



# TRANSFORMING THE 21ST CENTURY BUILT ENVIRONMENT: SELECTED STUDENT PAPERS IN DOMICOLOGY

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# INTRODUCTION

Dear Readers,

For several decades, many U.S. cities have experienced significant economic, and population decline that has resulted in large amounts of structural abandonment. This abandonment has pervasive social, environmental, and economic consequences that disproportionately affect already struggling communities. In response to this problem, scholars at Michigan State University have focused their efforts on understanding the complex circumstances that have led to blight in order to create potential solutions. One such research area has focused on altering our perceptions of the built environment from the traditional linear model to a cyclical system. Domicology examines the continuum from the planning, design, and construction stages through to their end of use, abandonment, deconstruction, and reuse.

The following primer was developed during a Spring 2022 special topics course in the School of Planning, Design & Construction at MSU entitled “Transforming the 21st Century Built Environment: Advancing the Science of Domicology.” The course was co-taught by Dr. Rex LaMore, faculty in the Urban and Regional Planning Program and Director of the MSU Center for Community and Economic Development as well as Dr. George Berghorn, faculty in the Construction Management Program. The primer seeks to expand on the existing knowledge surrounding structural abandonment, explore various implications of “design for deconstruction” principles, as well as assess the social, environmental, and political factors involved in adopting domicological practices. This primer and the primers developed in 2017, 2018, 2019, 2020, and 2021 can serve as introductory readings for those seeking to explore the various concepts of sustainable development and the life cycle of structures. The research contained in this primer is by no means a complete work; as the built environment is a multifaceted area of study, so too are its implications.

Contributors to the primer include selected students of the special topics course and represent several disciplines in the built environment including planning, construction, environmental sustainability, and other disciplines. Special thanks to our editor, Jhovonne Fernandez. For more information on the study of Domicology, we invite you to visit <https://domicology.msu.edu/>. We also welcome external research on the subject of the life cycle of structures, which can be submitted via the website.

We hope that you find these selected writings stimulating and informative as we seek to transform our understanding of the built environment.

Yours for stronger communities,

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**The statements, findings, conclusions, and recommendations expressed herein are solely those of the respective authors, and do not necessarily reflect the views of Michigan State University.**

**Redesigning and Right-Sizing for Better Cities**

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## **Introduction**

Often when people think of blight and abandonment, Detroit, Flint, Cleveland, or Gary come to mind. Images appear of crumbling structures and overgrown lots surrounded by blocks of nothingness, in an area that was once a thriving neighborhood in an industrial city. These places are just a few examples of cities left behind in the wake of economic challenges that culminated in the flight of residents from urban cores, and extensive structural abandonment.

The challenge for this generation of planners, economists, business owners, and city residents are to challenge the notion that these cities are dead or worthless. In doing so, these cities and regions will need to take steps to fight back on structural abandonment where possible, as well as pursue strategies to make these cities healthy and worth living in once again. This may include efforts like reconstructing public spaces and rights-of-way to better accommodate all forms of circularity; greening projects that utilize vacant land for energy production, recreation, or food growing; and, where some areas are beyond saving, pursuing right sizing strategies. Some of these actions will be tough for residents of the areas to endure, and some may even be controversial. Where greening and infrastructure improvements are unrealistic or unpopular, redrawing city boundaries, decommissioning public utilities, and even public services in some areas may all need to be considered in order to address the issues associated with blight and abandonment. All this, while pursuing the betterment of a city and a more balanced budget.

## Overbuilt Cities

Cities in the 21<sup>st</sup> century United States are plagued by overbuilt and crumbling infrastructures including roads, sewers, electrical utilities, schools, and other public services. This problem is a direct result of the ‘White Flight’ phenomenon from the greater half of the 20<sup>th</sup> century, and the economic downturn in urban cores that followed the departure of manufacturing for places with cheaper labor. With property tax incomes slashed and fewer residents to support, the infrastructure left in place and left behind soon became redundantly expansive and was allowed to crumble. Places such as Detroit have struggled with this issue for decades. To date, Detroit has seen a 35% decrease in its overall population, largely due to the decline of manufacturing jobs. James Chen of Investopedia explains, “the [Rust Belt] accounted for more than half of all manufacturing jobs in the country in 1950” (Chen, 2021). However, things took a downturn in places like Detroit, “from 1950 to 1980, the Rust Belt faced competitive pressure—domestically and overseas—and had to ratchet down wages and prices, as well as shutter many manufacturing jobs. This resulted in almost a two-thirds decline in employment share for the region” (ibid.). The economic decline of the last few decades and the substantial population losses in the Rust Belt are a direct cause of the overbuilt and vacant nature of former industrial hubs like Detroit. The only way to tackle these issues now is to attempt different right-sizing strategies. Author Jason Hackworth in, *Rightsizing as spatial austerity in the American Rust Belt*, defines right-sizing as, “a planning paradigm currently being applied to shrinking cities in North America and Europe. The central idea is to avoid the trap of growth-oriented planning by restructuring the urban landscape around mixed-income, mixed-use clusters. By replacing the current sprawling inefficiency, proponents argue, environmental, equity, and infrastructure efficiency goals can

be achieved” (Hackworth, 2015). This definition is critical to how we should view shrinking cities in the U.S, not always as a burden, but as an asset. Potential right-sizing strategies are discussed in detail below.

## **Construction and Greening Projects**

### Reconstruction of Public Spaces

Born as a reaction to streets that were built primarily for private automobile traffic, the complete street movement has become more popular for cities, as well as for regional and state government funding opportunities. The idea of complete street design is to transform city streets into spaces for all modes of travel. This includes wider sidewalks for greater pedestrian use, expanded bike lanes or paths separated from traffic by barriers or medians, and a greater focus on public transportation options such as municipal bussing, all as a push to lessen traffic and average vehicle miles traveled. In addition, streetscapes are often enhanced with trees and bioswales which can filter the air and reduce water run-off (NACTO, n.d). Many places even choose to establish a Business Improvement District to further the enhancement of streetscapes. These enhancements can take a 4-lane, crumbling stretch of city street and transform it into a place where businesses may return, and people may once again fill vacant housing. Visionary projects like complete street design can accomplish two important tasks in revitalizing a city: enhance the public sphere and provide better circulation options, all while reducing blight, vacancy, and abandonment. And while not explicitly designed to deal with blight and abandonment, complete streets inadvertently solved some of the issues associated therein, making it an additional strategy for solving these problems.



A prime example of how complete street design can transform an area and promote its economic wellbeing is the reconstruction of Livernois Avenue, also known as the avenue of fashion, in Detroit. According to the City of Detroit, “This project will include new roadway pavement, underground infrastructure, new extended sidewalks, removal of the median, bike lanes, better lighting, landscaping and other elements that will further make Livernois a beautiful welcoming corridor” (Serratos, n.d). The project, which was completed only a year ago, created an enhanced space for users of the street and shoppers along the corridor, as seen in *figure 2*. “Livernois will be an attractive, business-friendly thoroughfare that will be safer for motorists, bicyclists, and pedestrians alike. The beautiful streetscape design will encourage more shopping, dining, and pedestrian use of the street” (ibid.). The area has seen a spike in visitors and retail sales, which in turn is fueling the revitalization of the neighborhood and should hopefully prevent additional abandonment from occurring.



*Figure 1: Former state of Livernois Avenue*





*Figure 2: Livernois Avenue Complete Streets Conceptualization*

### Greening Projects and Deconstruction

Cities dealing with high levels of abandonment have turned to revolutionary new ideas regarding the use of vacant space as a commodity for food and even energy production. Authors Joseph Schilling and Johnathan Logan of the article, *Greening the Rust Belt*, state a few different ways in which green infrastructure projects have been able to not only address the problem of vacant land, but actually fix it. “Green technologies present opportunities for vacant properties to become sources of green energy including plots to produce biofuels or tradable commodities. Growth through Energy and Community Health (GTECH), a nonprofit business spun off from Carnegie Mellon University, is planting sunflowers, switchgrass, and other vegetation on vacant lots throughout Pittsburgh for biofuel production. Vacant lots could become sites for community-based renewable energy stations” (Schilling & Logan,

2008). They also state that jobs could spring up as a direct result of the push for green infrastructure and the altering of cities associated with it, “green-collar jobs could arise through the deconstruction and recycling of materials from the demolition of abandoned buildings” (ibid.). In fact, the City of Baltimore, Maryland partnered with Humanim, a group dedicated to reducing blight in Baltimore by training ex-convicts in deconstruction methods, both providing a service to the city, and providing jobs and a more sustained lifestyle to Baltimore residents, “not by clogging landfills with demolition debris, but by hiring and training local residents, many of whom were formerly incarcerated, to take apart these buildings, piece by piece, and then salvaging bricks and boards for resale” (Mutual of America Project, 2018). As of April 2022, the Humanim programs appear to still be in place and continue to successfully provide jobs while reducing blight in Baltimore.

Above are ways in which cities can take blighted and abandoned spaces and turn them into useful spaces once more, all while serving the underprivileged residents who live there.

Unfortunately, right-sizing strategies do not always work, and more drastic steps may need to be taken in cities where greening projects and reconstruction of public spaces may be financially unviable. This may come down to severing public services in parts of a city, or even de-annexing land all together.

## **Right-Sizing Communities and Neighborhoods**

### Decommissioning Public Services and Utilities

As cities decide how to tackle the issues of blight, vacancy, and abandonment, a new strategy has been born in the Midwest. It comes as very controversial to many people living in these cities and appears to be a strange and unusual way of solving these problems:

decommissioning public services. Public utility decommissioning has been a solution in cities like Flint and Detroit, However, decommissioning public services such as fire, policing, and other community resources has been far rarer. One example of attempted service decommissioning comes from the tenure of Detroit Mayor Dave Bing. A researcher from the Cleveland-Marshall College of Law writes, “Mayor Dave Bing [had] publicly declared his intent to relocate residents from the most woefully vacant areas so that the city can direct its infrastructure and service investments to more-viable neighborhoods. Should the law permit fiscally stressed cities like Detroit to shut down obsolete neighborhoods by compelling their citizens to move.” He states further, “In a word, yes. When population density plummets and the available tax base can no longer support the oversized infrastructure of an earlier era, cities owe their citizenry a reorganized urban geography” (Beckman, 2010). Beckman invited the comparison to a faltering shopping mall. When tenants move out and sales decline, the property owner will close off portions of the mall or demolish it all together. He reasons that it would not be entirely bizarre to do the same with city services or boundaries.

Mayor Bing did attempt some of the strategies presented by Beckman. According to an article by the Wall Street Journal, “Mr. Bing began cutting back on city services such as buses and laying off hundreds of municipal workers. The mayor is now making plans to shutter or consolidate city departments and tear down 10,000 vacant buildings. And Mr. Bing is supporting efforts to shrink the capacity of the city's school system by half” (Kellogg, 2010). While current mayor of Detroit Mike Duggan does not necessarily share the same opinions, it is not entirely clear whether other representatives of the city of Detroit would wish to see the visions of Mayor Bing play out. It is worth noting that the city of Detroit had

gone through bankruptcy in the time following Mayor Bing's tenure, which likely influences the way the current administration views the city's finances. Despite the Duggan administration, some researchers and local residents have visions of Detroit that involve a reuse of vacant lands that would coincide with the ideas of Beckman and Bing. The Wall Street Journal article also states, "academics and philanthropic groups are sketching visions of a different Detroit. One such vision has urban farms and park spaces filling the acres of barren patches where people once lived and worked [...] an area larger than the city of Miami" (Kellogg, 2010).

In a more recent publication, Jason Hackworth reports on the state of Saginaw, Michigan's efforts to eliminate people and services from one particularly hard-hit area of the city, stating, "blight is widespread throughout the city, but they take particular aim at one neighborhood northeast of downtown along the Saginaw River. This area, which is currently home to about 1,000 people and has been subject to decades of disinvestment, was deemed the 'Green Zone.' Here, they will focus exclusively on demolition to create a green reserve opportunity area" (Hackworth, 2015). Saginaw provides yet another example of decommissioning both public services and utilities and shrinking a city to a more appropriate size in a post-industrial era. The shuttering of police and fire stations, schools, and reduction of bus services may seem scary and out of reach to many residents of cities dealing with abandonment. However, the visions of different groups stated above seem to be a better option for places like Detroit and Saginaw, compared to continued abandonment, crime, and money spent to deal with the problems they bring. Instead, the ideas of Mayor Bing and the efforts of Saginaw could be useful on many different fronts. Tackling crime and poverty, cleaning up the environment, and balancing budgets could do wonders for other declining

cities. It could give residents a chance to see their cities in ways they never thought possible: shrunken, clean, and able to financially support its newly reorganized residents once more.

## **Conclusion and Recommendations**

For decades, residents of urban cores have seen their neighbors, community wealth, assets, and the life of their cities flee for the suburbs where crime, poverty and abandonment are much more uncommon. However, what the urban core lacks, it makes up for in resilient spirit and a confounding ability to pull itself back up from the brink. Detroit has proven itself through its many community-based organizations who fight daily to improve the quality of life for its residents. Greening projects and transforming rights-of-way can be a major boost to the economy and quality of a place. However, these projects are not always financially or realistically viable, at which point cities need to discuss further actions. Despite the unknown and fear that comes with the idea of decommissioning public services, it stands to reason that if all else fails, a city does retain the right to care for its citizens, even through drastic measures and redrawing city boundaries. In order to better care for its vulnerable yet valuable citizens, cities can and must have the option to shrink their scopes when they so choose.

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**Fighting Abandonment Before It Happens**

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## **Introduction**

Domicology is defined as "the study of the economic, social, and environmental characteristics relating to the life cycle of the built environment." (LaMore, 2015). The key phrase within the definition of Domicology is the life cycle of the built environment, which can have a significant impact on cities that face property abandonment in commercial sectors, with preparing for the abandonment and the steps needed to avoid or deal with abandonment cities face. Understanding that everything has a life cycle, including structures, is vital. Looking at structural abandonment, particularly in downtown areas that tend to be highly populated and dense, abandonment can be catastrophic in various ways. It can hurt the city and any redevelopment and revitalization efforts forcing the city to deal with consistent negative consequences. The most prominent, single reason for structural abandonment is the failure to plan and prepare for the issues associated with the process. Once the issues arise, the government is forced to deal with abandonment after it is too late. Economic, social, and environmental issues can occur at any time, and places that were once areas of wealth and innovation are now shrinking, dealing with the adverse effects abandonment has on cities. Knowing the causes, effects, and solutions of private property abandonment can be vital in solving problems before they happen, anticipating that conflict will be created, and having a plan to combat it. Understanding Domicology and the life cycle of structures including the businesses and people that fill those structures can be a great tool for planners preparing for abandonment. The City of Lansing currently faces an unknown future, one that is plagued by the after-effects of the COVID-19 pandemics and uncertainty of future trends. Being prepared for the possibility of abandonment and knowing the effects of abandonment can help civic leaders and the private sector prepare and be ready before it happens.

## **Causes of Property Abandonment**

There are many reasons a property would be abandoned, particularly in downtown districts. Economic trends and shifts in the area's demographics will noticeably change the demand that is warranted for specific buildings in specific locations. Operating costs may rise, and in the end, buildings will be left vacant and paying tax on the building may make more fiscal sense to property owners than rehabilitation. While that may be the best option for the owner, it can be a detriment to the city the building resides in. Analyzing the causes of abandonment can help prepare to avoid abandonment.

With the COVID-19 pandemic, downtowns have faced noticeable hardships as social distancing has encouraged people to stay apart, which is tough to do in cities with high density. Currently, new hybrid work schedules are a significant contributor to abandonment as tenants are leaving their leases behind, resulting in an empty building. No new businesses can be recruited as vacancies pile up. (Fisch & Kane, 2020). While this is a current and timely struggle, it is a newer cause of private property abandonment, and other consistent causes can be evident in downtown areas. Legacy cities, defined as shrinking or post-industrial cities, face population decline, a shrinking middle class, deindustrialization, and negative market trends will see property abandonment consistently as the need for supply and demand is altered. The fewer people in an area, the less interest businesses will have to be in an area: fewer employees and less demand for their business. A shrinking middle class provides fewer employees and plays into the decreasing population as they move to the suburbs leaving buildings behind in urban areas.

Deindustrialization has played a large part in abandonment in Rust Belt cities as the workforce has moved elsewhere for jobs in other industries. Industries drove cities to new

heights as industries invested in infrastructure. When the manufacturing jobs began to decrease, cities that held those jobs saw sharp declines in their economic power. (Schmachtenberger, 2021). The causes of private property abandonment can often be triggers that will continue to prolong abandonment as they linger over the city's head. Lastly, properties may be abandoned for environmental, legal, or financial concerns and can result in challenges such as title issues and ownership changes. Uncertainties in terms of who is responsible for liabilities relating to the buildings (such as taxes, renovations, etc.) may result in a revolving cycle of parties interested in the building, but weary to buy due to the potential obstacles the building faces.. The building will continue to be abandoned as it is not worth the cost to figure out the title issues. Cities that fail to address these problems and plan for the continuation of these problems will continue a circle of property abandonment moving forward (Brachman, 2005).

## **Effects of Property Abandonment**

The effects of property abandonment work seamlessly with the causes of property abandonment. As the causes get worse, the effects will worsen, which will make some of the causes (e.g., population decline, market trends, environmental and legal concerns, etc.) continue their negative trend, and the effects continue towards a downward spiral for structures. While preparing to plan to fix the causes, the effects should be considered strongly in the short term. Mitigating the effects of property abandonment can help slow the causes and allow cities to tackle their issues. Effects of property abandonment often include poor public perception, increased crime rates, environmental and health hazards, and a negative

economic impact. Property abandonment leads to buildings becoming blighted, which perpetuates the worsening effects of abandonment.

Public perception is essential for cities to consider, especially shrinking cities. While the public perception can frequently be inaccurate and fails to tell a complete story, it can hurt the city in its efforts to attract tourists or new talent to work in the area. The public may only view the blighted buildings that line one neighborhood and not the well-maintained buildings a few blocks away. This further increases crime rates, as people are aware that an area is abandoned and might not be monitored as closely. This effect can lead directly to the broken window theory. The broken window theory is a good explanation for further understanding how property abandonment and blight are vital factors in the public's perception of a building. The primary definition of the theory is, "graffiti, abandoned buildings, panhandling, and other signs of disorder in neighborhoods create an environment that leads people to commit more crime" (Martin, 2019). Whether the theory is true can be up to each person's interpretation. However, it can lead to the reverse part of the broken window theory, with people avoiding an area due to the perception that more crime happens in the area. Furthermore, public health and environmental hazards are of concern with abandoned properties. According to *Urban Blight and Public Health*, abandoned buildings can release harmful toxins in the air causing physical health complications, but also for those living near abandoned buildings can create negative mental health implications, connecting itself with poor public perception (De Leon & Schilling, 2017). Lastly, and of utmost importance for cities that are shrinking and already facing inadequate cash flow, is the negative economic impact abandoned buildings can have on communities. Abandoned buildings result in nearby property values declining sharply. The government must pay for the abandoned buildings if

they attempt any upkeep or blight removal of those buildings and may have to offer incentives to avoid the abandonment and blight, which comes at an additional cost.

Abandoned properties also do not pay taxes, as there is no one to pay the taxes, resulting in more income loss for the city. Looking at economic impact in general, abandoned properties affect nearby buildings' business, as fewer people will go to businesses with a blighted building next door, rolling into the broken windows theory once more. (Schilling & Pinzon, 2015).

## **Solutions to Property Abandonment**

The first step to solving the problem of property abandonment is admitting there is one. Cities that face these issues head-on instead of attempting to turn a blind eye and let the private sector deal with abandoned properties will find success in revitalizing neighborhoods. Through all the causes and the effects, a combination of failing to plan and preparing for future problems can be put at the forefront for identifying solutions. Pretending any specific city will never face property abandonment will eventually lead to property abandonment by not being ready to combat it before it happens. The current planning model fails to address the potential causes of property abandonment. Planners are not prepared for shrinking cities, and when property abandonment happens, cities are left dealing with issues they could have been prepared for but were not (Schilling & Logan, 2008). It is easy to talk about the causes and effects a problem causes but more challenging to realize the potential solutions. The report, *Revitalizing America's Smaller Legacy Cities: Strategies for Post-Industrial Success from Gary to Lowell*, is a substantial piece of literature that provides ideas and strategies for success from previous cities that have faced property abandonment. The report takes real-

world case studies and shows how they have had a positive effect on dealing with the causes of property abandonment. In summary, the article points out eight key strategies:

1. Build civic capacity and talent
2. Encourage a shared public- and private-sector vision
3. Expand opportunities for low-income workers
4. Build on an authentic sense of place
5. Focus regional efforts on rebuilding a strong downtown
6. Engage in community and strategic planning
7. Stabilize distressed neighborhoods
8. Strategically leverage state policies

These strategies all come with a real-world case study of a city that has put the idea to action and has seen noticeable success. Combining these ideas can give cities an excellent toolbox to fight property abandonment as it arises. Having strong leaders, both in the civic capacity and the private sector, including a shared vision, will allow people to be on the same page about the needs a city might have and the necessary work to get done. More opportunities for low-income workers will create a well-rounded workforce and one that shows the city is interested in all of its residents, not just the ones with a high paycheck. An authentic sense of place and a strong downtown give people a reason to want to stay in the city and feel a connected bond with the city. Engaging with the community and letting residents put forth their ideas for strategic planning continues to build the pride residents will have within their city and see those continue to fight to better their city. The first six strategies are all ideas that could be implemented before attacking blighted or abandoned properties. There are ways to put these strategies into action to help mitigate some of the

effects property abandonment may have on an area. As the effects are lessened, stabilizing a distressed neighborhood and utilizing state policies for the said neighborhood can help one by one address and attack both blight and abandoned properties, reversing the adverse effects and directly addressing the causes.

## **Preparing for Abandonment in Downtown Lansing**

First, it is important to note that vacant buildings and abandoned buildings are different. Vacant buildings refer to buildings that no longer have tenants but are still well maintained. Abandoned buildings, however, refer to empty buildings that are no longer maintained, leading to issues from the buildings not being monitored, such as broken windows, graffiti, and blight (De Leon & Schilling, 2017). A timely issue that Downtown Lansing currently faces, a city that never stood on the mountain other legacy cities did, such as Detroit, but similarly faced a significant decline in population as a result of deindustrialization leading to property abandonment over the following years (Cosentino, 2018). It is not a foregone conclusion that properties will be abandoned; however, they will be vacated. Downtown Lansing relies on one large employer, the State of Michigan. With the COVID-19 pandemic shifting trends to a hybrid structure and more reliance on "work-from-home," the state of Michigan is planning to reduce up to 50% of their leased spaces. Before the pandemic, they occupied 3.3 million square feet of space and housed thousands of workers in Downtown Lansing. Reducing their square footage by 50% will lead to large vacancies throughout downtown. With the majority of the properties being commercial office space, there is no guarantee these properties are filled by anyone else (Gardner, 2021). While the properties become vacant, the hope is that they are still maintained by the private



landlords that held these leases, but there is no guarantee of how long they will pay taxes on an empty building. Vacant buildings can have a similar impact as abandoned properties, however. While owners will still pay taxes, which will help the city in terms of revenue, empty buildings mean fewer people downtown, which will hurt retail and restaurants, leading to a string of empty buildings and bankrupt businesses. As previously mentioned, planners failing to plan and prepare for potential abandonment has hurt cities the most. The time is now for Downtown Lansing to prepare for what they can do moving forward. Prepare for the worse and create the best.

## **Case Studies**

The best way to prepare for abandonment is to plan what to do when abandonment happens. The real world has provided many examples of abandoned properties being turned into sustainable buildings that positively impact the community and economy. There are also plenty of examples of cities that have enacted programs or strategies that have brought people together to fight property abandonment, blight, and vacant buildings through key stakeholders in the community that are studied through the cases to follow. Studying these cases and preparing for how Lansing can adapt will be vital for moving forward and ensuring Downtown Lansing does not spiral into a worse situation than it already faces.

SteelStacks is an art and cultural campus located in Bethlehem, Pennsylvania. The campus was created from a former steel plant that had been abandoned and was turned into a vibrant, urban, arts, and entertainment destination. It is an excellent example of reuse in a community that desperately needs it. It was turned into a park on the outside with added green space and mixed uses for multiple events, classes, and entertainment on the inside.

Considerations were given to how people would use the space and how to ensure they could use the space safely. With a site like this, it faced many environmental challenges that are seen in the causes and effects of property abandonment. Nevertheless, through strong leadership from the city and a private sector working hard to accomplish a vision of what the SteelStacks could be, the property was revitalized into what is now a staple of the Bethlehem community. (ASLA, 2017). Downtown Lansing, on its very outskirts, has a similar power plant structure that, in a few years, could be in use of revitalization. This idea could translate well and ensures that the power plant does not remain vacant or abandoned long.

The following case study is the Downtown Dayton Partnership (DDP). DDP is a non-profit organization that focuses on business development, advocacy, and marketing with support from both public and private sectors. DDP works towards making downtown Dayton a better place to live, work, and play. It is an excellent example of the strategy in which public and private sectors work together to accomplish a shared vision. The organization targets vacant or abandoned buildings to ensure that they do not sit empty long and avoid any negative effects that abandoned buildings will have on its community, particularly its downtown spaces. (*Who We Are & What We Do*, n.d.). In Downtown Lansing, quite a few non-profits work similarly, ranging from Downtown Lansing Inc. to LEAP. These non-profits work to attract and retain talent in the Lansing area and address blighted or vacant properties. This is a good example of a strategy that Downtown Lansing is already undertaking, but continued government and city support could help them strengthen their vision. (Lehr, 2022).

The third case study focuses on Syracuse, New York, in which they overtook the strategy of focusing regional efforts on creating a solid downtown area. Their local regional

chamber of commerce recognized that a vibrant downtown would further help the districts that are located outside of downtown, by bringing in more people and excitement to the city as a whole. Downtowns are seen as the image of cities and are the first thing that pops up when a Google search of a city is done. Having a strong downtown goes a long way to ensure cities avoid the negative effects of blight and abandonment. Syracuse, New York, has received millions in investments from public and private sources that have helped them improve their downtown and have encouraged new businesses to be formed, recruiting for spaces to fill downtown (Garcia-Franceschini, 2021). This is a great case study, specifically for the non-profits in Downtown Lansing to look at. Gathering funds and using them specifically on bringing in more apartment buildings and businesses the residents want will be key to ensuring that Downtown Lansing becomes a robust economic engine coming out of the COVID-19 pandemic with space available. Instead of viewing property vacancies and abandonment as an issue (even if they are), viewing it as a drawing board to redevelop and recreate downtown, similar to how Syracuse has put in great effort towards their downtown, could be vital in adjusting to the new era Downtown Lansing is entering.

Lastly, the Grand Action case study is a coalition that brought together civic and community leaders in Grand Rapids, Michigan, is an excellent example of an idea that could be translated into Downtown Lansing. Grand Rapids being in the same state as Lansing certainly helps the cause, and the Grand Action has helped create interest in city revitalization. They came together to form a shared vision and used data to back up their vision. The Philanthropic Collaborative 2009 is credited with helping revitalize Grand Rapids, which has also been considered a legacy city. The plan called for a new arena, civic center, and more, which required the cooperation of key stakeholders throughout the public

and private sectors. Now, Grand Rapids is considered one of the most successful legacy cities in the Midwest, redeveloping and continuing its growth trend moving forward (*From Grand Vision to Grand Action*, 2015). With the COVID-19 pandemic slowly shifting into an endemic phase, the State of Michigan government vacating the majority of their leased space, and a new set of presented circumstances facing Downtown Lansing, now would be a perfect time for the city and key stakeholders to come together and figure out a plan moving forward. The city will face vacancies and abandonment like never before if it does not plan for the seriousness of the situation that could happen if these issues are not immediately addressed. Non-profits like Downtown Lansing Inc. and LEAP know this. They are working to prepare for the upcoming future. However, engaging community residents and other businesses can be a vital move to drum up excitement about downtown in general as the future approaches. Suppose the city can plan, working with the public and private sectors to accomplish a shared vision. In that case, Downtown Lansing could avoid catastrophe and come out even more substantially, avoiding all the causes and effects property abandonment causes and instead enacting solutions immediately.

## **Conclusion**

The failure to plan and prepare for the lifecycle of businesses, properties, and vacancies in cities can be detrimental. Attempting to address a problem before it happens can help avoid the problem altogether. Property abandonment is an issue that many cities face and will continue to face. Knowing the solutions to property abandonment can be essential to getting ahead of the game. Buildings that are maintained and avoid blight will keep a positive public perception of a city, avoid increasing crime rates, and in the end, avoid economic

shortfalls. Downtown Lansing is at a crossroads currently. It will soon be faced with vacancies in its central business district that they have never seen before. Knowing that this is coming and having a plan in a place filled with strategies to combat the conflict heading their way will be vital towards strengthening their downtown in the end. The study of Domicology and the understanding of structures' lifecycles before it is too late can be effective and meaningful in avoiding property abandonment. Studying what has worked before and why it worked can strengthen cities' fight against abandonment to avoid abandonment and blight altogether.

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**Sustainable Construction: Past, Present, and Future**

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## Introduction

Structures develop in trends making many of the buildings built currently obsolete within a short period of their completion compared to the total life span of the building itself. Trends come and go, but the buildings outlast the trends. How a building can sustain life past one use is greatly beneficial for sustainable construction. Constructing buildings with sustainability in mind includes considering a variety of uses throughout the building's lifetime, using materials that are easily modular and adaptable, and considering the environmental impact of the structure's construction, demolition, and life in between.

A sustainable building is a building that can maintain or improve:

1. the quality of life and harmonize within the local climate, tradition, culture, the environment in the region,
2. conserve energy, resources, and recycling materials
3. reduce the amount hazardous substances to which human and other organisms are (or may be) exposed
4. the local and global ecosystem throughout the entire building life-cycle (*What Is a Green or Sustainable Building?*, n.d.)

A life cycle assessment can be used to determine the sustainability of structures. Sustainable builders consider taking the project “cradle to cradle”, which means evaluating the materials at every step of the construction process, including what happens when the structure is deconstructed and what the materials can be used for next (Sharma, n.d.).

Structures utilize about 40% of common assets removed in industrialized countries, devouring 70% of power and 12% of consumable water, creating somewhere in the range of 45% and 65% of the waste arranged in our landfills (Sharma, n.d.). Limiting the amount of

building materials ending up in the landfill and upcycling those materials into new structures is important to make sure building practices as sustainable and as environmentally friendly as possible.

## **Why Using Sustainable Building Materials is Relevant**

Although building sustainably is more of an investment on the front end and with the correct market, sustainable buildings that can be deconstructed can make for a larger return on investment when recycling materials. Building materials' reuse has several benefits including reducing carbon footprint, conserving building material, extending landfills, and minimizing pollution. The overall performance of the building is the most important consideration in achieving more sustainable construction. Building materials play an essential role in increasing the sustainability of buildings and contributing to economic prosperity. The usage of building materials has a substantial impact on the environment, mainly because of the use of large quantities of non-renewable resources with the potential of depriving future generations of their use (Akadiri, n.d.). One of the main concerns with material reuse is with older building materials, these materials contain toxic contaminants such as lead and asbestos which makes these materials difficult to reuse. With the current technology available, it would be more trouble than it is worth to strip materials of the toxins and reuse them. During the deconstruction process, lead particles in dust are dispersed during demolition, increasing the risk of lead exposure even after the work phase, especially for young children, by increasing settled ambient dust containing lead. This dust is also a concern because it can be tracked into houses on shoes or blown in by the wind (Thompson & Lasley, n.d.). Deconstruction will inherently be easier in the future because these toxic materials are now

regulated and will not be a part of future deconstruction. Many precautions need to be taken during the deconstruction process to make the process environmentally friendly.

Another main concern of sustainable construction is having the correct “market”. The market for sustainable building materials depends on the location of the project and how many sustainable building projects are occurring in the area. In a recent review of sustainable building practices in Nigeria, Adeleji and Taiwo found that a very small proportion of building stock in Nigeria can claim to be sustainable in any way, whether judged on sustainable construction, design or performance in use. In the past, building materials that were commonly used in buildings consisted of branches, leaves, and animal hides which had the tendency to rot. With the search for buildings and structures with longer lifespans, long-lasting natural building materials such as wood, stone, and clay came into the mix (*Building Materials Used in Nigeria - the Most Popular*, 2020). Given such perceived benefit, what is stopping the use of sustainable building materials from being realized in practice? (Akadiri, n.d.). Nigeria does not have an established market for sustainable materials and therefore such a small portion of their construction can be deemed sustainable.

## **Current Sustainable Building Practices**

To achieve the goal of sustainable practices being the norm in construction it is important to recognize the strides already being made in the construction industry today. Every conceivable measure is to be taken to guarantee that materials and building frameworks don't radiate dangerous substances and gasses into the inside air. Measures are to be taken to clean and renew the inside air with filtration and planting (Sharma, n.d.). Below is a table of traits that can be used in sustainable construction. Some of these components are

better than others, for example, reusable is better than recyclable because reusing costs less energy and is, therefore, more sustainable.

<b>Component of Sustainable Green Materials</b>		
<b>Manufacturing Process (MP)</b>	<b>Building Operations (BO)</b>	<b>Waste Mgmt. (WM)</b>
Waste Reduction (WR)	Energy Efficiency (EE)	Biodegradable (B)
Pollution Prevention (P2)	Water Treatment & Conservation (WTC)	Recyclable (R)
Recycled (RC)	Nontoxic (NT)	Reusable (RU)
Embodies Energy Reduction (EER)	Renewable Energy Sources (RES)	Others ( O)
Natural Materials (NM)	Longer Life (LL)	

**Table 1.** Components of sustainable green materials, and what processes these materials can be used. (Sharma, n.d.)

One of the most notable processes in current building practices is wood-framed housing. Wood-framed housing has significant environmental advantages over both steel and concrete housing built with examples in Minneapolis, Minnesota, and Atlanta, Georgia (Lippke 2004; Bergman et al., n.d., 4). Utilizing sustainable building practices that are already readily available is the easiest way to start in sustainable building and should be considered by all in the industry. Two recent events illustrate the importance of the need for better materials management:

- 1) The USEPA has declared carbon dioxide and other GHG emissions as air pollutants (EPA 2009b).
- 2) A requirement for 50% C&D waste diversion by 2015 for Federal agencies (Bergman et al., n.d.,)

- 3) Considering the evidence and making an informed decision about whether to utilize sustainable building policies, the effect your construction takes on the environment should be of the utmost importance.

Another practice being used currently is LEED, the LEED award signifies a certification that “creates healthy, highly efficient, and cost-saving green buildings,” These awards are offered to buildings that meet a certain parameter of green building and offers kudos to those who heavily consider sustainability when designing and constructing buildings (*What Is LEED Certification & Steps for Getting a Certification*, n.d.).

### **How Can We Make Current Construction Processes More Sustainable?**

No matter how many of these processes are utilized there can always be more. The more popular sustainable building becomes, the easier it will be to develop sustainability implementing systematic change. So many different products and materials need to be evaluated, both individually and as assembled building components; assessment parameters are not consistent across product categories or different countries of origin; manufacturing processes lack transparency; products and materials evaluation has no universally agreed approach (Akadiri, n.d.). Implementing standardizations to the sustainable building process would require builders to follow sustainable practices, adding greatly to the market for materials and making the process more streamlined in the future. It is important that academics, practitioners, and policymakers collaborate to (a) explore alternative urban designs and innovative planning and zoning approaches to right-sizing; (b) collect accurate data on the number and costs of vacant properties and potential savings of different right-sizing strategies; (c) craft statewide vacant property policy agendas; and (d) establish a policy

network of shrinking cities to share information, collaboratively solve problems, and diffuse policy innovations (Schilling & Logan, n.d., p. 1). These strategies could solve the main issues with unsustainable building entirely.

## **The Future of Sustainable Building**

Determining the future of sustainable construction includes many components. Acknowledgment and determination of the earth's best materials for use in development exercises at the pre-building stage present a chance to limit such ecological and human wellbeing impacts. Ideally, material choices can be made dependent on a thorough evaluation of ecological weights all through the whole of the item or material (Sharma, n.d.). We can see the future of sustainable building in East Lansing, Michigan with the newly built STEM building on Michigan State University's campus was constructed with mass timber (*Mass Timber*, n.d.). For the architecture, engineering, and construction industry, building with mass timber can reduce project construction times and costs, reduce construction crew sizes and equipment needs, and create beautiful buildings that people love to work, learn, and live in. Made from a renewable resource, mass timber is less carbon-intensive to produce than other common building materials; plus, these wood materials store carbon absorbed by trees, keeping it out of the atmosphere where it would contribute to climate change (*Mass Timber*, n.d.).



## **What This Means in Terms of Domicology**

Thinking about sustainable building materials is relevant to the study of Domicology particularly in consideration of the building's life cycle and potential abandonment.

Determining what building materials retain value post abandonment. Creating structures with the ability to adapt to society's current need for that space allows for the structure to be sustainable and adaptable to change. This adaptability leads to decreased rates of abandonment, or if abandonment is the only option, sustainable structures allow for a greater interest in resale because of the versatility in the structure.

## **Conclusion**

In summary, sustainable building has a direct linkage to Domicology and a sustainable future. It is very important to consider sustainable construction when developing. In terms of existing structures and demolition processes, making sure toxins are not present on materials before reuse is an important consideration, as well as opting for deconstruction instead of demolition to be able to get the most reuse out of your materials. For the future of sustainable building, standardization is essential to the success, an increase in awareness of the benefits of using sustainable building materials would most likely increase the popularity of this topic and make it a norm for the construction industry.

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