Building Decarbonization Policies in the Midwest

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

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August 2022

Abstract

Building decarbonization is a critical piece of the climate change mitigation puzzle, and when working with policymakers, messaging needs to fit where people are located. A common inquiry MEEA receives relates to understanding what other Midwestern municipalities have been doing to address buildings. Research completed by MEEA in 2021 found that Midwest heating needs are the major source of direct fossil fuel consumption in both residential and commercial buildings, with 76% of residential units and 70% of commercial buildings having fossil fuel heating sources. This puts the Midwest significantly above the national average. That research also found that the Midwest electric generation is mostly fossil fuel (66%) and that the East North Central region has the second highest energy burden in the U.S. This makes policies that increase energy efficiency and renewable energy, while also addressing the energy burden and equity, essential to addressing decarbonization in Midwestern buildings. Thankfully, big coastal cities are not the only cities setting building decarbonization policies. This paper serves as a condensed resource of Midwest examples of building decarbonization policies. It identifies at least one city climate action plan in each state of MEEA's thirteen-state region, tracks progress on these plans where available and provides a matrix of common policies and strategies for policymakers to consider when setting equitable building decarbonization goals in the Midwest.

Introduction

Once a foreign concept, cities are now taking the lead in setting climate goals. Buildings account for 40% of the total energy consumption in the U.S., making building decarbonization a critical action for cities addressing climate change. However, cities – and their residents – are not all the same, which makes a blanket approach to building decarbonization unlikely. In order to understand, enact and implement successful building decarbonization, this paper looks at the Midwest region for examples, trends and "shining stars" in addressing building decarbonization. We hope this can be a resource of ideas for other municipalities to utilize, understanding that actions happening in the Midwestern backyard may be easier to enact than those happening in larger, coastal cities.

MEEA and The Midwest

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network, promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities. MEEA's vision is an achievable pathway for all people and communities in the Midwest to receive the economic, environmental and societal benefits of energy efficiency and the larger clean energy economy. MEEA oversees a 13-state region including Ohio, Kentucky, Michigan, Indiana, Illinois, Missouri, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska and Kansas. In this paper, the "Midwest" includes all thirteen of these states.

The Midwest has a higher percentage of older homes than the national average, especially with the oldest vintages built prior to energy codes (Figure 1). Model energy codes first emerged in the late 1970s; before then, buildings were not required to be built to established and nationally recognized standards of energy efficiency.

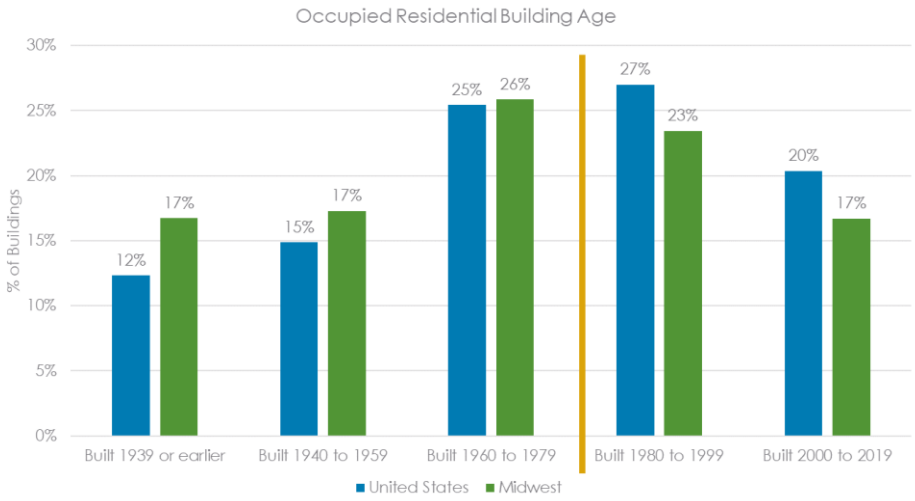

Figure 1. Age of occupied residential buildings in the Midwest compared to the entire United States. The orange line represents when the first energy codes emerged. Data Source: American Community Survey 2019

The Midwest also has the lowest average square footage for commercial buildings among U.S. regions. It has the second highest share of buildings (29%) and floorspace (27%) but has the third highest share of the U.S. population (21%) (CBECS 2018). About 60% of Midwestern commercial buildings were constructed pre-1990, and almost a third are over 50 years old.

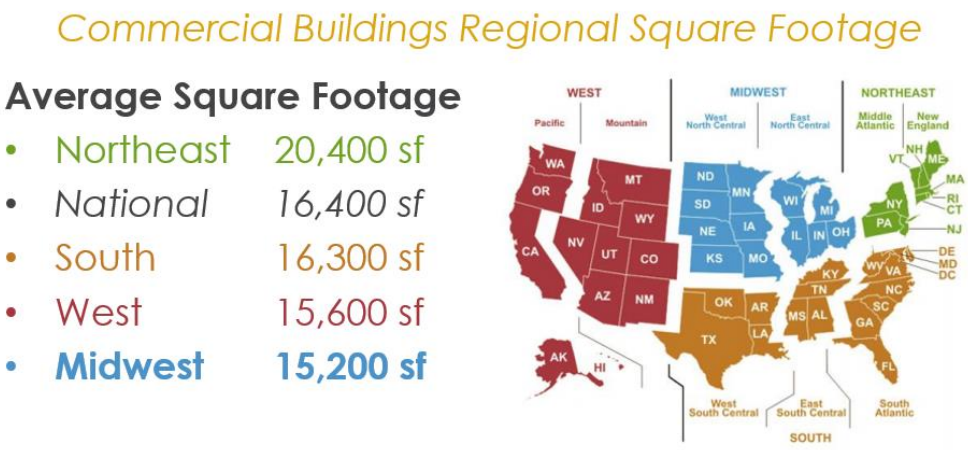

Figure 2. Average size of existing commercial buildings by region in the United States. CBECS does not include Kentucky in the Midwest. Data Source: CBECS 2018.

New residential buildings are added at a rate of about 0.6% annually in the Midwest and new buildings see a much higher square footage on average than existing homes. Over the past decade, Midwestern states have nearly doubled their new housing permits. New commercial buildings are added at a rate of about 0.2% annually and tend to be much larger on average. The Midwest adds 0.66% of total floorspace in new commercial construction each year (CBECS 2018, REED 2017).

Fossil Fuel Use

Midwest heating needs are the major source of direct fossil fuel consumption in both residential and commercial buildings. The Midwest has a much higher percentage of commercial buildings with gas heating than the U.S. average (70% vs. 49%). Midwest commercial buildings also have significantly higher hot water end uses (49% vs. 39%) (CBECS 2012). Fossil fuels are the dominant heating source for residences, as well (76% Midwest; 61% U.S.) (American 2019). Midwest residential units have higher fossil fuel end uses in hot water (60% vs. 40%), cooking (35% vs. 25%), and laundry/dryer over the U.S. average (24% vs. 15%). Midwest electric generation is also mostly fossil fuel-derived (66%).

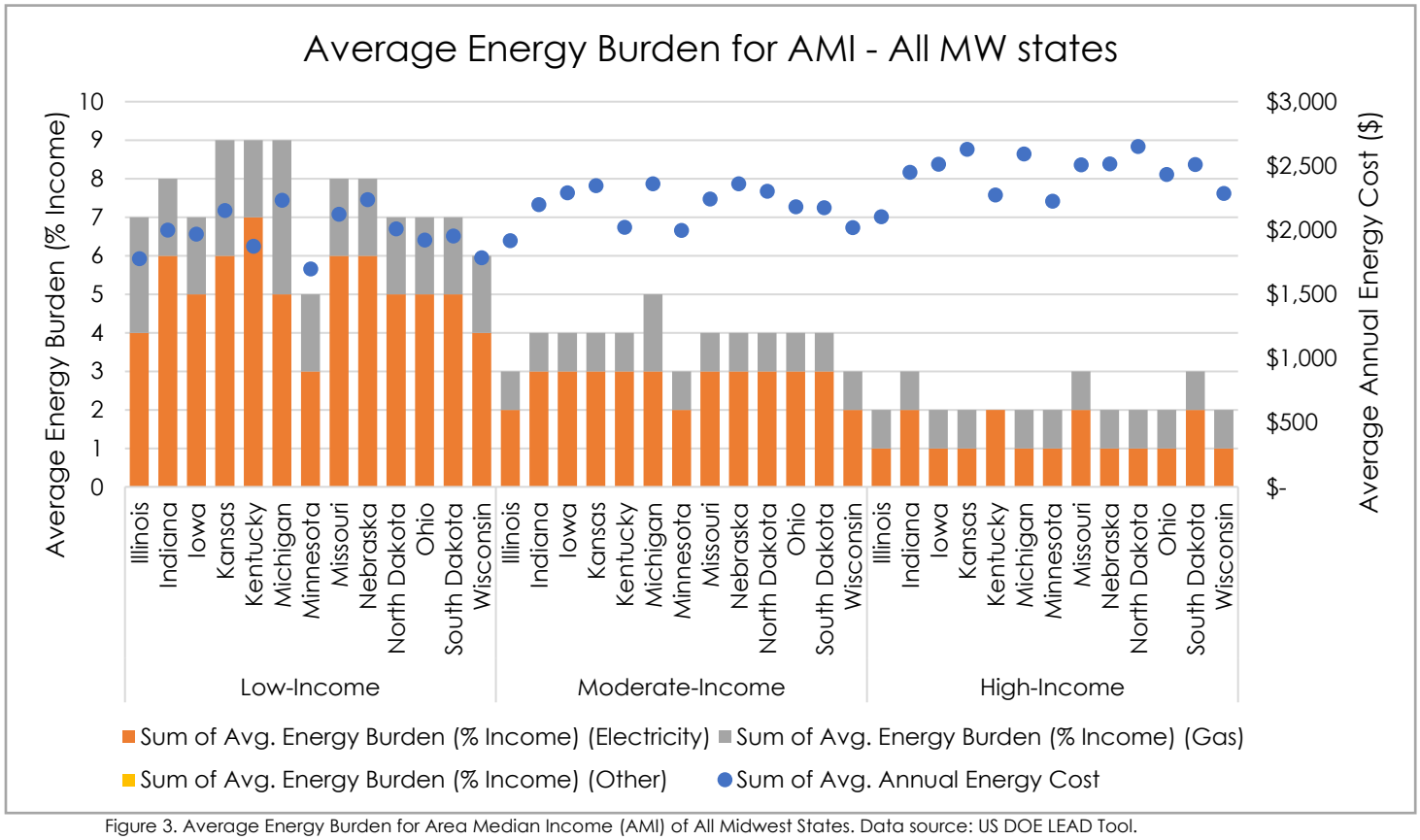

Figure 3. Average Energy Burden for Area Median Income (AMI) of All Midwest States. Data source: US DOE LEAD Tool.

Energy Burden

Energy burden is defined as the percentage of gross household income spent on energy cost and is measured by dividing the total average household utility bill costs by

the total average household income (US DOE). Based on the U.S. Department of Energy's LEAD[1] Tool data, the national average energy burden of low-income households is 8.6%, or three times higher than that of non-low-income households. Kansas, Kentucky and Michigan have the highest energy burden in the Midwest, with Indiana, Missouri and Nebraska not far behind (Figure 3)[2].

Efficiency First

Building energy efficiency is critical when considering decarbonization. About 40% of energy use and approximately 70% of electricity use is related to buildings nationally. Because the Midwest has a large reliance on fossil fuels for its building end uses and its electricity production, building efficiency is especially important for Midwestern communities considering electrification, where electricity costs already dominate utility bills. Communities with high energy burdens also benefit greatly from improved energy efficiency in buildings since it leads to lower utility bills, increased comfort and better indoor air quality.

Energy efficiency remains the most cost-effective solution to decarbonization. Efficiency can be a hard sell when comparing improved insulation values to a sleek new solar panel, but efficient buildings actually have twice the impact – not only do they decrease the grid load, they also decrease the amount of renewables needed to achieve net-zero energy (see Figure 4). A viable path forward to decarbonize buildings in the Midwest must include improved energy efficiency as a foundation.

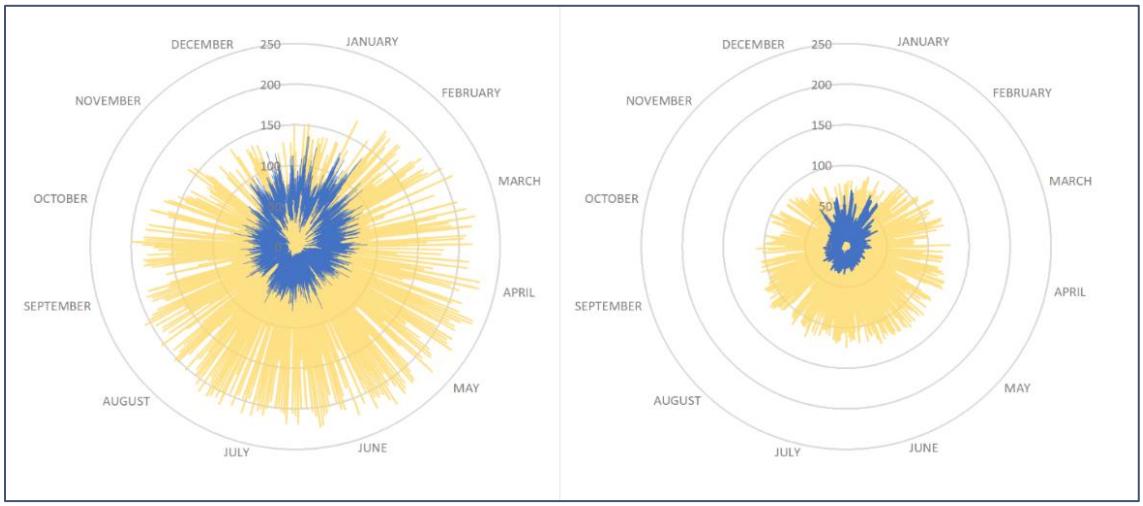

Figure 4. Annual chart reporting hourly building energy use (blue) versus photovoltaic power production (yellow). Baseline building (Left), Passive Building (right). The super-efficient Passive Building on the right needs less solar PV to offset the building energy use than the Baseline Building on the left. (Source: White, 2020)

Choosing Cities and Methodology

One city from each of MEEA's thirteen states is highlighted in this paper. The cities are: Ann Arbor, MI; Chicago, IL; Cleveland, OH; Dubuque, IA; Fargo, ND; Indianapolis, IN;

[1] Low-Income Energy Affordability Data (LEAD) Tool. https://www.energy.gov/eere/slsc/maps/lead-tool

[2]The LEAD Tool's Area Median Income (AMI) uses the following scale: 0-30% AMI—extremely low-income; 30-50% AMI—very low-income; 50-80% AMI—low-income; Over 80% AMI—no longer considered low-income; 100%+ AMI—above median income.

Kansas City, KS (area); Lexington, KY; Lincoln, NE; Milwaukee, WI; Minneapolis, MN; Saint Louis, MO; and Sioux Falls, SD.

Criteria considered when choosing the cities were: (1) the cities must have some climate goals; (2) only one city from each state; (3) the total representation should include both repeated trends and progressive efforts; and (4) the total representation should include a variety of population size, racial demographics and average median income.

Cities	Population	Demographics
Ann Arbor, MI	123,851	Persons under 18 - 12.8%; Persons 65+ - 11.7%; White - 71.1%; Black - 6.8%; Hispanic - 4.8%; Median household income - $65,745
Chicago, IL	2,746,388	Persons under 18 - 20.9%; Persons 65+ - 12.4%; White - 50%; Black - 29.6%; Hispanic - 28.8%; Median household income - $58,247
Cleveland, OH	372,624	Persons under 18 - 22.1%; Persons 65+ - 14%; White - 40%; Black - 48.8%; Hispanic - 11.9%; Median household income - $30,907
Dubuque, IA	59,667	Persons under 18 - 20.6%; Persons 65+ - 18%; White - 89.8%; Black - 5.2%; Hispanic - 2.6%; Median household income - $54,234
Fargo, ND	125,990	Persons under 18 - 20%; Persons 65+ - 11.9%; White - 84.6%; Black - 7%; Hispanic - 3%; Median household income - $55,551
Indianapolis, IN	887,642	Persons under 18 - 24.7%; Persons 65+ - 12.2%; White - 60.9%; Black - 28.6%; Hispanic - 10.5%; Median household income - $47,873
Kansas City, KS (area)	156,607	Persons under 18 - 27.8%; Persons 65+ - 11.9%; White - 56.9%; Black - 23.3%; Hispanic - 30.4%; Median household income - $45,665
Lexington, KY	322,570	Persons under 18 - 20.9%; Persons 65+ - 13%; White - 74.9%; Black - 14.6%; Hispanic - 7.2%; Median household income - $57,291
Lincoln, NE	291,082	Persons under 18 - 22.5%; Persons 65+ - 13%; White - 84.9%; Black - 4.4%; Hispanic - 7.6%; Median household income - $57,746
Milwaukee, WI	577,222	Persons under 18 - 25.9%; Persons 65+ - 10.5%; White - 44.4%; Black - 38.7%; Hispanic - 19%; Median household income - $41,838
Minneapolis, MN	429,954	Persons under 18 - 19.8%; Persons 65+ - 10%; White - 63.6%; Black - 19.2%; Hispanic - 9.6%; Median household income - $62,583
Saint Louis, MO	301,578	Persons under 18 - 19.4%; Persons 65+ - 13.1%; White - 46.5%; Black - 46.6%; Hispanic - 4%; Median household income - $43,896
Sioux Falls, SD	192,517	Persons under 18 - 25%; Persons 65+ - 12.7%; White - 84.5%; Black - 6.2%; Hispanic - 5.5%; Median household income - $59,912

Table 1. Chosen cities with population and demographics.

Midwest Building Decarbonization Policies

A variety of policy options are available to address building decarbonization and, specifically, energy consumption. All building decarbonization policies should impact the performance of the building and improve the lives of the building occupant that lives or works inside. Efficient building policies typically address the building envelope, appliances and technologies, mechanical systems and lighting. Some also add other elements, such as requirements (or readiness) for electric vehicles (EVs) and solar photovoltaic (PVs), electrification, grid-interactive technologies or other green building attributes. Improving the energy efficiency of the buildings as a foundation should be the first consideration.

Midwestern Policies Summary

Figure 5 shows the different considerations of building decarbonization policies that are most likely to be incorporated into Midwestern climate action plans. They address new construction, existing buildings, distributed energy resources, implementation and equity.

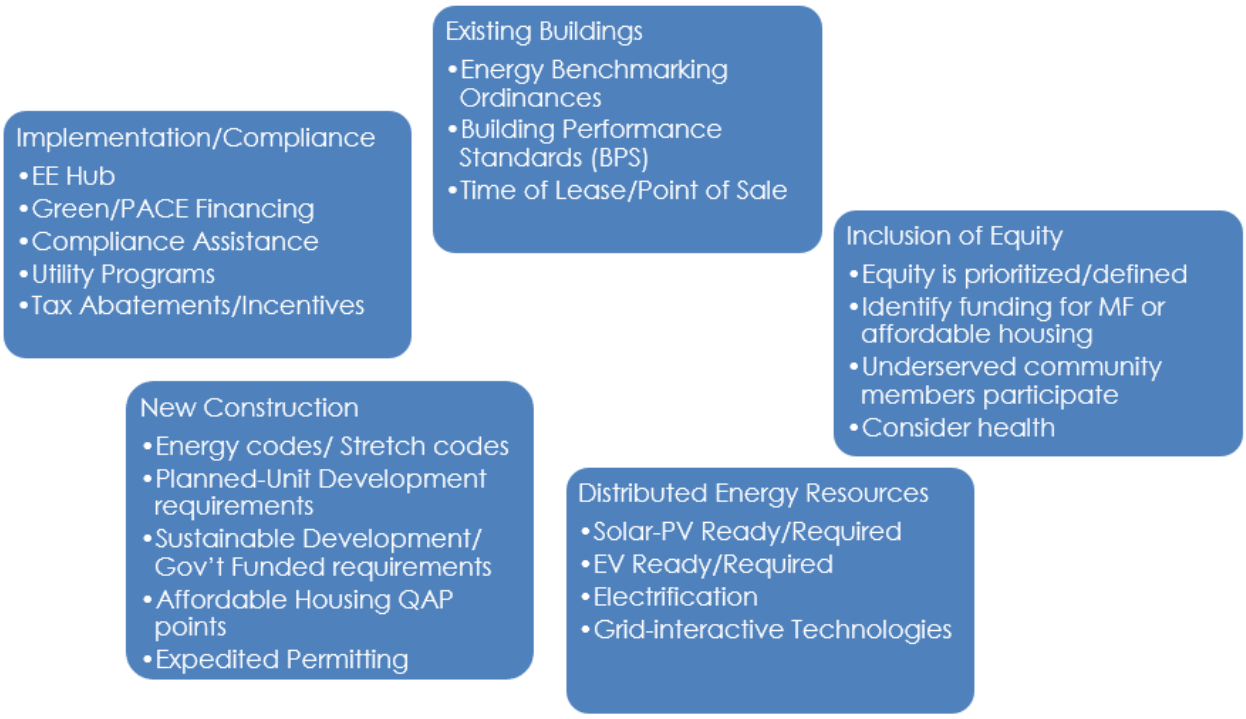

Figure 5. Building Decarbonization Policy Considerations for Climate Action Plans.

Overall Goals

Each of the cities in this paper has some sort of overall climate/energy goal (i.e., reducing greenhouse gas emissions, increasing use of renewable energy sources, achieving net zero). Most (85%) also include goals specific to buildings (i.e., reducing

energy consumption, improving energy efficiency, increasing use of green building standards) (Table 2, Table 3). Cities set climate goals during different years and update them in different intervals, meaning that the goals and the baselines are very different across the Midwest. However, the intentions to decarbonize and improve energy efficiency are similar. The most progressive goals were set forth by Dubuque, IA ("the first Net Carbon Neutral community in Iowa") and Ann Arbor, MI ("achieve carbon neutrality by 2030").

New Construction

New construction policies set the stage for the life of the building and future generations of occupants. Energy codes are the most cost-effective policy to decarbonize buildings. Codes protect consumers by prioritizing items they don't know how to demand (like insulation behind the walls). Codes provide occupants with energy savings, resiliency, health benefits and comfort. Stretch codes provide an above-model-code option for municipalities that are able to adopt them. Energy codes typically deal with energy conservation; while distributed energy resources (DERs) may be added to codes, energy conservation should be addressed first to maximize the benefits of DERs. Four of MEEA's states (KS, MO, ND, SD) do not set statewide energy codes, meaning that these municipalities adopt their own codes.

Figure 6. Benchmarking and BPS policies in the Midwest. Updated March 2022. Source: MEEA.

Table 2 shows whether cities have the most recent energy codes and whether they've enacted net-zero/green requirements for city buildings. Only the state of Nebraska has the most current energy code in the Midwest for both residential and commercial buildings. For the cities with no option to improve their energy codes, there are a number of other requirements that they have incorporated to improve energy efficiency in buildings, listed in Figure 5. For example, the Kansas City, KS area has specified areas to improve its housing codes as related to energy, health and equity.

Sioux Falls, SD has specified that they intend to support compliance efforts with the 2018 IECC City energy code.

Existing buildings

Energy efficiency of existing buildings should also be addressed in climate action plans. In the Midwest, this often starts with monitoring the energy consumption of city buildings and can move on to policies like benchmarking ordinances, building performance standards, and time of lease/point of sale policies (Figure 6, Table 3).

New Buildings Policies			
	Energy Code/Stretch Code Adoption		Net-Zero or Green Building Policy
Cities	2018 IECC or Better for Residential	2018 IECC or Better for Commercial	City-buildings or -funded projects w/ EE/NZE/green requirements?
Ann Arbor, MI	No	No	Goal
Chicago, IL	No	Almost	Yes
Cleveland, OH	No	No	Yes
Dubuque, IA	No	No	No
Fargo, ND	No	No	Goal
Indianapolis, IN	No	No	Goal
Kansas City, KS (area)	No	No	No
Lexington, KY	No	No	Yes – voluntary
Lincoln, NE	Yes	Yes	Goal
Milwaukee, WI	No	No	Yes
Minneapolis, MN	No	No	Yes
Sioux Falls, SD	No	No	Goal
St. Louis, MO	Yes – slightly amended	Yes	Yes

Table 2. Matrix of policies and programs related to new buildings. Grey cities can adopt their own codes separate from the statewide energy code. "Goal" denotes that the policy or program is specified within the city's climate action plan or otherwise formally declared. Chicago is "almost" because they slightly weakened existing building roofing requirements.

Existing Buildings Policies						
	Energy Benchmarking				Residential Point-of-Sale Policies	Building Performance Standard
Cities	City-owned/ financed	Multifamily & Commercial Privately-owned	Publicly-disclosed data	Upcoming in Climate Action Plan or Declared	Energy disclosure/ audit at point-of-sale	BPS passed or upcoming
Ann Arbor, MI	Yes	Yes	To city	Yes	Upcoming	By April 2024
Chicago, IL	Yes	Yes	Yes	Yes	Yes	By April 2024

Cleveland, OH	Yes	No	4.5 mil. sq ft reported publicly[3]	Yes	No	No
Dubuque, IA	No	No	No	Yes	No	No
Fargo, ND	No	No	No	Yes	No	No
Indianapolis, IN	Yes	Yes	To city (will be public in 2026)	Yes	No	No
Kansas City, KS (area)	No	No	No	Yes	Goal	Upcoming
Lexington, KY	Yes – voluntary	No	No	No	No	No
Lincoln, NE	No	No	No	Yes	No	No
Milwaukee, WI	Yes	No	No	No	Goal	By April 2024
Minneapolis, MN	Yes	Yes	Yes	Yes	Yes	No
Sioux Falls, SD	No	No	No	Yes	No	No
St. Louis, MO	Yes	Yes	Yes	Yes	No	BPS passed 2020

Table 3. Matrix of goals and policies related to existing buildings. "Goal" denotes that the policy or program is specified within the city's climate action plan or otherwise formally declared.

Distributed Energy Resources

Policies to encourage Distributed Energy Resources (DERs) should be implemented to decarbonize electricity consumption, and such policies are found in many Midwest climate action plans. They may include EV-ready/installed and PV-ready/installed requirements and electrification (Table 4).

Distributed Energy Resources Policies		
	Electrification	**Renewables**
Cities	Are there electrification or smart/grid goals, codes, policies?	Solar or solar-ready requirements, solar challenges?
Ann Arbor, MI	Goal	Yes
Chicago, IL	Goal	Yes
Cleveland, OH	Goal	Goal
Dubuque, IA	Goal	Goal
Fargo, ND	Goal	Goal
Indianapolis, IN	Goal	Goal
Kansas City, KS (area)	Goal	Goal
Lexington, KY	No	Goal
Lincoln, NE	No	Goal
Milwaukee, WI	Goal	Yes
Minneapolis, MN	No	Yes

Implementation and Compliance

A policy is only as effective as its implementation.

[3] Through the U.S. Department of Energy's Better Buildings Challenge - https://betterbuildingssolutioncenter.energy.gov/partners/cleveland-oh

Midwestern cities have attempted to facilitate compliance through the establishment of Energy Efficiency Hubs[4], financing mechanisms, technical assistance, partnerships with utility programs and tax abatements/incentives (Table 5).

Equity and Inclusion

Underserved and vulnerable communities are most likely to have high energy burdens and be disproportionately impacted by the negative effects of climate change. Taking action to incorporate equitable solutions for all communities is critical, and it is growing in popularity in Midwest city action plans. Some climate plan criteria include a prioritization and definition of equity, funding for multifamily/affordable housing, incorporating health in decarbonization and formally convening and engaging with underserved and underrepresented stakeholders and plans (Table 6).

Cities	Implementation Strategies, Financing and Incentives
Ann Arbor, MI	Biggest Loser Competition. Sustaining Ann Arbor Together neighborhood grant program. Green Business Challenge. Loan Loss Reserve Fund. Energy Concierge and Community Engagement Program.
Chicago, IL	Tax-Increment Financing. PACE Financing. Reduced permit fees for green features. Expedited permits for green features and solar projects. Green building design assistance. Energy code compliance assistance.
Cleveland, OH	Property tax abatement for meeting green building standards. Green Infrastructure Grant Program. Commercial PACE financing for EE and RE. Financial assistance for 2030 District projects. Home Weatherization Assistance Program. Greater Cleveland Partnership's Energy Programs. Other utility rebates and efficiency packages.
Dubuque, IA	Commercial Energy Efficiency Revolving Loan Fund. Sustainable Dubuque Community Grants. Efficiency redevelopment financial incentives.
Fargo, ND	Education, incentives and programs like the Neighborhood Revitalization Initiative. Considering: A free one-stop green resource center; Rural Energy Savings Program; Green Retrofit Program; incentives for renewables; expedited permitting for green buildings and supporting adoption of state PACE financing.
Indianapolis, IN	Neighborhood grant programs for efficiency upgrades.
Kansas City, KS (area)	Regionally promote PACE. Regional Building Energy Exchange. Pay-As-You-Save (PAYS) and other inclusive financing options. Promote retro-commissioning and building management strategies. Link efficient building policies to supportive utility incentives programs.
Lexington, KY	Create EE/Environmental Hub/Entity to collaborate and implement policies. Energy Improvement Fund revolving loan program. Green Check green business certification and recognition program. Expand EE initiatives and promote energy efficient buildings by supporting grants and public recognition. Offer PACE financing.
Lincoln, NE	TIF and PACE financing. Partnership with Lincoln Electric System's Sustainable Energy Program. Green recognition program.
Milwaukee, WI	Efficiency upgrade program (Me2) and incentives. Rebate incentives from Focus on Energy (funded by utilities). Offer commercial PACE financing.

[4] "Energy Efficiency Hub" is a one-stop resource shop to aid with implementation of energy efficiency policies. This practice has been employed by some cities across the U.S. with BPSs, like St. Louis and Washington, D.C.

	Promote and enhance Milwaukee's Smart Energy Hub and create an energy innovation center. Milwaukee Shines solar program.
Minneapolis, MN	Permanent Improvement Capital Fund. Commercial Energy Efficiency Loan program. Commercial PACE financing for EE and solar. Green Cost Share solar, EE and pollution reduction incentive program. Energy code compliance support.
Sioux Falls, SD	Residential and commercial energy efficiency rebates. City energy code compliance support. Connect participants w/ resources about residential EE. Energy efficiency assistance and incentives through Sioux Valley Energy and Southeastern Electric Coop.
St. Louis, MO	Set The PACE affordable financing program. Utility-offered Solar Rebates and Community Solar. Discounted solar panel purchase programs.

Table 5. Intended and continuing implementation strategies for buildings policies and goals.

Cities	Actions Taken to Address Inequity
Ann Arbor, MI	Develop Energy Concierge and Community Engagement Program. Establish a Loan Loss Reserve Fund for residents with lower credit scores. Expand Weatherization Program. Transition Affordable Housing Sites to Net Zero Energy. Promote Green Rental Housing Program. Support "Aging in Place Efficiently."
Chicago, IL	Energy Savers Program, Cook County Community and Economic Development Association Weatherization Program. Continue to help low- to moderate-income communities increase energy efficiency and reduce utility bills.
Cleveland, OH	CHN Housing Partners' energy programs. LMI Solar Project. Energy$aver Program. Climate Action Advisory Committee members were supported in taking racial equity training. An equity and engagement subcommittee also formed to develop a racial equity tool. This tool was used to assess every objective in the Climate Action Plan for its ability to improve racial equity.
Dubuque, IA	Renew DBQ - pilot project to help families with low- to moderate-incomes access solar technology. Green & Healthy Homes Initiative.
Indianapolis, IN	Held specialized focus groups and training for target populations. City staff attended various City and community events and held regular pop-ups at the public library and other central locations. Identify and eliminate barriers to engagement in AES Indiana's Income-Qualified Weatherization Program and other efficiency programs focused on low-income households.
Kansas City, KS (area)	Climate Action KC Equity Committee met with many underserved communities. Consider adoption of healthy housing codes and enforcement processes with emphasis on underserved neighborhoods, low-income housing, and rentals.
Lexington, KY	Cultivate a more collaborative pre-development process, incorporating community feedback prior to development review submission.
Lincoln, NE	Develop a joint plan to address energy efficiency in low-income and multifamily housing stock. Locate funding sources for low-income energy efficiency programs. Explore opportunities to build or renovate a net-zero affordable housing demo project with University of Nebraska-Lincoln (UNL).
Milwaukee, WI	Residential retrofits. Green and Healthy Homes Initiative. City-County Task Force on Climate and Economic Equity. HELP: Homeowners Emergency

	Loan Program. Affordable Net Zero Energy Housing Plan. Green Jobs Accelerator. Weatherization Assistance program.
Minneapolis, MN	The Climate Action Plan Environmental Justice Working Group recommended the creation of Green Zones within the city. A racial equity impact analysis. Low-Income Home Energy Assistance Program. Minneapolis Green Zones Initiative.
Sioux Falls, SD	City created and translated sustainability survey into multiple languages and worked with cultural leaders and organizations to encourage participation.
St. Louis, MO	St. Louis considers equity when making all of its policies. Underserved and underrepresented communities participated in the development of the city's Building Energy Performance Standards.

Table 6. Matrix of addressing equity when considering goals and policies.

City Policy Snapshots

Ann Arbor, MI

A2Zero Living Carbon Neutrality Plan: Achieve Carbon Neutrality by 2030
Ann Arbor has an overall goal to significantly improve the energy efficiency in its homes, businesses, schools, places of worship, recreational sites and government facilities. Last year, the city formally adopted Energy Criteria and Principles to support its work in achieving the energy-related goals in A2Zero. The city is also working to create a time-of-marketing ordinance, which would require a Home Energy Score to be provided to all potential home buyers. The city's Green Rental Efficiency Initiative aims to add energy efficiency requirements into the existing city rental licensing process, thereby ensuring that every rental unit in Ann Arbor meets a minimum energy efficiency and safety performance standard. The city is working with the State of Michigan to pass the 2021 building code and the net-zero code appendix so that all new developments and major renovations in Ann Arbor can be net-zero energy. The city also has a goal to require sustainable designs in new building approval processes. Ann Arbor formally adopted the Energy and Water Benchmarking Ordinance for buildings 20,000 square feet and larger. The city hopes to power its electrical grid with 100% renewable energy and to implement a Sustainable Energy Utility (SEU) with a 100% renewably-powered, reliable, local, shared and publicly-owned municipal energy utility.

Chicago, IL

Proposed 2022 Climate Action Plan: Reduce GHG Emissions by a Minimum of 60% by 2040
In 2019, Chicago passed Resilient Chicago in order to transition municipal operations to 100% renewable energy by 2025 and 100% renewable energy by 2035 city-wide. Also in 2019, Chicago adopted an ordinance requiring new commercial and multifamily buildings to be EV-ready. In 2020, the city strengthened the terms by requiring the installation of EV infrastructure that can be adapted to charging stations in the future. The Chicago Sustainable Development Policy basically requires development projects that are receiving financial assistance or special approvals from the city to include sustainable elements, and there are two ways buildings can comply: 1) by meeting the points required through various sustainable strategies listed in a provided "menu" or 2) by being certified through a listed building certification program. Points are given to the

latter depending on the type of building certification achieved and the level of certification. The City of Chicago also passed a building energy benchmarking ordinance for public, commercial and high-rise residential buildings in 2013, and it publicly discloses that data on its website. Finally, Chicago participates in the Better Buildings Challenge to reduce building energy use 20% below 2011 levels by 2022.

Cleveland, OH

Climate Action Plan: Reduce Community-wide GHG Emissions 16% Below 2010 Levels by 2020, 40% by 2030 and 80% by 2050.
Cleveland currently has a buildings-specific goal to reduce residential and commercial energy use 50% and industrial use 30% by 2030. The city also regularly benchmarks its municipal buildings and utilizes the energy data management system EnergyCAP to track its energy use. The Cleveland 2030 District, a voluntary benchmarking and reporting program for commercial buildings e,xists in the downtown and University Circle areas. The Cleveland Sustainable Municipal Building Policy requires all new municipal construction and major renovations to achieve LEED Silver standards and energy efficiency levels 30% beyond ASHRAE 90.1. The policy also includes efficiency requirements for "Fix it First" projects in existing buildings. The city advocates to the State for more stringent energy codes. The 2018 update to the CAP includes a goal of having 100% of electricity supplied by renewable sources by 2050.

Dubuque, IA

Community Climate Action & Resiliency Plan: Reduce Community-wide GHG Emissions 50% Below 2003 Levels by 2030; Reduce City-wide Energy Consumption by 10% by 2030
Dubuque has a goal to be the first Net Carbon Neutral community in Iowa, and Smart Energy Use and Green Buildings are two of its Sustainability Department's "12 Principles". In March 2013, the city began pursuing the Environmental & Sustainability Management System (ISO 14001) certification for its Municipal Services Center. It also adopted an Environmental & Sustainability Commitment for the Municipal Services Center to evaluate operations and set goals to lessen negative impact on the environment from electricity and natural gas consumption. The Dubuque Solar Project is a combination of two sites: the West Dubuque Solar Garden and the Downtown Dubuque Solar Garden. The city's goals include increasing distributed renewable energy by 21 MW of installed capacity by 2030, promoting "fuel switching" to reduce on-site fossil fuel use 10% by 2030 and increasing renewable energy's share of the electric grid to 15% by 2030. The city is exploring the development of a Revolving Loan program for municipal facilities to fund capital costs for high-performance energy efficiency and renewable energy options with appropriate return on investment.

Fargo, ND

GO2030 Comprehensive Plan
The City of Fargo has adopted the 2018 IECC, with amendments. One of the GO2030 recommendations is to "encourage building codes and other regulations to be as consistent as practical with energy efficiency goals and encourage green development through incentives and innovative strategies". The city is exploring the following recommended energy policy strategies: evaluating energy efficiency

standards in existing building code, connecting public subsidies for development projects to green building standards and setting energy/green standards for all new public buildings. Another recommendation is to "encourage friendly competition between homeowners, businesses, organizations and governmental entities to conserve energy," specifically through using ENERGY STAR Portfolio Manager. The City of Fargo encourages conducting a paper energy audit for each of its buildings, identifying areas for improvement and implementing those changes.

Indianapolis, IN

Thrive Indianapolis: Achieve carbon neutrality by 2050
A 2016 GHG inventory revealed that buildings have accounted for about 66% of Indianapolis' community wide GHG emissions. To offset that, the city set a goal for 20% of energy consumed in Indianapolis to come from renewable sources by 2025. Also by 2025, the city hopes to reduce those emissions by almost 2 million metric tons of carbon dioxide equivalent per year. The city would also like to certify 498 buildings as "green" (LEED or ENERGY STAR) by 2025. Indianapolis has committed that all newly constructed municipal buildings built after 2018 meet LEED-certified or equivalent standards. Moreover, Indianapolis' Energy Benchmarking and Transparency Ordinance requires city facilities over 25,000 square feet and non-city buildings in the commercial, multifamily and industrial sectors over 50,000 square feet to benchmark and report their energy and water usage.

Kansas City, KS (area)

Kansas City Regional Climate Action Plan: Achieve Net Zero GHG Emissions by 2050.
The Kansas City Regional Climate Action Plan serves Douglas, Johnson, Leavenworth, Miami and Wyandotte counties in Kansas, and Cass, Clay, Jackson, Platte and Ray counties in Missouri. The idea for a regional plan is to maximize impact by pooling resources. Interim net zero goals focus on local government operations (by 2030), energy generation (by 2035) and homes and buildings (by 2040). One of the overall goals of the plan is to increase whole building performance and health for homes and commercial, institutional and industrial buildings.
Some building policy goals include: facilitating the development of appropriate benchmarking and building performance standards for municipalities around the region which are linked to supportive utility incentives programs, developing and employing a building performance standard beginning with energy benchmarking and adopting commercial energy efficiency programming and incentives, promoting retro-commissioning and other commercial building management strategies, certifying every public building for Energy Star or LEED, promoting EnergyStar and LEED Certification, facilitating evaluation of housing codes and standards with cities to determine policy alternatives and improvements, developing the Climate Action KC Regional Building Energy Exchange and considering adoption of healthy housing codes and enforcement processes with emphasis on underserved neighborhoods, low-income housing and rentals.

Lexington, KY

2018 Imagine Lexington Comprehensive Plan: Reduce Lexington-Fayette County's Carbon Footprint
The County of Lexington-Fayette has a comprehensive decarbonization plan that includes building decarbonization. Some of the policy strategies include encouraging Lexington to join the STAR Community rating program and explore incentives for green building practices for new development and redevelopment. New development is encouraged to orient buildings for solar PV optimization, and civic agencies are provided incentives for sustainable development and following green building criteria. Each month, the city reviews over 1,200 utility bills to compare current use and cost against historical data using EnergyCAP software.

Lincoln, NE

2021 – 2027 Climate Action Plan - Reduce Lincoln's Net GHG Emissions 80% by 2050
The City of Lincoln, NE incorporates building decarbonization into its climate action plan. For municipal buildings, the goal is to increase energy efficiency and use of renewable energy to achieve 100% net renewable/carbon neutral by 2035. Some of the key identified building policy initiatives include: establishing energy efficiency and renewable energy goals and performance metrics for municipal buildings; updating operations and building plans to include energy efficient practices in municipal government and creating a policy that requires an evaluation of energy efficient investments as well as conversion to sources of renewable energy (including analyses for net-zero energy buildings) when funding improvements to municipal buildings, on new municipal building construction or enhancing municipal operations. Another initiative includes designating a city team to be responsible for tracking and reporting energy use from municipal buildings.

Milwaukee, WI

2013 ReFresh Milwaukee Sustainability Plan
Milwaukee's 2013 ReFresh Milwaukee Sustainability Plan aims to implement sustainable projects and encourage citizens and businesses to engage in solutions that are economically, environmentally and socially smart for the community. The city established a goal to reduce community-wide net greenhouse gas emissions at least 45% by the year 2030. The city is also currently developing a Climate & Equity Plan.

For buildings, Milwaukee hopes to cut energy use 20% over a decade in its municipal buildings and participating commercial buildings. To do this, the city has implemented sustainable building practices and standards for development and major redevelopment, and it has participated in the Better Buildings Challenge. By 2025, Milwaukee aims to have 25% of its energy come from renewable sources. The city wanted to adopt a Green Construction Code but was prohibited from doing so by Wisconsin State law, which disallows a municipality from adopting a more stringent code. Instead, the city now advocates for better building codes at the state level.

Minneapolis, MN

Minneapolis Climate Action Plan: Reduce Community-wide GHG Emissions by 30% by 2025 and 80% by 2050

Minneapolis set a goal to increase energy efficiency in commercial and industrial buildings 20% and residential buildings 15% by 2025. The city council also formally adopted a community-wide goal of 100% renewable energy by 2030. Minneapolis has since passed policies to meet these goals. Municipal buildings have been using the energy management software EnergyCAP since 2007. The city's LEED Building Policy requires "all new or significantly renovated municipal facilities...of 5,000 square feet or greater, should be built to a LEED Silver level of quality with an emphasis in LEED points related to 'Energy and Atmosphere...'." The Minneapolis Building Rating and Disclosure Policy requires city buildings of 25,000 square feet or more and commercial and multifamily buildings of 50,000 square feet or more to annually benchmark and report energy consumption. The city also tenaciously advocates to the State for more stringent energy codes. The city passed EV-ready requirements for buildings in May 2021. The Minneapolis Truth-in-Housing policy requires that all homes receive an energy audit at the time of sale, that the given energy rating is disclosed to potential homebuyers, and that the potential homebuyers receive recommendations for improvement opportunities and financing options.

Saint Louis, MO

St. Louis Sustainability Plan: Reduce Community-wide Greenhouse Gas Emissions 25% by 2020 and 80% by 2050

St. Louis, MO has implemented many policies to decarbonize buildings and meet its sustainability goals. These include code adoption of the 2018 IECC, the Solar Readiness Amendment to Building Code and the Electric Vehicle Readiness Through Charging Ordinance.

All new municipal construction over 5,000 square feet must be built to at least LEED Silver standards, and city buildings are required to benchmark through the Building Energy Awareness Energy Benchmarking Ordinance. The same ordinance also requires privately-owned commercial and multifamily buildings 50,000 square feet and larger to annually benchmark and report energy consumption to the city. Finally, St. Louis passed the Building Energy Performance Standard ordinance which applies to the same buildings governed by the benchmarking ordinance, and which sets energy performance targets for specific building types.

Sioux Falls, SD

Draft Sustainability and Climate Action Plan: Reduce Emissions by 45% by 2030 and Achieve Net-zero Emissions by 2050

Sioux Falls has a draft climate action plan that includes many building decarbonization goals. For municipal buildings, the city wants to establish a municipal building benchmarking and energy audit program, as well as develop a plan to improve city building energy efficiencies and electrification. All new city buildings should be designed, constructed and operated in accordance with green building standards to the fullest extent possible. Another goal is to encourage energy benchmarking, audits and upgrades of new and existing commercial and residential buildings. For codes, the city would like to switch from the current 2009 IECC energy code to the updated 2018 energy code starting in 2022 and provide compliance assistance. The city has also set a Commercial Building Electrification Goal: 7% of existing community-wide commercial square footage to be retrofitted per year starting in 2023, and 80% of new commercial

square footage to be electrified starting in 2024. Residential Building Electrification Goals are for 7% of existing occupied housing units to be retrofitted per year starting in 2023, and 80% of new residential buildings to be electrified starting in 2024. Sioux Falls has a Solar Energy Install Goal of 15 megawatts of solar PV installed by 2027, and the city is interested in constructing more EV-ready buildings.

Conclusion

Decarbonization policies cannot be "one-size-fits-all." However, there are universal lessons to be learned from those cities that have "trailblazed" the decarbonization path and taken a stab at developing and implementing successful climate plans. The first lesson is that cities should not shy away from adopting their own energy codes. Four of MEEA's states (KS, MO, ND, SD), for example, do not set statewide energy codes, meaning that their municipalities can. However, these climate action plans do not include specific resolutions to adopt such codes, or what potential codes might include. Second, it is important for cities to realize that once energy efficiency has been successfully addressed through new and existing building policy requirements, policies to encourage DERs should come next as they will help to decarbonize electricity consumption of the more efficient building.

And finally, cities should ensure that they are properly equipped for undertaking their decarbonization plans. Carrying out a climate action plan, or even individual policies is certainly not a one-person (or one-agency, one-department) job. Rather, it requires all-hands-on-deck. But even more important than the *number* of staff working is how well the staff works together. Success will not happen if a city's staff members or departments are pursuing opposing or contradictory goals. There must be a common cross-functional understanding and commitment to the city's objectives. Moreover, there must be some financial/budget security, as well. Cities should not only work to pursue various resources of funding but make sure those funds are effectively managed and allocated among projects. Nearly every department or division of a city – sustainability, health, planning, utilities, finance – is involved in this process and needs to work together to bring about change. We hope the cited examples of cities' efforts at decarbonization inspire and encourage more municipalities to take their first steps toward decarbonization.

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