Addressing Sustainability and Resiliency in the Built Environment



Tornadoes in February. The hottest year on record. Dangerous air quality in Waukesha caused by wildfires in Canada. Every year the dangers posed by climate change become more real – and not just for states dealing with sea level rise. As these threats increase, the need to take steps to reduce carbon emissions becomes more urgent. But the past few years have also demonstrated that the impacts of climate change are already here and will continue for decades, even after we stop emitting greenhouse gases. As a result, communities need to work to reduce their carbon emissions – while also adapting to an already changing climate. To do so, communities must consider how to incorporate resiliency into their current and future plans.

There is frequently confusion about the difference between sustainability and resiliency. Sustainability, also referred to as "mitigation" or "going green," is focused on minimizing or halting actions that contribute to climate change. This can involve things as simple as planting trees or as complicated as transitioning an entire energy system to renewable energy. A longtime focus of environmental efforts, sustainability programs are also referred to as "Net Zero" or "Carbon Neutral" projects or goals.

Resiliency, also referred to as "adaptation," on the other hand, addresses the ability of individuals, businesses, and communities to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate change.[1] Addressing resiliency is necessary because, even if we stopped emitting greenhouse gas emissions today, the impacts of climate change will still be felt for years to come.[2] While resiliency efforts often focus on extreme weather events such as tornadoes, hurricanes, heavy rainfalls, and droughts, the past year demonstrated that communities also need to prepare for more chronic conditions such as extreme heat and toxic air quality courtesy of wildfires, near or far. Billion-dollar disasters are becoming a common occurrence, with natural disasters costing the United States approximately $100 billion a year, or more.[3]

While both sustainability and resiliency are needed to address climate change, the two goals are often in tension because of competition for limited resources, funds, and time. There are some tools, however, that address both issues at once. Municipalities have a variety of tools that can be used to address both sustainability and resiliency. At a very high level, the following are some of the specific sustainability and resiliency issues that are present in the built environment.

Incorporating Sustainability in the Built Environment

"Embodied carbon" and "operational carbon" are two terms that are frequently used when discussing how the built environment can "go green." Embodied carbon refers to all the greenhouse gases that are emitted during the building process: this can include the carbon emitted while making the cement that is the key ingredient for most concretes, the cost of shipping job materials to the project site, and the gas emissions produced by machinery at the job site, to name a few things. Operational carbon, on the other hand, consists of the greenhouse gases that are emitted once the building is operational: this can include the emissions from the energy used to power the HVAC system and lighting, as well as

1. https://www.c2es.org/content/climate-resilience-overview/#:~:text=Climate%20resilience%20is%20the%20ability,better%20cope%20with%20these%20risks
2. https://www.eenews.net/articles/what-if-co2-emissions-stopped-today-a-study-offers-answers/
3. https://www.climate.gov/news-features/blogs/beyond-data/2023-historic-year-us-billion-dollar-weather-and-climate-disasters

the emissions related to the energy needed to handle water or equipment in the building. There are several programs or certifications that can help evaluate the sustainable nature of a project. LEED (Leadership in Energy and Environmental Design) is probably the most well-known certification program and offers a variety of options, depending on the project. A more recent tool is the Embodied Carbon in Construction Calculator ("EC3") tool, which is free and allows a project developer to develop benchmarks for and assess reductions in embodied carbon. Microsoft recently used this tool to reduce its emissions in redeveloping its headquarters.[4]

Ensuring the Built Environment is Resilient

Here in the Midwest, the most pressing climate change threats are extreme heat, heavy downpours, and flooding.[5] As we saw last summer, however, extreme weather doesn't have to be local to cause problems – wildfires in remote Canada can cause serious air quality problems in Wisconsin. Incorporating resiliency into the built environment can often be a challenge because all of the parties to a construction project tend to look to historical data instead of the present and future climate – historical water table levels and temperatures, as well as installation methods and materials suited for a climate that may no longer exist. Failing to analyze the risks posed by current and future climate, and the struggle to identify the party responsible for addressing such risks, can lead to serious problems during and after the construction process. Fortunately, every day there are more resources available to help communities understand future climate risks. Argonne National Laboratory, for example, just updated its Climate Risk and Resilience Portal, with tools that allow users to create reports showing how climate change can impact vulnerable populations and community infrastructure (e.g., retirement communities and hospitals, fire stations and sewer systems).[6] There are also numerous other resources providing guidance to communities on how to begin incorporating resiliency into their planning processes.[7]

As mentioned above, there are some tools that cross sustainability and resilience. Renewable energies, such as solar and wind power, are often seen as great ways to reduce greenhouse gas emissions. Incorporating renewable energy sources, however, can also benefit resiliency efforts, because generating renewable energy, particularly solar, is less sensitive to extremes in temperatures and weather. In addition, setting up "microgrids" and dispersed energy generating sources is much more feasible with renewable energy than fossil fuels, meaning entire communities are less vulnerable to massive power outages.[8] On a simpler note, planting trees can also provide both benefits: removing carbon emissions from the air while also providing a significant cooling benefit to counter urban heat island effects.[9] A similar benefit can come from evaluating areas at high risk of flooding and incorporating green spaces, which can serve to absorb carbon emissions, provide cooling effects, and act as a sponge to soak up excess floodwaters.[10]

Municipal Considerations and Limits in Addressing Sustainability and Resiliency

Many municipalities might be interested in implementing sustainability and resiliency measures but do not know how or where to begin. In that case, the first step for any interested municipality likely involves assessing any vulnerabilities or risks associated with climate change in their communities. Once that risk is identified, municipalities have several tools that can be used to incorporate sustainable and resilient elements into the built environment – for both new and existing buildings and facilities. Wisconsin law, however, also imposes some restrictions on what municipalities can do. Below, at a very high level, are several of those considerations and restrictions.

Tax increment financing ("TIF") is one of the main tools that municipalities can use to incentivize sustainability and resiliency elements in buildings and public infrastructure in new developments, including through direct cash grants to developers. Because TIF incentives are largely discretionary,

4. https://www.fastcompany.com/90608415/microsoft-and-skanska-are-using-this-free-tool-to-dramatically-cut-their-carbon
5. https://nca2014.globalchange.gov/highlights/regions/midwest
6. https://www.smartcitiesdive.com/news/climate-risk-resilience-data-tool-updated-argonne-national-laboratory/708500/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202024-02-26%20Smart%20Cities%20Dive%20Newsletter%20%5Bissue:59488%5D&utm_term=Smart%20Cities%20Dive
7. https://www.staffordlaw.com/blog/business-law/resiliency-resources-and-potential-requirements-for-addressing-climate-and-extreme-weather/
8. https://www.americanprogress.org/article/renewable-energy-is-the-key-to-building-a-more-resilient-and-reliable-electricity-grid/#:~:text=Nov%207%2C%202023-,Renewable%20Energy%20Is%20the%20Key%20to%20Building%20a%20More%20Resilient,maintain%20and%20improve%20grid%20reliability.
9. https://www.bbc.com/future/article/20230922-how-medellin-is-beating-the-heat-with-green-corridors
10. https://www.wired.com/story/if-you-dont-already-live-in-a-sponge-city-you-will-soon/

municipalities can create policies that guide when TIF incentives are available, or what developers must do to obtain additional TIF incentives. For example, a TIF policy or agreement could require that projects incorporate bird safe glass, solar panels, minimum EC3 or LEED requirements, upsized or alternative stormwater management facilities or methods, or mandate the use of certain building materials.

While this sounds simple in principle, requiring these elements often means that developers request a greater amount in TIF incentives because such elements are more costly to incorporate in the near term. Thus, from a policy perspective, municipalities should evaluate whether and to what extent incorporating sustainability and resiliency components will justify additional TIF support. When doing so, communities, developers, and investors need to be aware that, in many cases, there is a clear return on investment for incorporating resilience, even if that return is not fully realized until years later. Research by the National Institute of Building Sciences indicates that every dollar spent on resilience measures saves communities $5 to $7 in disaster response and recovery costs otherwise borne by communities and owners (and insurance).[11]

Even if developers are willing to incorporate sustainability or resiliency measures, TIF agreements should include objective criteria that identify how developers will satisfy those goals and create a mechanism for verification. For instance, a municipality could require that a developer provide documentation that the building is LEED Silver certified. While a municipality could create its own building material standards for embodied carbon, that process is time consuming and potentially difficult to verify after construction. Similarly, developers and municipalities could use an EC3 calculator to analyze the potential carbon emitted in the construction process and explore ways to reduce carbon emissions through alternative methods. A simple hazard risk acknowledgement form, such as the one created by the American Institute of Architects, also gives municipalities a way to work with developers to identify potential weather-related hazards that may impact the project and assign responsibility for addressing such risks.[12]

In addition, a developing area of Wisconsin law concerns the intersection between municipal zoning authority and the state control over uniform building codes. In general, municipalities are preempted by state law from imposing

11. https://floodcoalition.org/2022/11/flood-resilience-projects-and-long-term-return-on-investment/#:~:text=Communities%20can%20save%20%245%E2%80%937%20for%20every%20%241%20spent%20on%20resilience&text=Oft-cited%20research%20by%20the,in%20disaster%20response%20and%20recovery.
12. https://content.aia.org/sites/default/files/2021-12/Users_Guide_to_the_Hazard_and_Climate_Risk_Acknowledgement_Form_v2.pdf

more local restrictive requirements to building codes for both residential and commercial buildings.[13] In a recent decision, however, the Court of Appeals created a potential pathway for local governments to implement certain building materials standards. In *Associated Builders & Contractors of Wisconsin, Inc. v. City of Madison*, an ordinance that established standards for bird safe glass on new buildings was challenged as being preempted by state building code requirements.[14] The Court upheld the ordinance and found that state law did not preempt such requirements. In doing so, it created a new test to determine if a local ordinance runs afoul of statewide building standards by evaluating the "subject matter of the local ordinance, and also its specific content and its regulatory purpose … [including] whether the local ordinance sets minimum standards that are meant to ensure that buildings are constructed in such a way that they are structurally sound, and are equipped with systems and components – whether electrical, gas, plumbing, mechanical, or some other – such that the buildings are safe for employees, frequenters, and the public."[15] Because the bird safe glass requirement did not relate to the "structural integrity of buildings or any of their systems or components" the Court found the ordinance was a valid exercise of the city's zoning authority.[16] While not a bright line rule, this case could provide an avenue for municipalities to explore options for implementing sustainability and resiliency standards for new construction.

Although a full discussion of the tools available to municipalities is outside the scope of this article, municipalities may wish to explore other potential avenues to incorporate sustainable or resilient features in their communities. This might include reviewing and updating their comprehensive plan and ordinances to preserve or protect environmentally sensitive areas, increasing the area dedicated to parks and other green spaces, and increasing the availability of alternative methods of transportation. In addition, municipalities can and should perform long-term planning and hazard assessments of their public infrastructure, including how to improve and expand stormwater and flood mitigation facilities.

Conclusion

Climate change is forcing us all to rethink the ways we live, build, and do business. Fortunately, the tools to incorporate resiliency and sustainability measures in our communities and the built environment are available. In order to address these challenges, municipalities need to be aware of their own risks and vulnerabilities – including the cost of the status quo – and must be willing to make the hard choices to plan for and implement such measures before disaster strikes.

13. *See* Wis. Stat. §§ 101.65(1c) (prohibiting enforcement of a local dwelling standard not in conformance with state standards and allowing developer to waive a provision of a contract requiring adherence to a standard more strict than state law for dwellings) and 101.02(7r)(a) (prohibiting implementation of building standards more strict than state building code requirements).
14. *Associated Builders & Contractors of Wisconsin, Inc. v. City of Madison*, 2023 WI App 59, 409 Wis. 2d 660, 998 N.W.2d 549.
15. *Id.* at ¶ 55.
16. *Id.* at ¶ 56.

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