional culture and ecology, reflecting carbon-conscious material selection. Photograph by Integrated Studio, 2023.

to reuse existing material. The wooden joists removed to make space for the stairs were used to create feature walls. The existing wood floors were refinished rather than receiving a new floor finish. Even an old overhead freight door was kept in place—fixed in its original open position—reducing waste, maintaining historic character, and telling the story of the building within the staircase that replaced the freight elevator (Fig. 9). Ultimately, new materials had less impact on overall carbon emissions than the building itself.

The Stanley Center focused more closely on regional materials and their carbon intensity, in addition to minimizing the number of finishes used and ensuring that the materials were a healthy and responsible choice. This decision was made partly because the LBC requires it and partly because the new fit-out of the Stanley Center was substantial, so material selection would inherently have a greater impact on the project (Fig. 10).

Although not designated as historic, the Stanley Center sought to highlight significant cultural and historical themes of Muscatine through its material and finish choices, including pearl button blanks, oak wood, and limestone. When selecting materials for the new rainscreen, a carbon analysis was conducted that evaluated factors such as cost, durability, maintenance, context, and appearance, as well as the embodied energy of each option. Carbon was an important consideration when choosing major materials or systems. In the case of rainscreen cladding, wood was the clear winner when measured against metal, glass, and stone.

The project site's location in the Midwest helped when it came to material sourcing. By sourcing 48 percent of materials from within 500 kilometers, the project lessened its footprint.[13] Major elements that came from within that radius were structural steel, roofing, mechanical components, fire suppression components, site materials, oak veneer, and acoustic felt baffles. Third-party designations, labels, and certificates—such as Environmental Product Declarations, Declare Labels, and Forest Stewardship Council certification—became additional tools for identifying smart choices regarding health, responsible supply chains, and carbon impacts.[14]

For adaptive reuse projects, finding the right balance of new material characteristics is important; carbon intensity is a consideration—but may not be the driving factor—when deciding on the scope of new materials.

Conclusion

The path to a decarbonized building becomes shorter when starting with reuse. In the cases of Market One and the Stanley Center, planning to reuse as much as possible gave the projects an advantage in terms of their carbon footprints. New materials were evaluated for their carbon impact on the overall projects. Efficient and electrified MEP strategies, tailored to building envelope conditions and operational energy use, further reduced carbon impacts. Finally, the use of renewable energy generation to offset operational carbon provided a clear path toward true decarbonization. These generalized strategies apply to both historic and nonhistoric existing buildings. Expanding understanding of decarbonization approaches can help preserve more buildings while making communities more resilient, sustainable, and historically rich.

Every adaptive reuse project is different, so careful coordination and consideration are needed early in the design process to ensure that the retention of historic and cultural character and the advancement of decarbonization are achievable. Market One and the Stanley Center demonstrate that adaptive reuse projects can simultaneously pursue aesthetic, preservation, and sustainability goals, and that unique needs can guide a project to innovative solutions.

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Notes

1. LEED (Leadership in Energy and Environmental Design) is administered by the US Green Building Council and is a commonly used third-party certification for sustainable buildings, with Platinum being the highest level of achievement.

2. “Living Building Challenge,” (Living Future), living-future.org/lbc/.

3. “COTE® Top Ten Award,” (American Institute of Architects), aia.org/design-excellence/awards/coter-top-ten-award-0.

4. “COTE® Top Ten Award 2021,” (American Institute of Architects), classic.aia.org/resource/6391171-2021-cote-top-ten-awards; “COTE® Top Ten Award 2025,” (American Institute of Architects, June 5, 2025), aia.org/design-excellence/award-winners/cote-top-ten-award-2025.

5. “The Stanley Center for Peace and Security,” (Stanley Center for Peace and Security), stanleycenter.org.

6. “Living Future Buildings Certification: Audit Process,” (Living Future), support.living-future.org/article/1465-audit-process-summary. “Ready Audit” is an intermediate milestone within the LBC audit process, indicating that an initial audit has found the project compliant with the information provided to date.

7. “Market One,” (Neumann Monson Architects), neumannmonson.com/market-one.

8. “The Stanley Center for Peace and Security,” (Neumann Monson Architects), neumannmonson.com/the-stanley-center-for-peace-and-security.

9. “The Secretary of the Interior’s Standards for Rehabilitation,” (National Park Service, US Department of the Interior, last updated May 19, 2025), nps.gov/subjects/taxincentives/secretarys-standards-rehabilitation.htm.

10. Stephen R. Kellert and Elizabeth F. Calabrese, *The Practice of Biophilic Design* (2015), biophilicdesign.umn.edu/sites/biophilic-net-positive.umn.edu/files/2021-09/2015_Kellert%20_The_Practice_of_Biophilic_Design.pdf.

11. “The AIA 2030 Commitment,” (American Institute of Architects), aia.org/design-excellence/climate-action/zero-carbon/2030-commitment.

12. Neumann Monson Architects, *Materials Reporting for Market One,* prepared for LEED certification, internal firm report, 2017.

13. “The Stanley Center for Peace and Security,” (Neumann Monson Architects), neumannmonson.com/the-stanley-center-for-peace-and-security.

14. “The Declare Label,” (Living Future), living-future.org/declare.

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