

City of Des Moines

CLIMATE ACTION & ADAPTATION PLAN

Draft | October 2023

Des Moines will reduce our climate change risks and contributions through advancement of a more resilient, just, and equitable future.



A NOTE FROM MAYOR COWNIE



In 2021, the Des Moines City Council approved a resolution to achieve one hundred percent 24/7 carbon-free electricity by 2035, and to reduce emissions by 45% by 2030 and net zero by 2050. These aggressive targets build on nearly two decades of work to create a more sustainable community, and solidify our city's role as a climate change mitigation and adaptation leader across the Midwest, nationally, and internationally.

With these goals, we aim to lead-by-example, building a stronger and more vibrant community for the years and generations to come. City leadership knew we needed a comprehensive framework and tactics to reach our ambitious climate goals. Thanks to countless hours and valuable input from staff and stakeholders, we proudly present the ADAPT DSM Climate Action and Adaptation Plan.

Our ability to directly serve our residents is why local governments can play such a significant role in implementing climate mitigation and adaptation strategies. As the global climate continues to change, we must make conscious efforts towards reducing our emissions and increasing our community resilience to future risks, ensuring that Des Moines remains a safe and healthy place to call home. With over one hundred action items addressing everything from building and transportation decarbonization, to increasing clean energy supply, protecting natural resources, increasing food security, and community preparedness, I am confident this plan will protect, preserve, and strengthen our wonderful city.

A plan that reflected the needs and wants of our community was of utmost importance to us. Over seven hundred community members engaged through surveys, visits to our websites, and numerous public events. Thanks to you, our vision for a Climate Action and Adaptation Plan that centers equity and inclusivity has become a reality. I cannot overstate how grateful I am for our residents and their willingness to voice their opinions regarding this monumental initiative.

The unveiling of this plan does not mean the end of our fight against the negative impacts of climate change, as this only marks the beginning of our work together. This living document will need continued review and engagement to guarantee the effective implementation of our actions. I invite you to carry out these efforts with us for years to come and stay tuned for ways you remain involved.

Sincerely,

A handwritten signature in black ink that reads "Frank Cownie". The signature is written in a cursive, flowing style.

T.M. Franklin Cownie
Mayor, City of Des Moines



OUR CLIMATE ACTION & ADAPTATION PLAN ACKNOWLEDGMENTS

To the committed members of the Core Project Team, Steering Committee, and Technical Advisory Group, thank you for your leadership and commitment to ADAPT DSM. To all the community members and organizations that helped share information about the project and participated in surveys, community conversations, and plan-related events and activities, thank you for your time, perspectives, connections, and contributions to the plan. Finally, thank you to the Des Moines City Council and City of Des Moines leadership for aligning City resources and strategy to better coordinate our community's response to climate change, reduce harmful emissions, and chart a more resilient future for Des Moines.

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COMMUNITY ORGANIZATIONS

The following organizations received copies of the Outreach Toolkit and other updates during the planning process. The City will continue to expand engagement efforts with other organizations during plan implementation.

AARP
Al Exito
American Heart Association
American Lung Association
ArtForce Iowa
Blank Park Zoo
BOMA
Broadlawns
By Degrees Foundation
Capital Crossroads
Capital City Pride
Iowa Citizens for Community Improvement
Central Iowa Shelter Services
Civil and Human Rights Commission
Corinthian Baptist Church
Creative Visions
Des Moines Botanical Gardens
Des Moines Public Library
Des Moines Area Community College
Iowa Department of Natural Resources

Dogpatch Urban Gardens
Downtown Chamber
DSM Sustainability Task Force
EMBARC Iowa
Environmental Law and Policy Center
Evelyn K. Davis Center
Food Bank of Iowa
Friends of Des Moines Parks
Good Vibes
Grandview University
Greater Des Moines Partnership
Green Iowa AmeriCorps
Healthiest State Initiative
Iowa Environmental Council
Iowa Homeless Youth Centers
IMPACT Community Action
Interfaith Alliance of Iowa
Invest DSM
Iowa Bicycle Coalition
Iowa Interfaith Power and Light
Iowa Rivers Revival
Knock and Drop Iowa
Neighborhood Associations

Neighborhood Finance Corporation
Nissa African Family Services
One Iowa
Polk County Housing Trust Fund
Practical Farmers of Iowa
Principal Financial Services
Proteus
Refugee Alliance of Central Iowa
Sierra Club
Supply Hive
Sweet Tooth Farm
Tai Community
The Collective
The Energy Group
The Ingenuity Company
The Nature Conservancy
Trees Forever
Unity Point Health Foundation
Urban Dreams
Wellmark Healthy Hometown
Westside Chamber
YMCA
Young Women's Resource Center



OUR CLIMATE ACTION & ADAPTATION PLAN SUMMARY



Des Moines is already experiencing the effects of the climate crisis. In the last ten years alone, our community has faced damaging floods and derecho events, sweltering summers, drought, and record-breaking temperatures. These hazards threaten our quality of life, economy, and future; and are expected to worsen in coming years due to global climate change. While every member of our community will be affected by climate change, the impacts will be felt most by those least able to adapt; those who have been chronically underserved and historically underrepresented.



Through this plan, we have come together as a community to address climate change. With an unprecedented challenge comes extraordinary opportunity to leverage the creativity of Des Moines' residents and businesses, our history of cooperation, and our long-standing culture of collaboration. Together, we have changed the narrative and are shaping a future for Des Moines that is sustainable, resilient, and equitable. ADAPT DSM is a visionary, action-oriented, and community-driven plan to do just that. The plan is designed to guide decision making, policy, and programs that reduce harmful pollution that causes climate change, while increasing resilience and enhancing the adaptive capacity of our community.

CLIMATE CHANGE IN DES MOINES

The global climate is warming at historically unprecedented rates due to the release of harmful greenhouse gases (GHGs) into the atmosphere, known as "climate pollution," which is associated with the burning of fossil fuels and the clearing of land for human activities. Because of these historic activities, global warming is projected to continue for at least the next several decades. While we will need to adapt to the impacts of global warming, we still have an opportunity to mitigate the most severe impacts of climate change by limiting future emissions.

COMMUNITY CLIMATE HAZARDS

As part of this plan, a Risk and Vulnerability Assessment identified four primary hazards facing our community as a result of climate change:



Extreme Hot Temperatures

Hotter summers with more 100+ degree days putting older adults, children, and outdoor workers at risk



Extreme Precipitation and Flooding

More heavy rainstorms and riverine flooding causing damage in neighborhoods



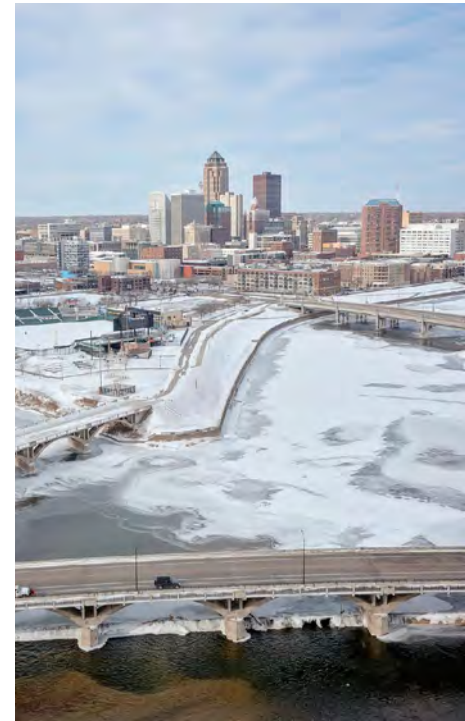
Severe Storm and Wind

More derechos, tornadoes, and other wind events damaging homes and public infrastructure, as well as putting pedestrians and outdoor workers at risk



Water Scarcity and Wildfire

Longer drought periods affecting farming and gardening and increasing the threat of wildfire



COMMUNITY VULNERABILITIES

Certain individuals and areas of Des Moines are disproportionately impacted by climate change. For example, neighborhoods located in the floodplain often experience more severe flooding impacts than those that are situated on higher ground. Additionally, characteristics like race, age, disability status, income, language, housing type, and access to transportation and critical services can also influence an individual's capacity to adjust to a hazard, take advantage of new opportunities, or cope with change. Understanding the factors that determine vulnerability to climate hazards in Des Moines will help us maximize the impact of targeted, equitable, climate action and adaptation solutions.



OUR CLIMATE ACTION VISION & GOALS

Vision

Des Moines will reduce our climate change risks and contributions through the advancement of a more resilient, just, and equitable future.

Principles to guide our pursuit of this vision include:



Equity & Justice

We will center equity and justice in all climate action decision-making and investment.



Creative & Innovative

We will catalyze unique solutions that create benefits for Des Moines, our region, and our world.



Economic Benefits

We will advance climate action solutions to benefit our local and regional economy.



Health & Welfare

We will improve the health and vitality of our community members through climate action.

Climate Pollution Reduction Goals

This plan supports the 2016 Strategic Plan and Roll Call Number 21-0040, in which City of Des Moines leaders committed to:



2025

28% Reduction
in emissions from 2008 levels



2030

45% Reduction
in emissions from 2010 levels



2035

100% 24/7 Carbon-Free
electricity citywide



2050

Net-Zero
greenhouse gas emissions

Climate Adaptation & Resilience Goals

2030



Reduce vulnerability and increase capacity of Des Moines to be resilient to future climate risks including extreme hot temperatures, extreme precipitation and flooding, severe storm and wind, and water scarcity and wildfire.



Ensure every resident has **reasonable access to a Resilience Hub** (facility that supports community members during and after emergencies).



Develop and maintain plans that address climate risks and vulnerabilities for 100% of major municipal government facilities.



Become nationally and/or internationally recognized as a **safe and welcoming climate migration destination**.

2045



Achieve **32% tree canopy cover** per the Urban Forest Master Plan.

OUR FOCUS AREAS & SOLUTIONS

The plan is organized into seven focus areas with actionable solutions that will help us achieve our goals and realize co-benefits. Many of the solutions and supporting actions included in this plan build on the significant sustainability and climate action work already happening around Des Moines, including but not limited to LEED for Cities certification, solar installations on municipal facilities, levee and stormwater improvements, and more.

	Focus Areas	Solutions
Guiding Principles Health & Welfare Economic Benefits Creativity & Innovative Equity & Justice	 <i>Buildings & Infrastructure</i>	B-1. Improve building efficiency, performance and comfort B-2. Advance building decarbonization B-3. Ensure reliable and climate-resilient infrastructure
	 <i>Energy Supply & Distribution</i>	E-1. Increase distributed renewable energy E-2. Expand utility-scale clean energy options
	 <i>Transportation & Land Use</i>	T-1. Plan for efficient land use and development T-2. Shift vehicle trips to walking and bicycling T-3. Increase transit access and ridership T-4. Advance transportation electrification, decarbonization, and alternative fuels
	 <i>Natural Systems & Water Resources</i>	N-1. Expand native ecosystems and a sustainable tree canopy N-2. Enhance watershed management and source water protection N-3. Reduce flood risk N-4. Increase water conservation and drought management
	 <i>Waste Management & Reduction</i>	W-1. Reduce waste generation W-2. Increase waste diversion and recovery
	 <i>Food Systems & Security</i>	F-1. Expand local food production F-2. Improve food security and nutrition
	 <i>Climate Preparedness & Resilience</i>	C-1. Amplify climate-related education and individual and community preparedness C-2. Create climate resilience hubs/shelters C-3. Prepare for climate migration and displaced people

Collectively, the emissions reductions in this plan could result in a community benefit of about \$55 million in 2035 (see Appendix B for calculation details). These benefits are seen in avoided negative impacts on agriculture productivity, human health, property damages from severe weather, and changes in energy system costs.

OUR GAME PLAN

We will need help from everyone in our community to successfully implement our collective solutions and achieve our climate action vision and goals. To help us stay on track, the following groups will coordinate plan implementation through leading by example and working with community partners.

- The **City of Des Moines Sustainability Office** will lead overall coordination of plan implementation, including tracking and reporting progress through the City's [Performance Metrics Dashboard](#) and annual reports to City Council and the community.
- The City's **Sustainability and Resiliency Team** includes City staff from multiple departments (including the Equity Office) and will focus on activating the plan through City operations and policies.
- The **Community Climate Allies Committee** will include members of community organizations (including the Task Force on Sustainability and Civil and Human Rights Commission) who will advise the City and connect the community to opportunities for getting involved.
- The **Climate Action Funding Team** will identify, track, and help direct funding to the City, community-based organizations, and the public to support plan implementation, as part of or in parallel to the City's Sustainability and Resiliency Team.

Our Climate Action Catalysts

Climate actions catalysts reflect themes from the community engagement process. Each catalyst is supported by priority actions to initiate momentum for climate action.

Provide Climate
Action Leadership
& Coordination



Continuously Improve
Municipal Government's
Role in Climate Action



Expand Climate Action
Outreach Engagement
& Capacity



Leverage & Maximize
Resources & Capital for
Climate Action



Our 35x35 Priority Actions

ADAPT DSM prioritizes 35 actions to be achieved by 2035. These high impact actions will drive our progress toward a more sustainable community, share multiple benefits across focus areas, and can leverage city, state, federal, and other funding sources to accelerate implementation. While we will focus our work on these actions, we will continue to identify opportunities and community need for the remaining actions identified throughout the planning process.



Buildings & Infrastructure (B)

B-1A. Upgrade Efficiency at City Facilities

B-1B. Expand Energy Efficiency and Demand Management Tools and Resources

B-1C. Improve Residential Efficiency

B-1D. Leverage Federal Funding to Fill Gaps in Energy Efficiency Incentives

B-2A. Pilot Municipal Decarbonization Projects

B-2B. Advance Building Decarbonization Incentives, Education, and Group Buys

B-3D. Prioritize Resilient Capital Improvement Projects



Energy Supply & Distribution (E)

- E-1A. Update Development Standards and Permitting Processes for Clean Energy
- E-1B. Install Alternative Energy Sources with Storage for Municipal Facilities
- E-1C. Expand Solar Adoption and Incentives
- E-2A. Collaborate on and Maintain Clean Energy Implementation Plan
- E-2B. Advance 24/7 Carbon-free Electricity Transition and Management
- E-2C. Explore Regional Renewable Energy Projects and Programs



Transportation & Land Use (T)

- T-1A. Plan for Walkable and Transit-Supportive Neighborhoods
- T-1B. Promote Infill, Redevelopment, and Adaptive Reuse
- T-2B. Improve Bicycle and Pedestrian Infrastructure
- T-2C. Expand Active Transportation Education and Incentives
- T-3B. Improve Transit Coordination and Engagement
- T-4A. Electrify Municipal Fleet
- T-4D. Expand Electric Vehicle Charging Infrastructure
- T-4E. Provide Transportation Electrification Education and Incentives



Natural Systems & Water Resources (N)

- N-1A. Implement the Urban Forest Master Plan
- N-1B. Refine Tree Planting and Mitigation Standards
- N-1D. Manage Public Properties for Multiple Benefits
- N-2A. Educate about Pollution Prevention and Stormwater Management
- N-2C. Incentivize Best Management Practices for Stormwater and Landcover on Private Properties
- N-2B. Advance Master Drainage and Watershed Management Plans
- N-3B. Advance Flood Mitigation and Stormwater Improvement Projects



Waste Management & Reduction (W)

- W-2A. Reduce Recycling Contamination
- W-2B. Provide Waste Diversion Options in Public Spaces and at Public Event



Food Systems & Security (F)

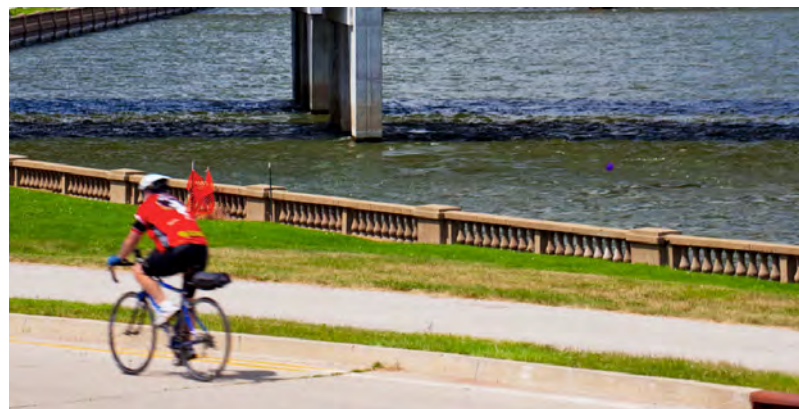
- F-1A. Increase Coordination of Local Food Systems
- F-2A. Reconvene the Food Security Taskforce










Climate Preparedness & Resilience (C)

- C-1A. Educate Community Members about Climate Risks and Preparedness
- C-1B. Monitor and Share Climate Data
- C-3A. Identify Champions and Build Climate Migration Knowledge

ADAPT DSM is a community-wide effort to change Des Moines' climate future.
Sign up to stay informed at dsm.city/adapt.



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CLIMATE ACTION & ADAPTATION PLAN INTRODUCTION



“When the Derecho hit Des Moines, I lost power for several days, and due to being disabled, I needed electricity for my sleep machine. I became ill during this time as there was no generators; plus, I lost all my premade meals, so I had no food. For my disabled friends with a home they owned, many lost theirs and no one came to help rebuild.”

– SURVEY PARTICIPANT



Des Moines is already experiencing the effects of the climate crisis. Our community is no stranger to extreme weather and, in the last ten years alone, we've faced damaging floods and derecho events, sweltering summers, drought, and record-breaking temperatures year-round. These hazards are a threat to Des Moines' quality of life, economy, and future; and they are expected to worsen in coming years due to global climate change. While every member of our community will be affected by climate change, the impacts will be felt most by those least able to adapt; those who have been chronically underserved and historically underrepresented.

A COMMUNITY PLAN

Because climate change impacts our full community and taking action will require leadership and participation by all facets of our society, this plan is written in the first-person perspective using "we" and "us" to describe the shared ownership of this plan between community leaders and the public.



Through this plan, we come together as a community to address climate change. With an unprecedented challenge comes extraordinary opportunity to leverage the creativity of Des Moines' residents and businesses, our history of cooperation, and our long-standing culture of collaboration. Together, we have changed the narrative and are shaping a future for Des Moines that is sustainable, resilient, and equitable. ADAPT DSM is a visionary, action-oriented, and community-driven plan to do just that. The plan is designed to guide decision making, policy, and programs that reduce harmful pollution that causes climate change, while increasing resilience and enhancing the adaptive capacity of our community.

ABOUT ADAPT DSM

Des Moines has been a sustainability and climate leader for decades. Previous and ongoing efforts include the resident-led Sustainability Task Force, STAR community designation (now LEED for Cities), the Building Energy and Water Benchmarking program, greenhouse gas (GHG) inventories and reporting, and more. Furthermore, the City and region have a long legacy of planning for the future and implementing those plans. While many of these efforts relate to climate change, none comprehensively address the climate action and adaptation vision, goals, and solutions for the Des Moines community directly.

ADAPT DSM is the first Climate Action and Adaptation Plan (CAAP) for the Des Moines community. With the development and adoption of this plan, we are launching a new multi-disciplinary, long-term effort to help our community navigate the transformative changes needed to address climate change and manage risk. This effort reinforces goals established in existing City of Des Moines planning documents, including Plan DSM, Guide DSM, Live DSM, and MOVE DSM; identifies ways for the city to act as an agent for, and catalyst of, change; and sets the stage for community-wide collaboration.

The ADAPT DSM process and plan document are comprehensively intended to help Des Moines:

- A**ssess our climate risks and vulnerabilities
- D**esign equity-centered solutions
- A**ct now and with urgency
- P**revent the worst effects of climate change
- T**ake action together to create a more resilient future



RELATED PLANS

- City Comprehensive Plan - [PlanDSM](#)
- City Strategic Plan - [GuideDSM](#)
- LiveDSM, Parks and Recreation - [LiveDSM Parks and Recreation Comprehensive Plan](#)
- MoveDSM - [Transportation Master Plan](#)
- Invest DSM [Neighborhood Revitalization Strategy](#)
- City Forest Master Plan - [Urban Forest Master Plan](#)
- Downtown Plan – [Downtown DSM: Future Forward](#)
- Polk County - [Polk County Hazard Mitigation Plan](#)
- MPO Sustainable Development Plan – [The Tomorrow Plan](#)
- MPO Bike & Pedestrian Plan – [CONNECT: Central Iowa Bicycle and Pedestrian Transportation Action Plan 2020](#)
- MPO Environmental Justice Report - [Des Moines Area MPO](#)
- Regional Vision and Action Plan Capital [Crossroads](#)

NAVIGATING THIS PLAN

Introduction (page 1)

About ADAPT DSM

Climate Change Overview

Our Climate Action Vision (page 15)

Vision

Des Moines will reduce our climate change risks and contributions through advancement of a more resilient, just, and equitable future.

Guiding Principles



Equity & Justice



Creative & Innovative



Economic Benefits



Health & Welfare

Goals

Emissions Reduction & Climate Adaptation & Resilience



2025



2030



2035



2045

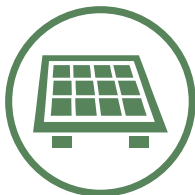


2050

Our Focus Areas & Solutions (page 27)



Buildings & Infrastructure



Energy Supply & Distribution



Transportation & Land Use



Natural Systems & Water Resources



Waste Management & Reduction



Food Systems & Security



Climate Preparedness & Resilience

OUR GAME PLAN FOR IMPLEMENTATION (page 67)

Climate Action Catalysts

- Provide Leadership & Coordination
- Expand Outreach, Engagement & Capacity
- Continuously Improve Municipal Government's Role
- Leverage & Maximize Resources & Capital

35x35 Priority Actions

- Near-Term Resource Needs
- Near-Term Resource Opportunities
- Priority Action Summary

PROCESS & ENGAGEMENT OVERVIEW

Development of ADAPT DSM included four phases. Each phase centered on exploring important questions to identify common themes and new opportunities.

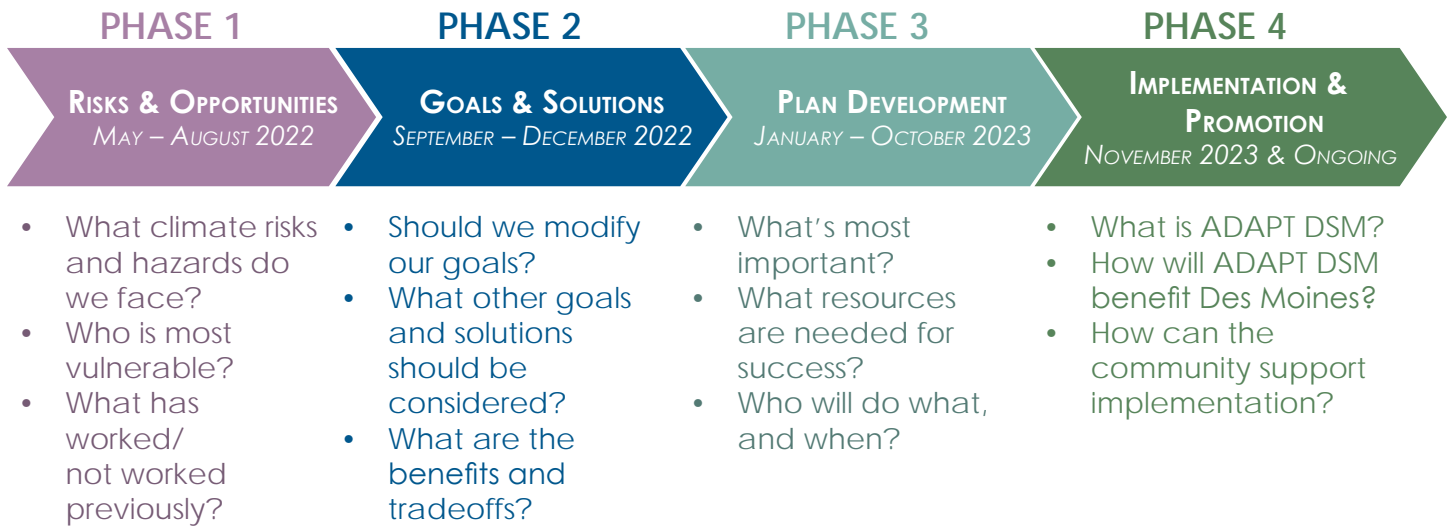


Figure 1. ADAPT DSM timeline and key questions

Three formal stakeholder groups helped inform the process and shape the direction and content of this plan. Details about each group’s role, composition, and frequency are provided in Table 1.

Table 1. ADAPT DSM stakeholder groups

	Core Project Team (CPT)	Technical Advisory Group (TAG)	Steering Committee (SC)
Role	Oversee process coordination and content development	Provide technical expertise to ensure the plan is feasible and impactful	Provide unique perspectives and ensures the plan reflects the concerns and priorities heard during engagement
Composition	City of Des Moines departmental leaders	Subject matter experts from City of Des Moines and local organizations and institutions	Stakeholders from key local and regional institutions and organizations
Number of Participants	12	37	16
Engagement	Monthly meetings (18 total)	<ul style="list-style-type: none"> 8 focus groups (Phase 1) 2 large group workshops (Phases 2 & 3) Follow-up topic group conversations (Phase 2) 	<ul style="list-style-type: none"> 4 in-person workshops (Phases 1, 2, 3) 3 online meetings (Phases 2, 3)

In addition to these formal stakeholder groups, Des Moines community members engaged in the process through surveys, in-person and virtual open houses, roadshow presentations, conversations at community events, focus groups, and the project website. See Appendix F. Engagement Summary for details about the community engagement process and outcomes.



Figure 2. ADAPT DSM engagement metrics

Recognizing that ADAPT DSM is a long-term community initiative, community engagement and involvement will need to not only continue following plan adoption, but it will need to expand to include even more people, ensuring that implementation is equitable, inclusive, and beneficial to the community. Appendix G: Climate Action Toolkit provides materials and recommendations for ongoing ADAPT DSM community engagement.



CLIMATE CHANGE OVERVIEW

The global climate is warming at historically unprecedented rates due to the emission of greenhouse gases (GHGs) into the atmosphere. Global warming since the mid-20th century has been attributed to an increase in atmospheric GHG emissions associated with the burning of fossil fuels and clearing of land for human activities. In fact, reports released in 2021 by the International Panel on Climate Change (IPCC) – an intergovernmental panel of scientists assembled by the United Nations in 1988 to monitor and assess all global climate change science – found that it is “unequivocal that human influence has warmed the atmosphere, ocean, and land” (IPCC, 2021).

WHAT IS CLIMATE POLLUTION?

Climate pollution refers to the emission of greenhouse gases (GHGs) into the atmosphere. GHGs include a wide range of compounds that trap heat from the sun and keep our planet warm through the “greenhouse effect”. The main gases responsible for the “greenhouse effect” include carbon dioxide, methane, nitrous oxide, water vapor and fluorinated gases. The presence of some naturally occurring GHGs in our atmosphere is beneficial, since without them the Earth would be a frozen uninhabitable place. However, in the past 150 years, the concentration of GHGs has increased rapidly as a result of human activities. Carbon dioxide (CO₂) is the most abundant GHG released by human activities and one of the longest lasting - 40% of carbon dioxide emitted into the atmosphere still remains after 100 years, 20% after 1,000 years and 10% as long as 10,000 years later (NRDC, 2019). Other GHGs such as methane (CH₄) and nitrous oxide (N₂O) are less long-lived but far more potent in terms of their greenhouse gas effect – these gases have a global warming potential (GWP) 25 and 300 times greater per molecule than that of carbon dioxide respectively (NRDC, 2019). GHGs are typically measured in metric tons of carbon dioxide equivalent (MTCO₂e) to represent the GWP of gases standardized to one unit of CO₂.

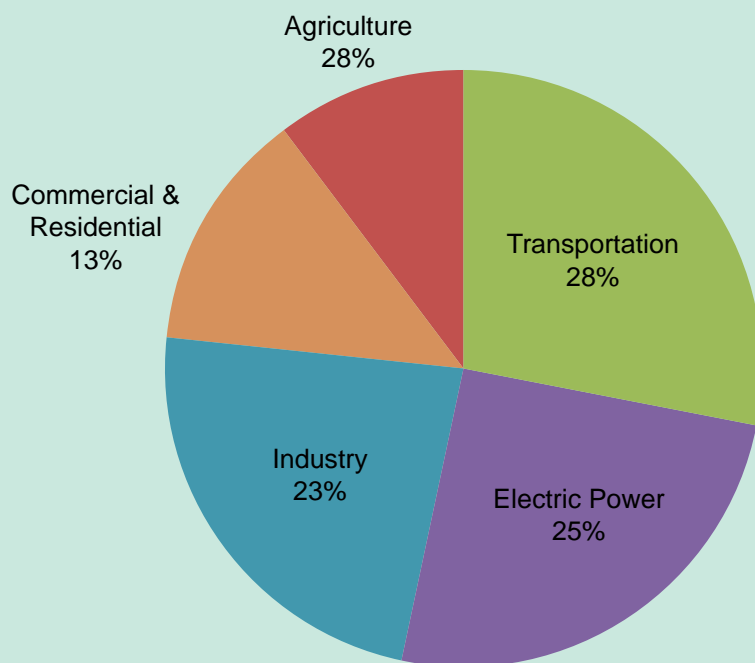


Figure 3. Sources of U.S. Greenhouse Gas Emissions in 2021 (Environmental Protection Agency, 2021)

The primary sources of GHG emissions in the United States in 2021 were transportation (28%), electricity production (25%), industry (23%), commercial and residential (13%), and agriculture (10%) (Environmental Protection Agency, 2022). Des Moines’ most recent GHG inventory, completed in 2020 shows community-wide emissions are lead by commercial buildings (34.5%), residential buildings (28.1%), then transportation (26.1%), followed the industrial sector (10%).

In this plan, the terms “climate pollution” and “greenhouse gas emissions” are used interchangeably.

As shown in Figure 4, the global climate has warmed by approximately 2°F (1.1°C) since 1850 and annual average temperatures have been over 1.4°F (0.8°C) higher than the 20th century average since the mid-2000s. This is “already affecting many weather and climate extremes in every region across the globe” (IPCC, 2021) and having a profound impact in the US and in our community. Globally, climate change is causing sea level rise, triggering the retreat of glaciers, warming ocean temperatures, and increasing the frequency and severity of many weather and climate extremes such as heatwaves, heavy precipitation events, drought, and tropical cyclones. Global warming is projected to continue until at least mid-century, regardless of efforts to reduce future climate pollution. Many of the changes due to past and future greenhouse gas emissions will be irreversible for centuries to millennia (IPCC, 2021). However, the impacts of climate change are generally expected to scale proportionally with future climate pollution and, while adaptation to inevitable change will be critical, we still have an opportunity to mitigate the most severe impacts of climate change by significantly limiting emissions by 2030.

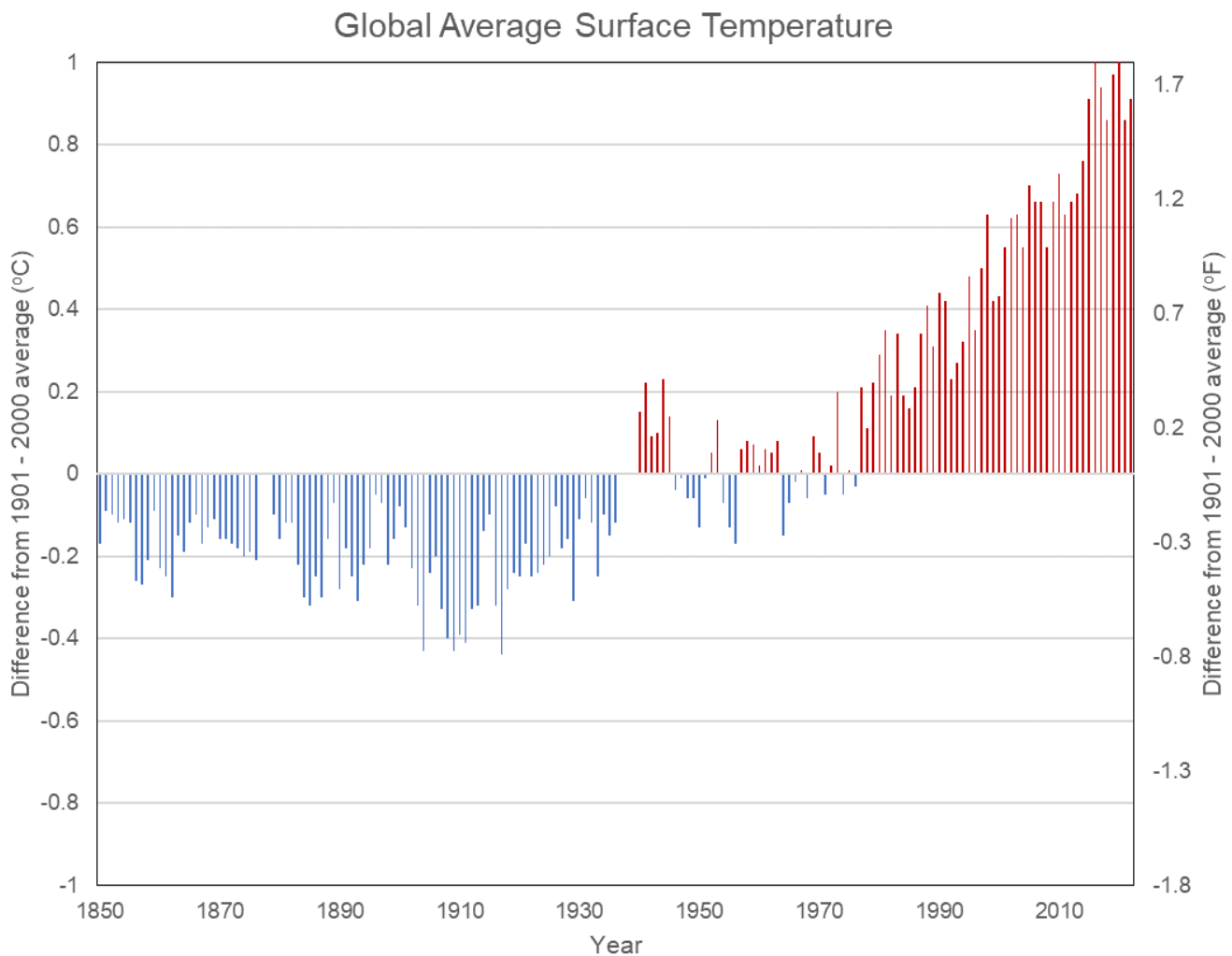


Figure 4. Annual average surface temperature anomalies from 1850 to 2021, compared to the 20th-century (1901-2000) average. Blue bars indicate cooler-than-average years; red bars show warmer-than-average years (adapted from NOAA, 2022).

In line with the global trend, annual average temperatures in the US have risen by 1.8°F (1°C) since the beginning of the last century. Additional increases of approximately 2.5°F (1.4°C) are expected over the next few decades, regardless of future climate pollution, and warming could reach 3°F to 12°F (1.7°C to 6.7°C) by the end of the century, depending on the global emissions pathway (USGCRP, 2018). Climate change is already impacting communities, economies, and ecosystems across the country, including in Iowa and Des Moines specifically.

WEATHER VS. CLIMATE: CLIMATE IS WHAT YOU EXPECT, WEATHER IS WHAT YOU GET

The weather can change every day, or even within a day, hours, or minutes while a region's climate is relatively constant over time. While weather describes short-term atmospheric changes, climate describes what the weather is like over a longer period. For instance, we know that a desert's climate is generally dry, or that Des Moines has a continental climate characterized by warm, humid summers and cold winters.

We understand climate by looking at averages of precipitation, temperature, humidity, sunshine, wind and other measures of weather over a long period such as 30-years. We can look at weather averages over time at different scales, from regions to nations or even the entire planet, to understand how the climate is changing. Today, our global climate is warming.

A changing climate results in altered weather patterns. Using future climate projections, scientists can evaluate the likelihood of certain weather events occurring under changing conditions. While there will still be plenty of days within normal historical ranges, we can expect to see more overall variability and extreme events going forward.



Figure 5. Weather versus climate
(from NOAA National Centers for Environmental Information
<https://www.ncei.noaa.gov/news/weather-vs-climate>)



"Climate change is very evident from when I was a child and in college, here in Iowa, to now in my forties. From the date of the first snow, how much snow fell, when winter ended, when Tulip Time tulips naturally bloomed (now always supplementing due to shifting climate), how many over 90-degree days there are per summer (used to be very rare!), to when the trees change color in the fall."

– SURVEY PARTICIPANT

CLIMATE POLLUTION IN DES MOINES

Evaluating past, and projected future, greenhouse gas (GHG) emissions in Des Moines helps develop an understanding of, and identify opportunities to reduce, our community's contribution to climate pollution. In Des Moines, most of our climate pollution stems from powering buildings with natural gas and electricity and from how we move around the region. From 2008-2019, community GHG emissions in Des Moines decreased by 18% (Figure 6). In that time, electricity emissions decreased due to a combination of reduced demand and a cleaner electric grid. Natural gas emissions increased due to growing natural gas use in the commercial and industrial sectors. Transportation, solid waste, and water and wastewater emissions all remained consistent. The emissions breakout by sector for both 2008 and 2019 is shown in Figure 7.

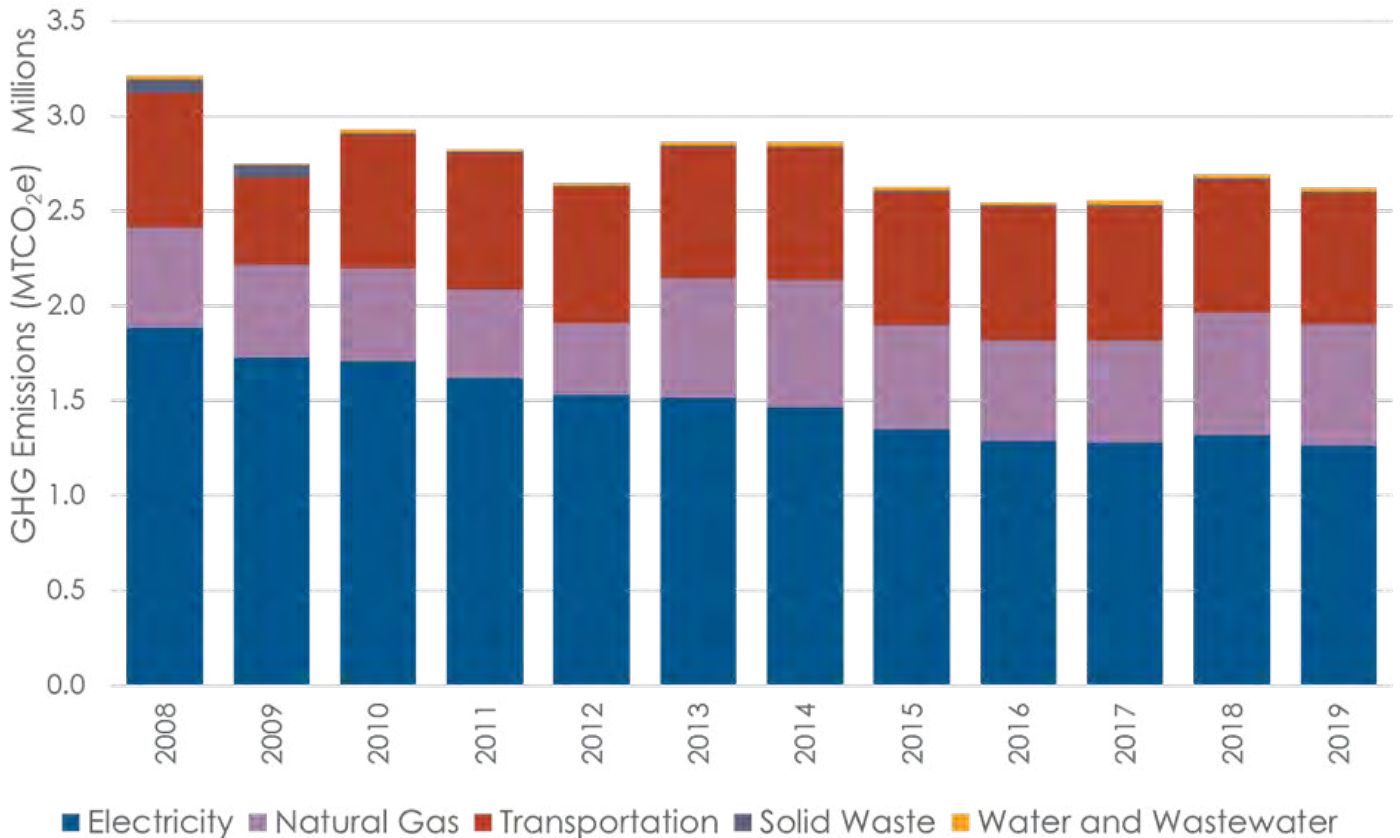


Figure 6. Community GHG emissions, 2008 to 2019 (note that in 2010, the GHG inventory methodology for the City of Des Moines was changed)

METRIC TONS OF CARBON DIOXIDE EQUIVALENT (MTCO₂E)

A unit of measure for greenhouse gas emissions. The unit "CO₂e" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO₂), based on the global warming potential (GWP) of the gas.

One MTCO₂e is equivalent to the greenhouse gas emissions from 2,564 miles driven by an average gasoline-powered vehicle (Environmental Protection Agency, 2023).

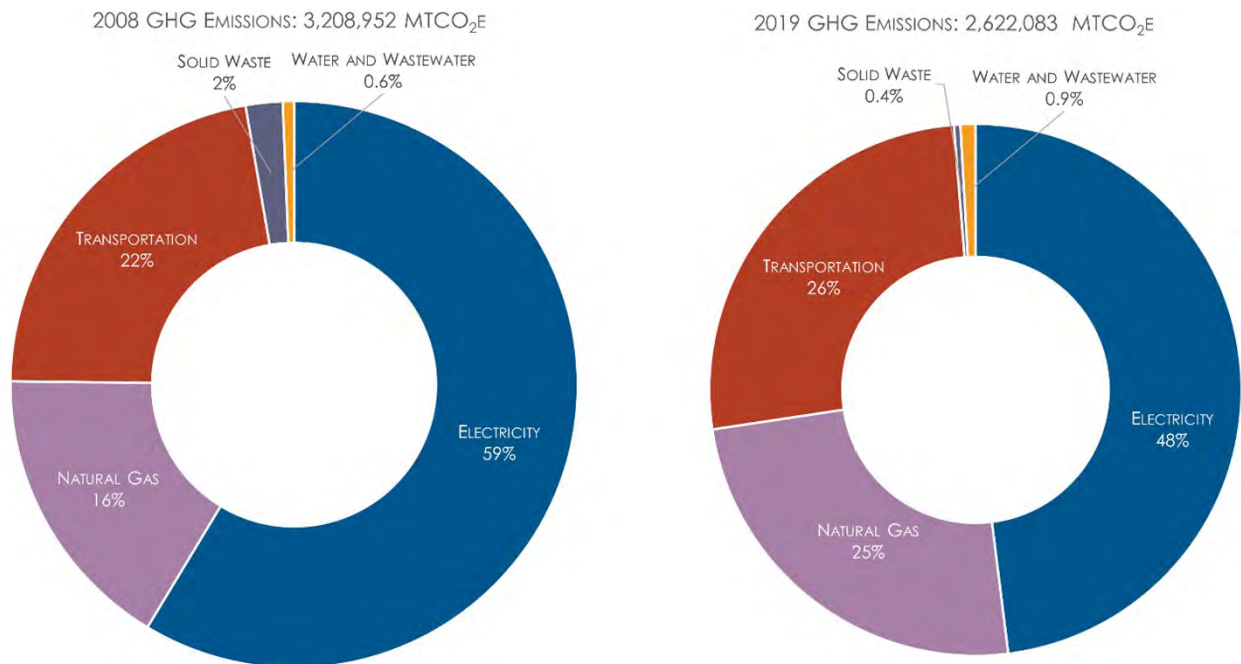


Figure 7: Community GHG emissions in 2008 and 2019. (Note that the last GHG inventory was completed in 2019; the City of Des Moines is working to produce an updated GHG inventory.)

MIDAMERICAN ENERGY'S DESTINATION NET ZERO COMMITMENT

MidAmerican Energy is on a mission to reach net-zero greenhouse gas emissions by 2050 and is a crucial partner in helping the City of Des Moines meet its clean electricity and emissions goals.

A major milestone on MidAmerican Energy's road to net zero is delivering 100% renewable energy through the [GreenAdvantage®](#) program. In 2021, 88.5% of the energy MidAmerican Energy's Iowa customers used over the course of the year came from renewable sources, with the largest share coming from wind energy.



To continue advancement to 100% renewable energy, MidAmerican Energy must continue to invest in [wind](#) and [solar](#). The recently proposed [Wind PRIME project](#), if approved by the Iowa Utilities Board, would add 2,000+ megawatts of wind and 50 megawatts of solar – enabling MidAmerican to meet its goal of delivering 100% renewable energy to its Iowa customers on an ongoing basis. To meet net zero, MidAmerican Energy also plans to:

- Investigate emerging clean technologies, like energy storage and advanced nuclear power, and stay in-tune to new innovations
- Build out transmission infrastructure
- Work with stakeholders to accelerate low-carbon transitions
- Partner with customers to be part of their decarbonization solutions

The City of Des Moines will continue to work with MidAmerican Energy to identify opportunities to collaborate and advance the solutions and actions of ADAPT DSM.

CLIMATE CHANGE IN DES MOINES

Central Iowa's climate is characterized by four distinct seasons, below freezing winter temperatures, hot and humid summers, and precipitation throughout the year (NOAA, 2022). The City of Des Moines also experiences an urban heat-island effect, with average temperatures 2.9°F (1.6°C) warmer than the surrounding area (Climate Central, 2022).

Des Moines is already seeing the effects of climate change, with observed shifts in temperature, humidity, precipitation, and extreme weather events. Temperatures across Iowa during the 2000s were higher than any historical period on record, except for the 1930s Dust Bowl Era, summers are getting muggier, and there has been an increase in the frequency of heavy rainfall events (NOAA, 2022). The impacts of climate change are projected to continue and worsen in the future and, in general, Des Moines can expect to see:

- Hotter and more humid summers
- Milder winters
- Increased annual average temperatures
- More frequent and intense heavy rain events

Ongoing climate change will exacerbate the impact of existing climate hazards in Des Moines. As a first step in developing Des Moines' Climate Action and Adaptation Plan, a Risk and Vulnerability Assessment (RVA) was conducted to evaluate current and future climate risks and vulnerabilities facing our community (see Appendix A. Community Risk and Vulnerability Assessment). This assessment – which drew on national, regional, and local climate change resources as well as stories and lessons learned from local experts, community leaders, and Des Moines residents – identifies the primary climate hazards facing Des Moines to be:



**Extreme Hot
Temperatures**



**Extreme Precipitation
and Flooding**



**Severe Storm
and Wind**



**Water Scarcity
and Wildfire**

Unfortunately, we are already seeing the public health and safety, economic, and ecological impacts of these hazards on our community. Events like the 2012 drought, 2018 and 2019 floods, and 2020 derecho are expected to become more frequent as the climate warms and will disproportionately impact certain groups within our community.

“The 100-degree + temperatures have become more common. Floods and droughts have affected Iowans.”
– SURVEY PARTICIPANT

What We Heard: Concerns



Which of the following climate change risks or impacts are you most concerned about when considering the next 10-20 years in Des Moines?

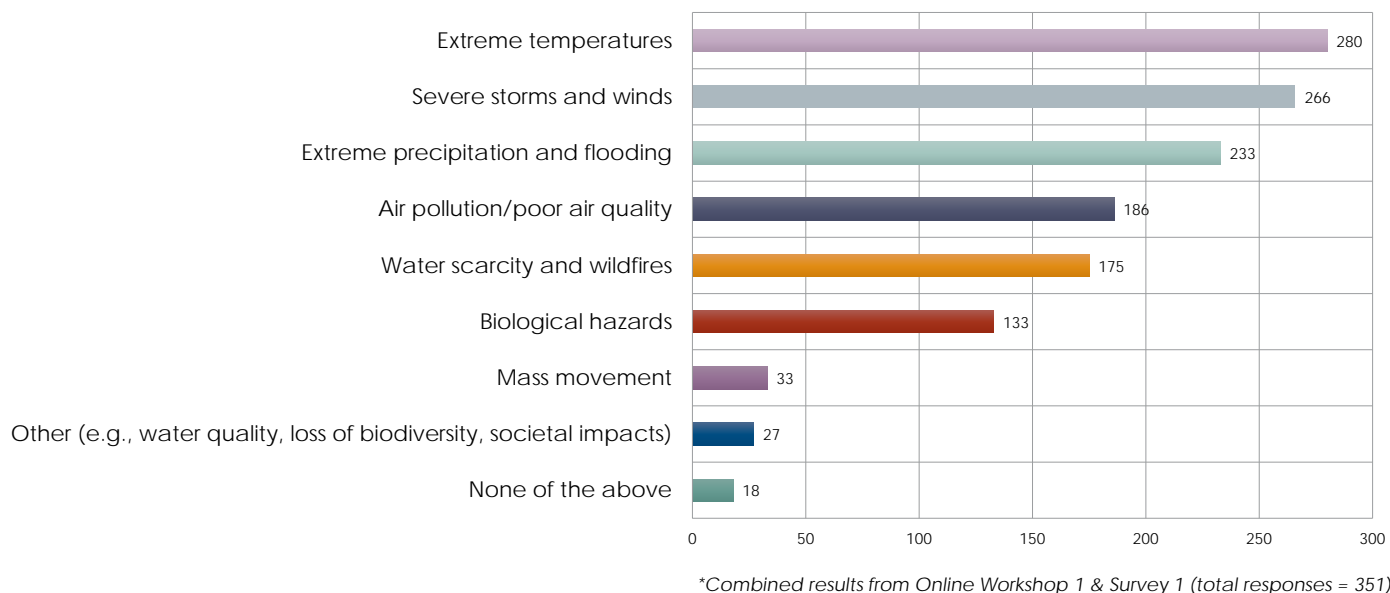


Figure 8. Community perspectives about future climate change risks and impacts

CLIMATE VULNERABILITY OF DES MOINES RESIDENTS AND BUSINESSES

While climate change will have profound impacts for all residents and businesses in Des Moines, the effects will be born disproportionately by certain groups. Those who contribute least to climate change often experience the worst impacts; vulnerability to climate hazards is impacted by geographical, socio-economic, and demographic characteristics. It is important to note that “vulnerability” is in the context of acknowledging system and resource deficiencies, rather than judgment of individuals or their neighborhoods. Appendix A provides an evaluation of community vulnerability and adaptive capacity to climate hazards.

The likelihood that individuals, businesses, or assets will experience a climate hazard is sometimes referred to as “climate exposure” and is closely tied to geographical location. For example, people, buildings, and infrastructure located in the floodplain are more exposed to the impacts of flooding than those that are situated on higher ground. However, where people live, and where certain businesses or community services are located, is not random or driven by personal choice alone. Housing affordability and a long history of inequitable policies, such as redlining, have dictated where people can and cannot live, and have impacted the distribution of people, the passing of generational wealth, and the targeting of investment throughout Des Moines.

Characteristics such as race, age, disability status, income, language, housing type, and access to transportation and critical services can also influence an individual's capacity to adjust to a hazard, take advantage of new opportunities or cope with change. Understanding the factors that determine vulnerability to climate hazards in Des Moines will help us maximize the impact of targeted, equitable, climate action and adaptation solutions.

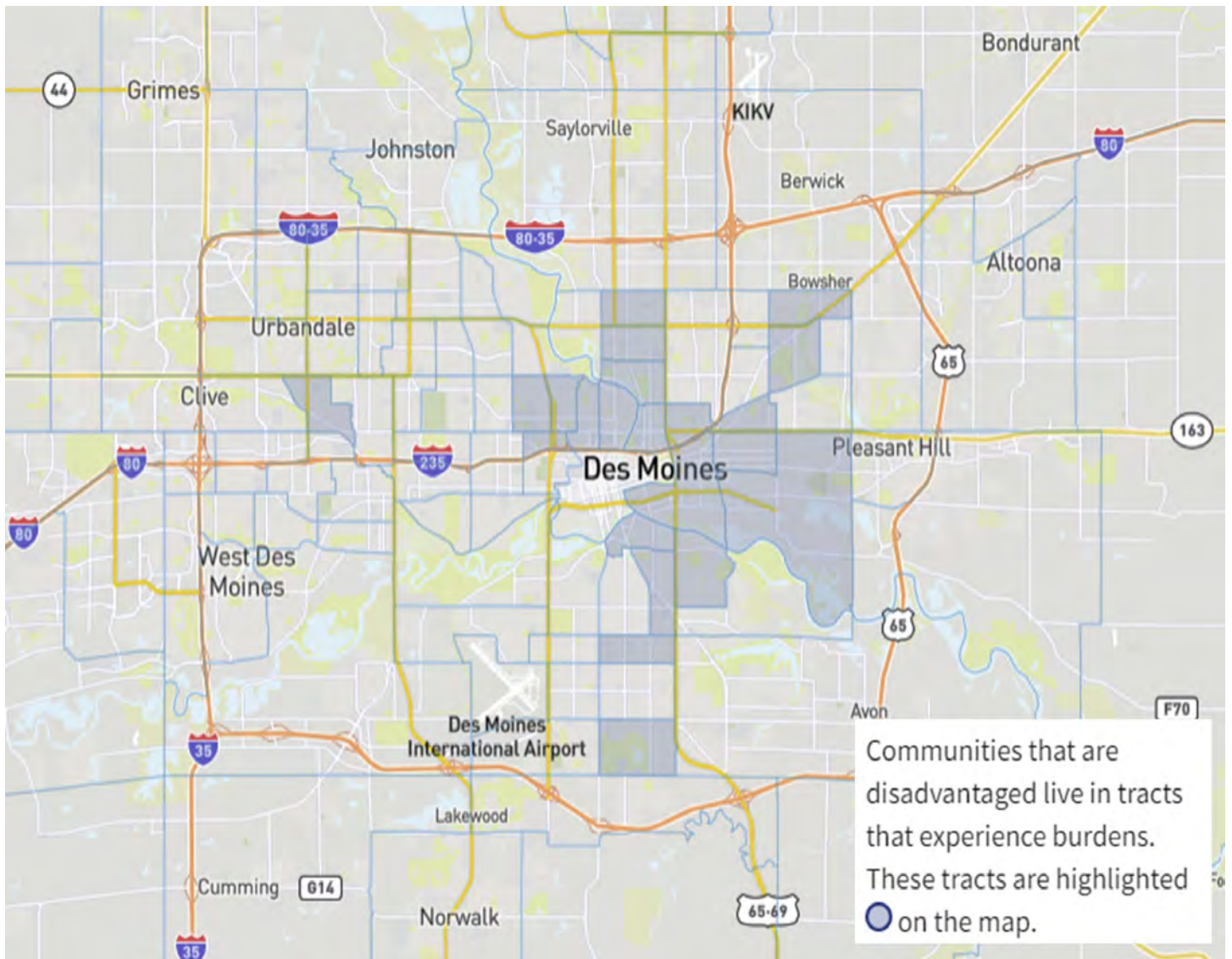
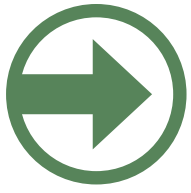


Figure 9. The *Climate and Economic Justice Screening Tool* identifies census tracts in light blue that meet the thresholds for at least one of the tool's categories of burden. The burden categories include climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development (Council on Environmental Quality, 2022).





OUR CLIMATE ACTION VISION & GOALS



"[We need to] reduce emissions at every level, increase infrastructure resiliency, and improve commercial and residential efficiencies."

– Survey Participant



Des Moines has the opportunity and potential to lead the region, state, nation, and world in its climate action and adaptation efforts. Through ADAPT DSM, we commit to the following vision and goals to guide our individual, governmental, and community efforts.

VISION

Des Moines will reduce climate change risks and contributions through the advancement of a more resilient, just, and equitable future.

Principles to guide our pursuit of this vision include:



Equity & Justice: We will center equity and justice in all climate action decision-making and investment.



Creativity & Innovation: We will catalyze unique solutions that create benefits for Des Moines, our region, and our world.



Economic Benefits: We will advance climate action solutions to benefit our local and regional economy.



Health & Welfare: We will improve the health and vitality of our community members through climate action.



Examples of how these principles will support our vision are provided throughout this plan.



GOALS

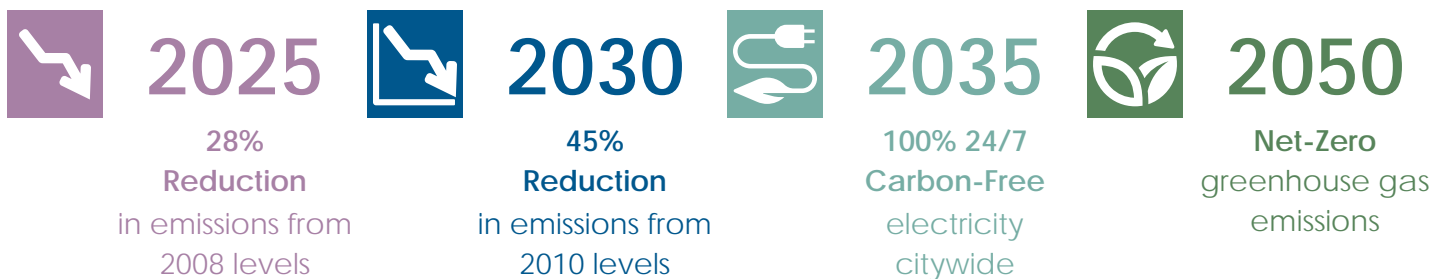
ADAPT DSM works to support a suite of climate action goals that define what Des Moines hopes to achieve through implementation of this plan. They include goals to cut climate pollution through reduced emissions of GHGs and building adaptive capacity and resilience to a changing climate.

REDUCING CLIMATE POLLUTION

Forecasted GHG emissions are expected to be over 2.2 million MTCO₂e in 2030 and nearly 1.5 million MTCO₂e in 2050. Significant emissions reductions have been made since 2008, largely coming from the addition of clean energy resources to the electric grid; MidAmerican Energy's commitment to net-zero GHG emissions will help continue this trend.

However, this trajectory alone does not inherently advance the vision of addressing our community's climate change contributions; more collaboration and work must be done to proactively reap the co-benefits of emissions reductions and position the community for a more resilient future.

Recognizing this need to catalyze local climate action, through the [2016 Strategic Plan](#) and [Roll Call Number 21-0040](#), City of Des Moines Council Members unanimously committed to a series of GHG emissions reduction goals for our community:



Des Moines recognizes that achieving these goals may not be enough to reduce our contributions to global climate change, nor do they reflect our historic contributions to the problem. As such, we aspire to reach reduction levels of greater than 58.2% (62.8% per capita) by 2030 and commit to monitoring our progress towards achieving these science-based targets.

See the Achieving Our Goals section for details about emissions reduction forecasting, scenarios, and targets. See Appendix B for additional details about the emissions-related technical analysis.





SCIENCE-BASED TARGETS

[Science-Based Targets \(SBTs\)](#) provide a methodology for setting GHG emission reduction targets in alignment with the United Nation's [Paris Agreement](#) goal of keeping global warming well below 1.5° Celsius, while also prioritizing global emissions equity. This means that countries and cities most responsible for current global emissions meet their fair share of emissions reductions at a faster rate than those national and sub-national governments that are still developing their economies.


CLIMATE ADAPTATION & RESILIENCE

As described in Appendix A. Community Risk and Vulnerability Assessment, the hazards and risks associated with climate change have potential to significantly impact the Des Moines community now and into the future. The following goals will help guide our efforts to adapt and increase resilience to these future climate impacts.

2030

-  **Reduce vulnerability and increase capacity of Des Moines** to be resilient to future climate risks including extreme hot temperatures, extreme precipitation and flooding, severe storm and wind, and water scarcity and wildfire.
-  Ensure every resident has **reasonable access to a Resilience Hub** (facility that supports community members during and after emergencies).
-  **Develop and maintain plans** that address climate risks and vulnerabilities for 100% of major municipal government facilities.
-  Become nationally and/or internationally recognized as a **safe and welcoming climate migration destination**.

2045

-  **Achieve 32% tree canopy cover** per the Urban Forest Master Plan.

See the following Achieving Our Goals section for details about how to measure progress towards achieving these goals.



ACHIEVING OUR GOALS

The following sections explain the ADAPT DSM goals and how to measure progress towards achieving them. More information about the technical analysis and assumptions is provided in Appendix B. Technical Analysis Summary.

Reducing Climate Pollution

A forecast serves as the starting point for the analysis in this plan, and helps to estimate the GHG emissions in Des Moines from 2020-2050 (Figure 10, gray bars). The forecast was informed by previous and current greenhouse gas inventories. It factors in expected future population and employment growth, and incorporates emissions reduction benefits from utility commitments and federal policy.

MidAmerican Energy's mission to reach net-zero GHG emissions by 2050 is a driving force in the forecast development and in reducing GHG emissions in Des Moines (Berkshire Hathaway Energy, 2022). MidAmerican Energy's current commitments will help reduce forecasted emissions 49% by 2050. Federal light-duty vehicle fuel standards are another factor that will help decrease forecasted emissions 5% by 2050 (Center for Climate and Energy Solutions, 2022).

Accounting for these forces, emissions are forecasted to be over 2.2 million MTCO₂e in 2030. Yet, maintaining the forecasted trajectory will be insufficient to reach our community-wide goals. We will need to significantly ramp up efforts to decrease emissions to achieve a 45% reduction in emissions by 2030 and to achieve net-zero emissions by 2050 (Figure 10).

Based on the emissions forecast, the gap in achieving the 2030 goal is due to the three largest sources of emissions: electricity, natural gas, and on-road transportation. Looking out several decades, as MidAmerican Energy makes further progress towards its net-zero commitment, the remaining sources of community GHG emissions (on-road transportation and solid waste) become increasingly important to address to achieve community-wide net-zero GHG emissions by 2050. See Appendix B for additional charts depicting the emissions reduction pathways to 2030 and 2050.

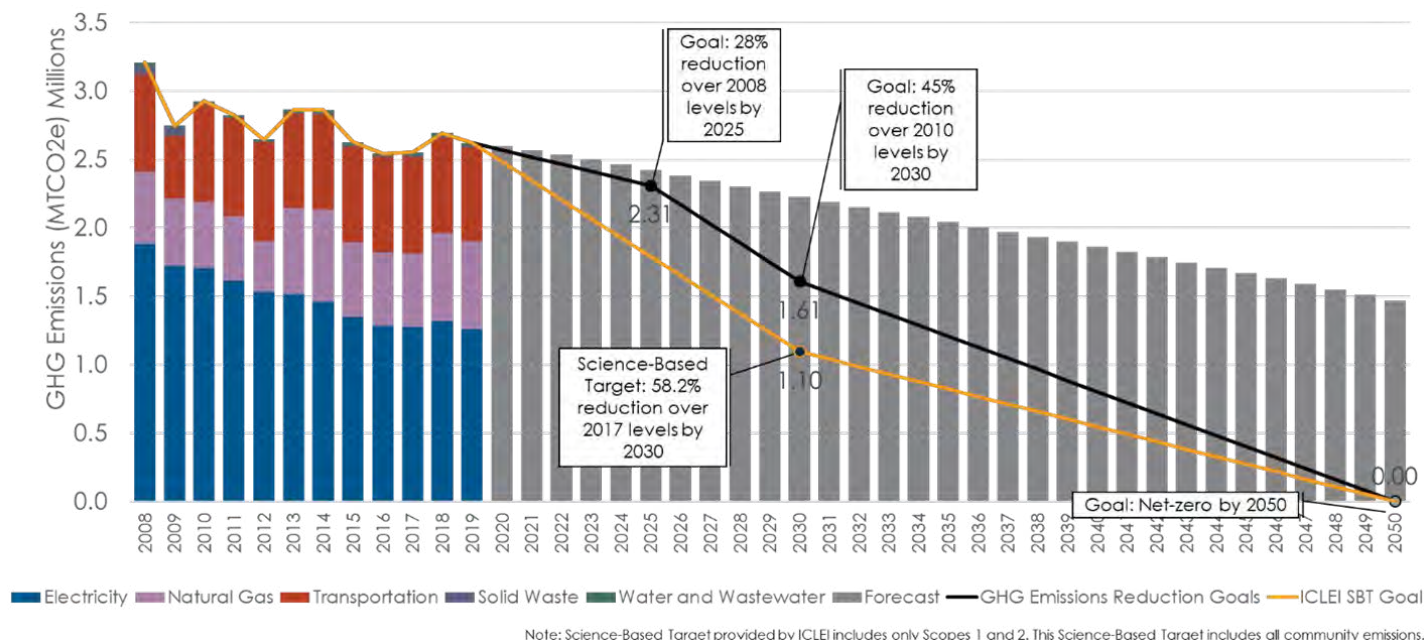


Figure 10. GHG emissions forecast with adopted City of Des Moines emissions reduction goals and Science-Based Target

To advance the City’s 2030 and 2050 climate pollution reduction goals, as well as Science-Based Targets (SBTs), ADAPT DSM explored three different pathways (i.e., “scenarios”)(Table 2). **All three scenarios emphasize energy efficiency and energy demand management as foundational solutions that have significant near-term opportunities for widespread community adoption.**

Table 2. Summary of GHG emissions reduction scenarios

	Scenario A: Community Reinvestment	Scenario B: High Impact	Scenario C: Peer Community
Scenario Overview	Prioritizes the near-term emissions reduction benefits from accelerating adoption of practices and technologies that are widely available today.	Prioritizes the emissions reductions needed to achieve 2050 goals; based on ICLEI High Impact Analysis.	Prioritizes the long-range emissions reduction benefits based on best-in-class peer community examples.
Emissions Reduction Solutions Emphasized	<ul style="list-style-type: none"> • Improve Building Efficiency, Performance and Comfort • Expand Utility-Scale Clean Energy Options • Shift Vehicle Trips to Walking and Bicycling • Increase Transit Access and Ridership 	<ul style="list-style-type: none"> • Advance Building Decarbonization • Improve Building Efficiency, Performance and Comfort • Expand Utility-Scale Clean Energy Options • Advance Transportation Electrification 	<ul style="list-style-type: none"> • Advance Building Decarbonization • Improve Building Efficiency, Performance and Comfort • Expand Utility-Scale Clean Energy Options • Advance Transportation Electrification
2030 Emissions Impact (from 2010 level)	56% reduction	66% reduction	53% reduction
2050 Emissions Impact (from 2010 level)	98% reduction	99% reduction	93% reduction
Technical Feasibility	Near Term: High Mid-Term: Moderate Long Term: High	Near Term: Low Mid-Term: Moderate Long Term: High	Near Term: Moderate Mid-Term: Moderate Long Term: High

Because 2030 is less than a decade away, Des Moines must carefully balance long-term emissions reduction aspirations with the near-term availability of technologies and available incentives to support emissions reductions. Furthermore, the guiding principles of equity and justice benefits, creativity and innovation, and economic benefits must be factored into the rate of adoption and the emissions reduction solutions emphasized.

ADAPT DSM recommends pursuing the targets in Scenario A as the emission reduction pathway to 2030. Figure 11 shows the emissions reduction potential associated with Scenario A. Accelerating adoption of building energy efficiency, investing in clean energy, walking and bicycling, and transit ridership will help community members save money, spur job growth, drive economic development, support innovation and continuous improvement while generating myriad health and well-being benefits. Capitalizing on the near-term availability of federal funding and technical support opportunities will help accelerate progress (see Appendix E. Resource Opportunities).

In addition to near-term emphasis on reinvesting in Des Moines through energy efficiency, clean energy, walking and bicycling, and transit ridership, the City of Des Moines should continue to pursue an all-of-the-above approach to identifying and implementing emerging solutions and technologies. Solutions to reduce climate pollution across all sectors are poised for continued innovation and progress.

Beyond 2030, the City of Des Moines will review its GHG inventory progress and ADAPT DSM accomplishments and re-evaluate available technologies, incentives, and community priorities. It is likely that building and transportation decarbonization technologies will be more widely available in the future, supporting widespread adoption and greater emission reduction benefits, along the lines of Scenario B and/or C.

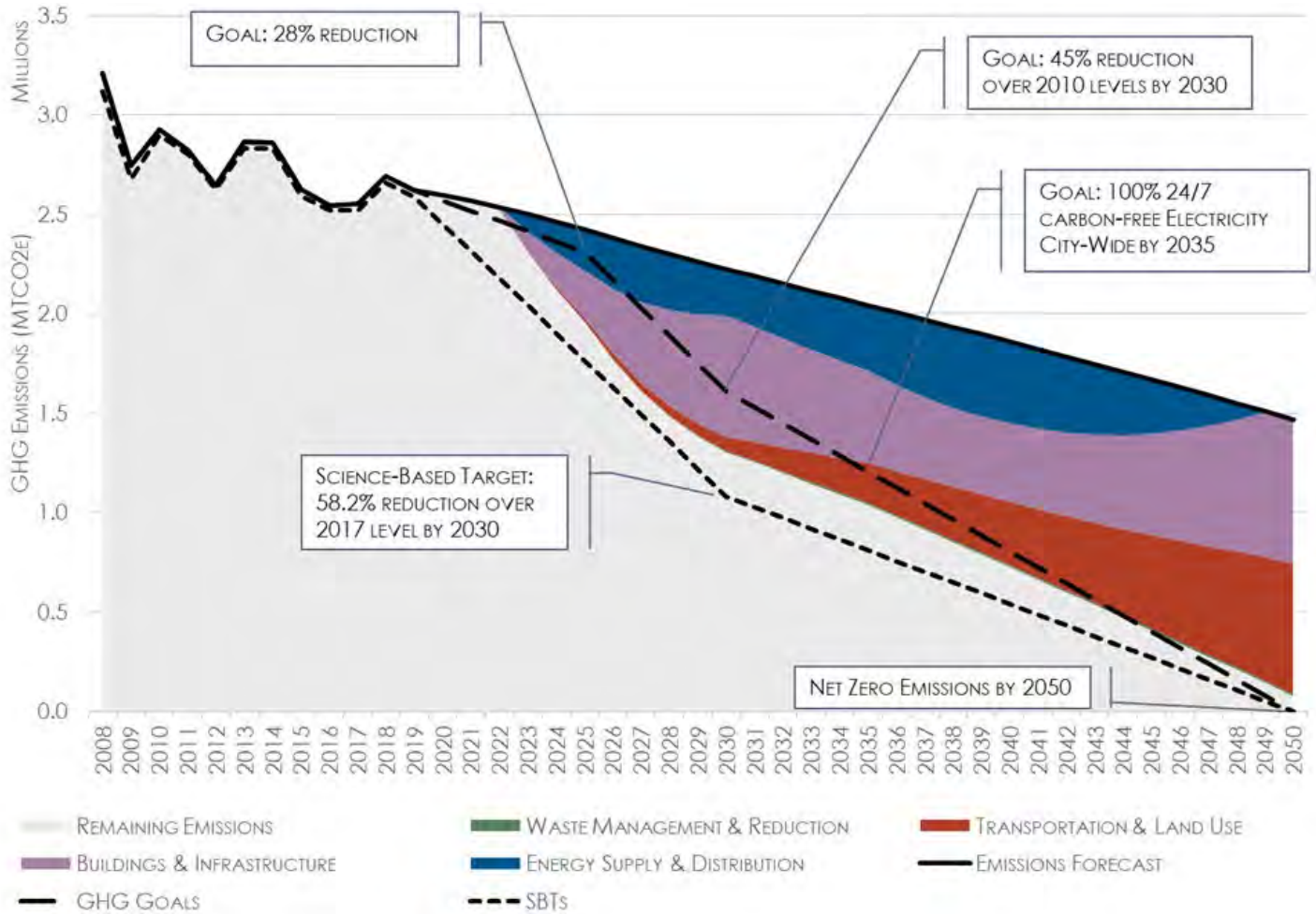


Figure 11. GHG emissions reduction potential from Scenario A

Using the Environmental Protection Agency estimate of the social cost of carbon (SC-CO₂) (\$55 per metric ton in 2035), the emissions reductions outlined in Scenario A would result in a community benefit of about \$55 million. These benefits are seen in avoided negative impacts on agriculture productivity, human health, and property damages from severe weather as well as the changes in energy system costs (US Environmental Protection Agency, 2023).¹

¹ In September 2022, the EPA filed a report recommending an increase in the social cost of carbon that would increase this estimate to \$155 million (US Environmental Protection Agency, 2022).

Climate Adaptation & Resilience

Similar to the pathway for achieving the climate pollution reduction goals, the pathway towards achieving our climate adaptation and resilience goals requires the ongoing implementation of various solutions and actions. The following section outlines the background conditions associated with these goals and outlines proposed pathways to achieving them.



Reduce vulnerability and increase capacity of Des Moines to be resilient to future climate risks including extreme hot temperatures, extreme precipitation and flooding, severe storm and wind, and water scarcity and wildfire

Part of the ADAPT DSM process included development of a community risk and vulnerability assessment (RVA)(Appendix A). The process involved identification of major climate hazards and categories, identification of vulnerable and impacted systems, and evaluation of adaptive capacity. The results of the process were used to identify community climate adaptation solutions and actions, which appear throughout ADAPT DSM.

While a complete RVA is not expected to be completed each year, there are still ways to measure progress towards reducing community vulnerabilities and increasing community adaptive capacity and resilience. For example, the [Polk County Hazard Mitigation Plan](#) includes a risk assessment by hazard, as well as a hazard ranking summary by jurisdiction (see Figure 12). An update to the Polk County Hazard Mitigation Plan is required every five years, and so the next update (likely in 2024) will consider changes in vulnerability due to action implementation, document any new hazards that may arise or were previously overlooked, and incorporate any new data or studies on hazards and risk (Polk County Emergency Management, 2019). The City of Des Moines' participation in this update process will be important to inform ADAPT DSM goal progress.

Jurisdiction	Animal/Plant / Crop Disease	Dam Failure	Drought	Earthquake	Expansive Soils	Extreme Heat	Flash Flooding	Grass / Wildland Fire	HAZMAT Incident	Human Disease	Infrastructure Failure	Levee Failure	River Flooding	Sinkholes/ Landslide	Structural Fire	Thunderstorm/ Lightning/Hail	Tornado	Transportation Incident	Windstorm	Winter Storm
Polk County	1.9	2.2	2.4	2.7	1.8	2.6	2.9	1.5	1.9	1.6	2.1	2.4	2.7	2.2	1.6	3.1	2.0	2.8	2.9	2.7
City of Alleman	3.0	-	2.5	2.7	1.8	2.4	1.8	2.3	3.3	1.3	1.8	-	-	1.4	2.1	3.0	3.7	3.0	3.3	3.3
City of Altoona	-	-	2.1	-	1.7	2.4	2.0	1.9	2.5	2.1	2.5	-	-	1.6	2.5	3.3	3.3	3.0	3.1	3.2
City of Ankeny	1.6	1.8	2.1	2.4	2.0	2.6	2.5	1.7	2.6	1.6	2.2	-	-	2.2	1.8	2.9	2.5	2.0	2.1	2.7
City of Bondurant	2.0	-	2.3	1.0	1.3	2.0	3.6	2.3	2.0	1.0	3.1	-	1.5	1.5	2.9	2.8	1.6	2.8	1.5	1.5
City of Clive	-	1.3	1.3	1.8	1.7	1.7	3.3	1.5	2.0	1.3	1.7	-	-	1.7	2.9	2.6	2.0	1.6	1.9	1.1
City of Des Moines	-	2.2	2.1	-	-	2.6	2.8	1.5	1.6	1.3	2.7	2.7	3.6	3.0	2.0	1.6	2.7	1.5	2.4	2.4
City of Elkhart	2.9	-	2.9	-	1.4	2.8	2.3	1.5	2.0	2.0	2.0	-	-	1.0	2.3	3.0	-	-	3.0	2.6
City of Grimes	1.6	2.4	2.5	1.5	1.5	2.0	2.8	2.4	3.1	2.5	2.5	-	2.1	1.5	3.1	2.7	3.0	3.1	2.8	3.2
City of Johnston	1.8	2.1	-	1.8	2.1	2.6	2.4	1.6	2.1	1.8	2.9	1.9	3.1	1.7	2.8	2.8	2.4	2.0	2.6	2.7
City of Mitchellville	1.3	-	1.3	-	-	2.2	-	1.0	1.0	1.0	1.7	-	-	-	1.7	1.3	1.9	1.8	1.5	1.2
City of Pleasant Hill	2.9	-	1.4	2.7	1.5	2.1	2.5	1.8	2.1	1.7	1.6	-	-	2.4	2.1	1.5	1.9	1.5	1.2	1.5
City of Polk City	-	3.2	1.0	3.0	1.0	2.5	3.0	2.6	3.0	2.0	2.7	1.0	2.0	1.5	2.9	3.5	4.0	2.9	3.5	3.5
City of Runnels	1.3	-	1.1	-	-	1.1	1.5	1.5	3.0	-	2.4	-	-	2.5	1.6	2.0	-	-	1.9	1.9
City of Urbandale	-	1.8	1.8	1.6	-	3.3	3.1	-	3.5	1.5	2.2	-	1.5	1.8	2.8	3.1	2.4	2.1	3.1	3.0
City of West Des Moines	1.6	2.2	2.1	2.7	2.5	2.0	3.0	2.3	3.2	2.1	2.4	2.5	2.4	2.5	3.0	3.0	3.0	3.8	3.0	3.3
City of Windsor Heights	-	1.5	2.8	1.7	2.4	3.0	3.3	2.6	2.6	2.6	2.6	2.6	3.7	2.9	3.5	3.5	3.7	4.0	2.3	2.3
Des Moines Water Works	1.3	2.7	1.8	2.7	1.8	2.7	3.3	2.1	2.9	1.6	2.5	3.1	2.2	1.7	2.4	2.7	2.8	2.6	3.2	3.2
Ankeny, 261	1.6	2.1	2.2	1.5	1.5	2.0	3.1	2.0	3.1	2.5	2.5	-	3.0	1.5	3.1	3.0	3.0	3.1	2.8	3.2
Bondurant-Farrar, 720	1.3	1.3	-	1.9	1.4	2.2	2.4	1.6	2.0	1.8	1.8	1.5	1.8	1.7	2.1	2.5	3.2	2.3	2.9	3.6
Dallas Center-Grimes, 1576	-	-	-	-	2.4	2.0	-	-	1.5	2.5	2.7	-	-	-	2.7	2.0	2.7	1.5	2.0	1.9
Des Moines Independent, 1737	1.3	2.2	2.5	1.5	-	3.0	3.4	1.4	1.8	2.4	2.5	1.5	2.2	1.0	2.8	2.5	1.8	2.5	2.5	2.5

Figure 12. Hazard Raking Summary by Jurisdiction (Polk County Emergency Management, 2019)



In recent years, the City of Des Moines and Polk County have made concerted efforts to establish and publicize warming and cooling shelters for periods of extreme temperatures and weather. Resilience hubs take this concept to the next level. Resilience hubs are “community-serving facilities augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event” (Urban Sustainability Directors Network, n.d.).



Figure 13. Resilience Hubs are community-serving facilities augmented to support residents, coordinate communication, distribute resources, and reduce climate pollution while enhancing quality of life (Urban Sustainability Directors Network, n.d.)

The Urban Sustainability Directors Network (USDN) Resilience Hubs website offers details about what hubs are, core components, and supporting resources. Advancing the Resilience Hub concept community-wide will help improve the ability of all Des Moines residents to anticipate, accommodate, and positively adapt or thrive amidst changing climate conditions and hazard events.

Defining “reasonable access” is somewhat subjective, but for initial planning purposes reasonable access could be aligned with a Park Score 10-minute walk with connected sidewalks, a 10-15 minute bus ride, or a 5-10-minute drive. As the City works to build out the Resilience Hubs, community involvement will be essential in determining what reasonable access means.

Ensuring that every resident has reasonable access to a Resilience Hub will require regular coordination between the City of Des Moines and other community organizations and partners (e.g., places of worship, schools, etc.) to create and align on design guidelines and standard operating procedures. It will also require ongoing transportation investments to ensure hubs can be accessed from multiple modes such as walking, bicycling, and transit. Furthermore, ensuring reliable and climate-resilient infrastructure at hubs will help reinforce their purpose as essential facilities during times of community disruption and recovery.



Develop and maintain emergency plans that address climate risks and vulnerabilities for 100% of major municipal government facilities

Through the ADAPT DSM process, the City of Des Moines government conducted a preliminary risk and vulnerability assessment (RVA) for municipal facilities. The approach explored the potential exposure of facilities and their occupants, the risk of climate-related hazards that could impact the facility or asset, and the capacity of the facility/building to adapt and build resilience to climate risks.

The adaptive capacity analysis explored whether the facility has an emergency plan, whether building staff have been informed and/or trained about emergency procedures for the facility, if the facility has emergency shelters or evacuation space for occupants, and whether the facility has standby or emergency backup power.

To achieve this goal, the City of Des Moines can build on the results of the analysis and ensure that climate risk plans and strategies are developed for major facilities that do not currently have a plan in place. Plans/strategies might include physical improvements to reduce vulnerabilities and potential impacts. Furthermore, ongoing training and communication to City staff will help ensure that all City of Des Moines employees are aware of emergency procedures and evacuation and sheltering protocols.

Installing distributed renewable energy, including solar plus storage at such facilities and ensuring reliable and climate-resilient infrastructure will further help reinforce the functionality and role of City facilities during emergencies, many of which could eventually serve as climate Resilience Hubs.





Become nationally or internationally recognized as safe and welcoming climate migration destination

Climate change is forcing people to leave their homes at record levels worldwide, making climate migration a growing international and domestic priority. In Brendle Group's white paper [International Climate Migration: What Can U.S. Communities Do?](#), the authors said "At its core, voluntary climate migration is a form of climate resilience. Climate stressors such as droughts, floods, rising sea levels and wildfires are already forcing people in some parts of the world to relocate."

The term "climate migrants" refers to all people who are forced to leave their home or living environments temporarily or permanently because of the negative effects of climate change that have threatened their existence or seriously affected their living condition. Climate migration may be temporary or permanent, and migration may happen domestically (e.g., from another city or nearby state) or internationally.

People who migrate due to climate change bear a burden of vulnerability as they relocate. In their new communities, climate migrants need access to employment, housing, health services, education, and more. Yet climate migrants can also present new opportunities and wealth to their new communities, as they bring skills, knowledge, and diversity.

According to a study conducted by Heartland Forward, Des Moines' immigrant population was among the fastest growing in the United States from 2010 to 2019 (Heartland Forward, 2021). With climate change as a potential force multiplier, Des Moines can proactively plan and prepare for climate migration to reduce potential negative impacts and maximize the beneficial effects and opportunities. Some communities are beginning to brand and position themselves as climate migration destinations or "receiving communities," recognizing the moral imperative and economic development potential of supporting and welcoming climate migrants.

To become a nationally or internationally recognized climate migration destination, it will be important to formally assess the City's efforts to include and welcome immigrants in all areas of civic, social, and economic life in their communities. Welcoming America supports local governments and nonprofits in assessing and creating inclusive communities. Their Certified Welcoming designation provides a set of standards to distinguish welcoming communities and build a competitive advantage.

Amplifying climate-related education and individual and community preparedness, improving food security and nutrition, and creating Resilience Hubs are other ways to further prepare for and support future climate migration and displacement.



Achieve 32% tree canopy cover by 2045

The City of Des Moines Urban Forest Master Plan (2020) establishes the ambitious goals of increasing the urban tree canopy cover from 29% in 2014 to 32% by 2045. The City recognizes the value of having a strong tree cover in lowering the urban heat island effect, sequestering carbon out of the atmosphere, releasing oxygen into the atmosphere, supporting property values, and helping to manage stormwater. As shown in Figure 14, the estimated annual economic benefits of the Des Moines tree canopy is more than \$4.7 million.

Implementation of the Urban Forest Master Plan is already underway and meeting the 2045 goal will require an average of 3,800 new trees planted per year. Yet, planting alone will not support a healthy and resilient tree canopy. A cyclical pruning program will help guarantee health and longevity of existing trees. Refinements to tree planting and mitigation standards, enhanced public education and awareness, and management of public properties will also support achievement of the tree canopy goal.

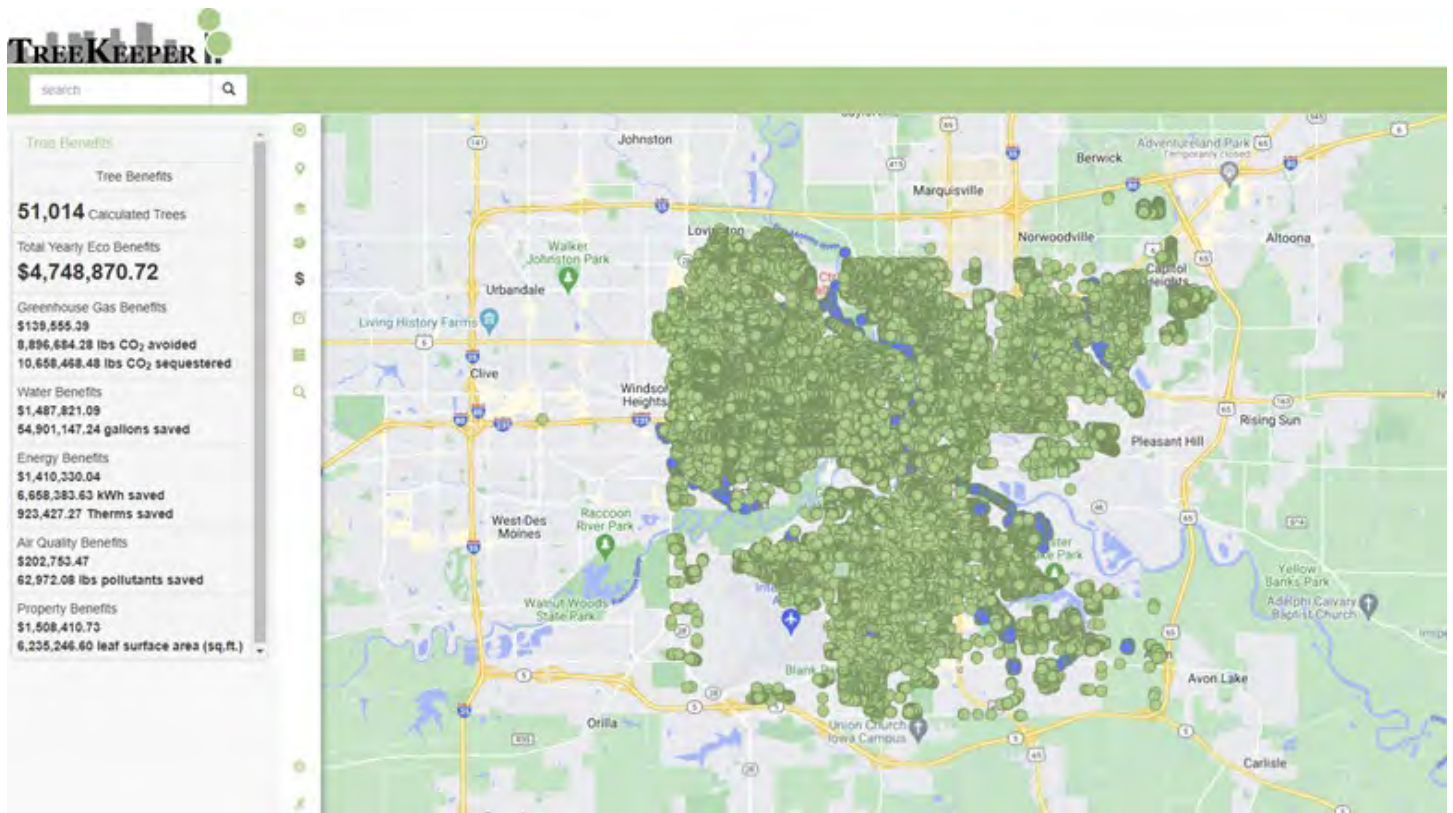


Figure 14. The City's tree canopy is monitored with TreeKeeper software



OUR FOCUS AREAS & SOLUTIONS



“Disabled and many marginalized populations are forced to live in poorly maintained buildings with terrible air ventilation/filtration and climate resiliency. Their concerns are often dismissed. We need to be at the design and decisions table.”

– Survey Participant



ADAPT DSM features seven focus areas that introduce and organize our climate action and adaptation solutions, highlighting the co-benefits inherent in each. Throughout each focus area, we've applied our four guiding principles to ensure we achieve our vision of a more resilient and equitable future by working together to address our climate change risks and contributions (Figure 15). All the ADAPT DSM solutions are important and critical to achieving Des Moines' Climate Action vision and goals.

		Focus Areas	Solutions
Guiding Principles	Health & Welfare	 <p><i>Buildings & Infrastructure</i></p>	B-1. Improve building efficiency, performance and comfort B-2. Advance building decarbonization B-3. Ensure reliable and climate-resilient infrastructure
		 <p><i>Energy Supply & Distribution</i></p>	E-1. Increase distributed renewable energy E-2. Expand utility-scale clean energy options
	Economic Benefits	 <p><i>Transportation & Land Use</i></p>	T-1. Plan for efficient land use and development T-2. Shift vehicle trips to walking and bicycling T-3. Increase transit access and ridership T-4. Advance transportation electrification, decarbonization, and alternative fuels
		 <p><i>Natural Systems & Water Resources</i></p>	N-1. Expand native ecosystems and a sustainable tree canopy N-2. Enhance watershed management and source water protection N-3. Reduce flood risk N-4. Increase water conservation and drought management
	Creative & Innovative	 <p><i>Waste Management & Reduction</i></p>	W-1. Reduce waste generation W-2. Increase waste diversion and recovery
		 <p><i>Food Systems & Security</i></p>	F-1. Expand local food production F-2. Improve food security and nutrition
	Equity & Justice	 <p><i>Climate Preparedness & Resilience</i></p>	C-1. Amplify climate-related education and individual and community preparedness C-2. Create climate resilience hubs/shelters C-3. Prepare for climate migration and displaced people

Figure 15. ADAPT DSM guiding principles, focus areas, and solutions

See Figure 16 for guidance on how to read each solution. Implementation of the solutions happens through more detailed climate actions that are listed with each solution and described in more detail in Appendix D. Action Details. It is important to consider the synergies and sequencing of actions as a system, rather than lists of independent activities. For example, some actions may serve as “critical path” items that must be accomplished first, before others will be successful. Similarly, prioritization of one action may create synergies to advance implementation of another. Note that the plan metrics will be refined as implementation occurs, including establishing baseline values and calculation and tracking methodologies as necessary.

Metrics: What we will be tracking as indicators of progress

Targets: What we hope to achieve (and by when)

B-1: Improve Building Efficiency, Performance, and Comfort

Retrofit existing buildings to be resource efficient and support occupant health and encourage new buildings to be built to enhanced standards using voluntary incentives and support.

METRICS & TARGETS

<p>Residential energy use (BTU)</p> <ul style="list-style-type: none"> » Decrease residential energy use by 26% by 2030 <p>Commercial and industrial energy use (BTU)</p> <ul style="list-style-type: none"> » Decrease energy use in existing commercial buildings by 32% by 2030 » Decrease energy use in existing industrial buildings by 34% by 2030 <p>Compliance with the Energy and Water Benchmarking Program (% of properties)</p> <ul style="list-style-type: none"> » 100% participation in 2025 	<p>Low-income energy efficiency program participation (# of participants)</p> <ul style="list-style-type: none"> » Increase annually <p>Municipal facility energy use intensity (EUI)</p> <ul style="list-style-type: none"> » Reduce average EUI of all buildings/facilities <p>Municipal LEED new construction (% of new buildings certified)</p> <ul style="list-style-type: none"> » All new buildings are certified LEED silver or better
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Co-benefits: N/A: ○○○
Low: ●○○
Medium: ●●○
High: ●●●

See Appendix C for details

CO-BENEFITS

EMISSIONS REDUCTION	CLIMATE ADAPTATION & RESILIENCE
<ul style="list-style-type: none"> ✓ Addresses emissions from electricity and natural gas ✓ Supports 24/7 carbon-free electricity 	<ul style="list-style-type: none"> Climate Risk Addressed Goals Supported

Emissions Reduction: Narrative text describes emission source addressed and/or if the solution supports the 24/7 carbon-free electricity goal.

Climate Risk Addressed: Describes the climate risks addressed

Goals Supported: Describes the climate adaptation and resilience goals supported

Extreme Temperatures	Extreme Precipitation & Flooding	Reduce Vulnerability	Resilience Hub Access	Emergency Plans
Severe Storm & Wind	Water Scarcity & Wildfire	Climate Migration Destination	Tree Canopy	



Key Principles:

Equity & Justice: We will center equity and justice in all climate action decision-making and investment.

Creativity & Innovation: We will catalyze unique solutions that create benefits for Des Moines, our region, and our world.

Economic Benefits: We will advance climate action solutions to benefit our local and regional economy.

Health & Welfare: We will improve the health and vitality of our community members through climate action.

SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ B-1A. Promote Commercial Energy Efficiency through the Benchmarking Program

NEAR TERM ACTIONS

- ★ B-1B. Upgrade Efficiency at City Facilities
- ★ B-1C. Expand Energy Efficiency Education and Training
- ★ B-1D. Improve Home Efficiency
- ★ B-1E. Leverage Federal Funding to Fill Gaps in Energy Efficiency Incentives

MID-TERM ACTIONS

- B-1F. Encourage Beyond-Code Construction and/or Voluntary Energy Modeling

Supporting Actions:

Ongoing: already underway and continuing

Near-Term: initiate before the end of 2029

Mid-Term: initiate at the beginning of 2030 to end of 2036

Long-Term: initiate beyond 2036

★ Indicates Priority Action

See Appendix D. Action Details for implementation details, including roles and resource needs.

Figure 16: Solution Guide



BUILDINGS & INFRASTRUCTURE

The Buildings & Infrastructure focus area includes the existing and future residential, commercial, and industrial buildings in our community, as well as the roads, bridges, and other infrastructure to support them. Without improving the aging buildings and infrastructure in our community, we will not be able to meet our emission reductions or climate adaptation and resilience goals. More than half of the 95,000+ homes in Des Moines were built before 1960 (U.S. Census Bureau, 2021) and older homes are often poorly insulated, resulting in additional energy use and costs from heating and cooling that can burden household finances. Additionally, existing natural gas systems, like gas stovetops and furnaces, contribute to climate pollution and release air pollutants that threaten human health (Harvard Chan, 2022).

Our infrastructure also faces threats from extreme precipitation, especially for the more than 3,000 people that live in areas susceptible to flooding (see Appendix A. Community Risk and Vulnerability Assessment). Flooding also can damage roads, bridges, and other community assets, blocking access and services. Creating climate resilient infrastructure includes building sustainable new development, as well as retrofitting our existing buildings so that our community can stay and thrive in their homes and businesses, and so that we can preserve our historical assets.

SOLUTIONS

B-1: Improve Building Efficiency, Performance, and Comfort

B-2: Advance Building Decarbonization

B-3: Ensure Reliable and Climate-Resilient Infrastructure



RECENT & RELATED EFFORTS

CITY EFFORTS

- [LEED Municipal Facilities](#): A commitment to ensure all new City facilities are constructed to standard of LEED Silver or higher. Eleven facilities are currently LEED certified or pursuing certification.
- [Historic Preservation Plan Update](#): The original plan recognized the importance of historic resources and protected historic areas. The 2023 plan update will add a focus on intangible historic resources and mid-century modern buildings, with an intentional promotion of social equity.
- [Invest DSM](#): This collaboration with Polk County provides financial support for neighborhood revitalization, including home renovations.
- [LEED for Cities](#): Des Moines is certified under the LEED for Cities program (previously called STAR certification, under which Des Moines received a 4-star (out of 5) certification in 2019).
- [Benchmarking DSM](#): A requirement for owners of commercial and multi-family residential buildings 25,000 sq. ft or larger to report their energy and water usage (74% were in compliance in 2021).

COMMUNITY EFFORTS

- Des Moines was recently recognized as the 2nd place mid-sized city for number of ENERGY STAR certified buildings in 2023, up from 9th place in 2022.
- [Energy Efficiency in Schools](#): Des Moines Public Schools is an ENERGY STAR® partner and provides regular Energy Report Cards to report on the district's work and progress on energy efficiency. Since 2008, energy efficiency efforts at DMPS have saved more than \$20 million and 6 facilities were ENERGY STAR certified (Des Moines Public Schools, 2021).
- [Green Iowa Energy Audits and Energy Saver Kits](#): Green Iowa is run by AmeriCorps and provides free energy audits and free energy saver kits for those who prefer a contact-free option.
- [Neighborhood Finance Corporation Energy Advantage](#): This program provides deferred loans for home energy improvements.

EQUITY & JUSTICE CONSIDERATIONS

Improving the efficiency, performance, and resilience of buildings and infrastructure has the potential to create benefits for all Des Moines residents and businesses. Disproportionately impacted communities, such as low-income households and individuals of color, are more likely to occupy aging, inefficient buildings that lack reliable infrastructure. These residents stand to benefit from utility cost savings, increased comfort, and health and safety improvements associated with this solution. However, to ensure that the costs and benefits are fairly distributed we will need to develop intentional strategies that overcome potential barriers to participation, for example:

- Reducing the up-front cost of energy efficiency improvements for low-to-moderate income households through targeted programs, incentives, and outreach.
- Mitigating for potential short-term utility bill increases associated with decarbonization for low-to-moderate income households and small businesses while reinforcing the overall cost-benefit gains over the lifetime of improvements, including co-benefits like improved health and safety.
- Developing strategies that prioritize energy upgrades for small businesses, which typically spend 2-3 times more on energy costs per square foot than larger businesses.
- Addressing the split incentives for building and infrastructure improvements at rental properties through outreach efforts, reviewing and removing policies that limit the incentive for owners and tenants to make improvements, and exploring regulations that help rental properties keep pace with maintenance and improvements seen at owned properties.
- Developing outreach and information that is accessible to all residents and businesses, including a range of formats and languages.
- Mitigating the impact of any rate increases required to cover the cost of infrastructure upgrades.

B-1: Improve Building Efficiency, Performance, and Comfort

Retrofit existing buildings to be resource efficient and support occupant health and encourage new buildings to be built to enhanced standards using voluntary incentives and support. Build on the successes of the City’s Building Benchmarking program and help more buildings monitor their energy and water use.

METRICS & TARGETS

Residential energy use (BTU)

- » Decrease residential energy use by 26% by 2030

Commercial and industrial energy use (BTU)

- » Decrease energy use in existing commercial buildings by 32% by 2030
- » Decrease energy use in existing industrial buildings by 34% by 2030

Compliance with the Energy and Water Benchmarking Program (% of properties)

- » 90% participation in 2025

Energy efficiency program participation (# of participants)

- » Increase annually

Low-income energy efficiency program participation (# of participants)

- » Increase annually

Multi-family energy efficiency program participation (# of participants)

- » Increase annually

Municipal facility energy use intensity (EUI)

- » Reduce average EUI of all buildings/facilities

Municipal LEED new construction (% of new buildings certified)

- » All new buildings are certified LEED silver or better

Develop an Energy Master Plan for all City facilities

- » Identify and complete energy efficiency improvements in each facility by 2030

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from electricity and natural gas
- ✓ Supports 24/7 carbon-free electricity

CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- ★ B-1A. Upgrade Efficiency at City Facilities
- ★ B-1B. Expand Energy Efficiency and Demand Management Tools and Resources
- ★ B-1C. Improve Residential Efficiency
- ★ B-1D. Leverage Federal Funding to Fill Gaps in Energy Efficiency Incentives

MID-TERM ACTIONS

- B-1E. Incentivize Beyond-Code Construction and Incorporate Energy Modeling

B-2: Advance Building Decarbonization



Gradually transition to decarbonized building systems by piloting new technologies, finding ways to lower upfront costs, and developing a workforce that can support decarbonization. When offering economic development incentives, prioritize investments that exceed minimum energy code requirements.

METRICS & TARGETS

Residential heating fuel (% households)

- » Annual increase in proportion of homes heated with electricity

Community fuel use (MMBtu electricity/MMBtu natural gas)

- » Increase ratio of electricity to natural gas use by sector

Municipal facility decarbonization (% of facilities)

- » Annual increase of percentage of facilities using electricity as primary fuel source

COMMUNITY ENGAGEMENT

“We need to electrify buildings to stabilize energy rates and decarbonize our fuel sources.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from natural gas
- ✓ Supports 24/7 carbon-free electricity



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



CLIMATE ADAPTATION & RESILIENCE



Climate Risks Addressed



Goals Supported



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- ★ B-2A. Pilot Municipal Decarbonization Projects
- ★ B-2B. Advance Building Decarbonization Incentives, Education, and Group Buys

MID-TERM ACTIONS

- B-2C. Market Commercial Decarbonization Demonstrations and Example Projects
- B-2D. Pilot a Net-Zero Energy Neighborhood

B-3: Ensure Reliable and Climate-Resilient Infrastructure



Maintain and upgrade citywide infrastructure to withstand existing and expected climate change impacts.

METRICS & TARGETS

Community energy storage (number of installs and/or installed capacity)

- » Increase annually

Municipal energy storage (% of City facilities with storage)

- » Increase annually

Electric and communications system undergrounding (% of system underground)

- » Increase annually

COMMUNITY ENGAGEMENT

“Invest now in solutions to address our risks or reduce emissions so we don’t have to pay more later, as a reaction to hazards we could have prevented.”
 – SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Supports 24/7 carbon-free electricity

CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

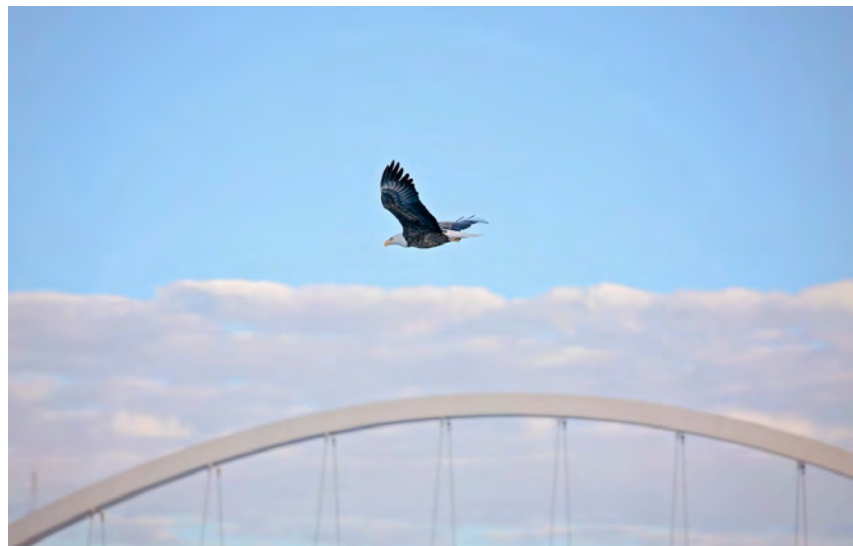
See Appendix B for action implementation details, including roles and resource needs.

ONGOING ACTIONS

- B-3A. Underground Utilities

MID-TERM ACTIONS

- B-3B. Explore Enhanced Reliability/ Resiliency Utility Projects
- B-3C. Create Neighborhood Infrastructure Rehabilitation Program
- ★ B-3D. Prioritize Resilient Capital Improvement Projects







ENERGY SUPPLY & DISTRIBUTION

Energy powers all our daily activities, from turning on the lights to charging electric cars. To avoid the worst impacts of climate change, we must accelerate the decarbonization of our energy supply, investing in wind, solar, geothermal, biomass, and other clean sources of energy. Energy demand management and energy efficiency are other distributed tools that can support a clean energy supply. Energy storage, and carbon capture and storage are also emerging strategies that can drive progress. Our goal to achieve 100% 24/7 carbon-free electricity citywide will accelerate the decarbonization of our energy supply, while ensuring a just transition to clean, reliable and affordable energy for all Des Moines community members. MidAmerican Energy, Des Moines' energy utility, currently provides more than 88% of its electricity for Iowa customers from renewable sources, retiring those renewable energy credits on customers' behalf (MidAmerican Energy, 2022). The remaining fossil fuel mix, made up primarily of coal and natural gas, creates pollution that accelerates climate impacts. ADAPT DSM actions included in this section can have a significant impact in reducing our community-wide contributions to emissions.

SOLUTIONS

E-1: Increase Distributed Renewable Energy

E-2: Expand Utility-Scale Clean Energy Options

100% 24/7 CARBON-FREE ELECTRICITY

The City of Des Moines is a signatory to the [24/7 Carbon-free Energy Compact](#). This is a transformative approach to energy procurement, supply, and policy that accelerates our transition to clean energy resources. It means that every kilowatt-hour of electricity consumption is met with zero emissions sources, every hour of the day, every day of the year. It is based on the principles of time-matched procurement on an hourly basis, local procurement of clean energy, technology inclusivity, enabling new carbon-free energy generation, and maximizing system impact by addressing the hours of electricity consumption when the most fossil fuel is used. The City of Des Moines is at the forefront of this movement and will collaborate with partners across sectors to advance systemic change and drive rapid decarbonization.



RECENT & RELATED EFFORTS

CITY EFFORTS

- Solar Field: Two solar arrays will be constructed to provide renewable energy for 2 new City facilities under construction (planned for completion in 2024).
- Solar Installations on Municipal Facilities: The City installed 173 kilowatts of solar capacity in 2021, with a total installed capacity reaching nearly 1.5 megawatts of solar once all planned installations are complete.
- Biogas Waste to Energy: Des Moines Metropolitan Wastewater Reclamation Authority takes their biogas waste, cleans it, and injects the clean gas into the local utility's pipeline.
- Clean Energy Statement of Intent to Cooperate: The City of Des Moines and MidAmerican Energy Company developed a joint statement to guide their work together to advance community-wide energy efficiency, decarbonization, and clean energy. A future Clean Energy Work Plan will further define implementation details.

COMMUNITY EFFORTS

- Grow Solar Polk County: This initiative provides solar education and group solar buys to bring down the cost of solar installations. In 2022, the total installed capacity in Des Moines was 91.2 kilowatts, resulting in \$250,781 investment in clean energy resources for homes and businesses.
- Iowa State University Food, Energy, Water Systems (FEWS) Initiative: This program develops analytical skills and social awareness within the complexities of FEWS nexus.
- Polk County Energy District: As part of the Clean Energy Districts of Iowa, Polk County is forming an Energy District to help accelerate the local, inclusive, clean energy transition.
- Neighborhood Finance Corporation Energy Advantage: This program provides deferred loans for home energy improvements, including solar.

EQUITY & JUSTICE CONSIDERATIONS

To ensure that carbon-free energy is accessible to, and benefits all Des Moines residents and businesses, we will need to be mindful about:

- Developing outreach and information related to local generation opportunities and programs that are accessible and available in a range of formats and languages.
- Prioritizing projects and programs that support local businesses and create local jobs.
- Increasing participation in renewable energy projects and programs by low-to-moderate income households, renters, and disproportionately impacted communities.
- Ensuring that any programs to add utility-scale renewable generation are structured to deliver costs and benefits equitably, for example through mitigation of any rate increases for disproportionately impacted communities.



E-1: Increase Distributed Renewable Energy



Develop more local renewable energy generation and storage infrastructure in Des Moines, including on-site solar photovoltaic (PV), solar thermal and geothermal systems, community solar gardens, and biomass facilities.

METRICS & TARGETS

Additional community installed distributed solar PV generation (MW)

- » 2030: 16 MW
- » 2050: 62 MW

Municipal installed distributed solar PV generation (kW)

- » Increase annually

Community generation from other renewable energy systems (BTU)

- » Increase annually

Municipal generation from other renewable energy systems (BTU)

- » Increase annually

COMMUNITY ENGAGEMENT

“We need to focus on reducing energy burden and expanding access to clean energy for low to moderate income homeowners, and renters. The city should work with multifamily property owners to make clean energy investments as well.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from electricity
- ✓ Supports 24/7 carbon-free electricity



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ E-1A. Update Development Standards and Permitting Processes for Clean Energy

NEAR TERM ACTIONS

- ★ E-1B. Install Alternative Energy Sources with Storage for Municipal Facilities
- ★ E-1C. Expand Solar Adoption and Incentives
- E-1D. Enhance Clean Energy Advocacy and Policy Development

MID-TERM ACTIONS

- E-1E. Develop Community Solar Gardens

LONG-TERM ACTIONS

- E-1F. Develop District Energy System(s)

E-2: Expand Utility-Scale Clean Energy Options



Increase community access to renewable energy through the electric grid by developing utility-scale renewable energy generation and storage infrastructure.

METRICS & TARGETS

Carbon-free energy (% of each source)

- » Community-wide 100% 24x7 electricity from carbon free sources by 2035¹

Investment in utility-scale clean energy projects that provide additionality to the regional clean energy mix

- » Increase annually

COMMUNITY ENGAGEMENT

“Switching to clean energy is a fundamental change in the economy, meaning people must make different decisions than they have in the past. It also requires investment in new infrastructure. Both require funding and incentives for people and companies to spend the money on clean energy instead of something else that they would otherwise want. Partnerships with companies that develop clean energy projects are also helpful.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



✓ Addresses emissions from electricity



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ E-2A. Collaborate on and Maintain Clean Energy Implementation Plan

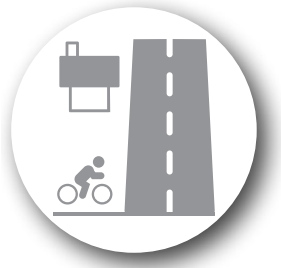
NEAR TERM ACTIONS

- ★ E-2B. Advance 24/7 Carbon-free Electricity Transition and Management
- ★ E-2C. Explore Regional Renewable Energy Projects and Programs

MID-TERM ACTIONS

- E-2D. Develop Other Utility-Scale Zero Greenhouse Gas Generation

¹ Accelerated adoption of this target will help the community achieve the community’s science-based targets.



TRANSPORTATION & LAND USE

Our transportation systems currently contribute to 26% of Des Moines' GHG emissions and influences how well we are connected to daily needs and services (Appendix B. Technical Analysis Summary). However, there are several challenges to connectivity in our community: street design and condition, safety concerns, and gaps in the multimodal network. As we implement [MoveDSM](#) (Des Moines' Transportation Master Plan) which provides guidance on addressing each of these challenges, we must prioritize driving less, developing carbon free "last mile" solutions to connect people from transit stops to their destinations, and adopting low-carbon travel options, including walking, biking, transit, and electric mobility. In particular, electrifying personal vehicles and transit systems will help enable us to maintain efficient transportation networks while reducing GHG emissions and cleaning our air.

In addition to transportation infrastructure improvements, we must also focus on making land use decisions that enable our community to adapt to climate change. This means following the development standards outlined in [PlanDSM](#) that provide a mixture of land uses to support low-carbon travel options and protect our natural resources that are critical to improving air quality and resiliency to flooding and heat. Land use planning should promote increased density, infill, and adaptive reuse that drives walkability, minimizes parking, increases economic opportunity, and supports transit oriented design and other uses patterns

SOLUTIONS

T-1: Plan for Efficient Land Use and Development

T-2: Shift Vehicle Trips to Walking and Bicycling

T-3: Increase Transit Access and Ridership

T-4: Advance Transportation Electrification, Decarbonization, and Alternative Fuels



RECENT & RELATED EFFORTS

CITY EFFORTS

- [Electric Vehicle \(EV\) Charging Stations](#): There is reserved parking for charging EVs available in several City-owned parking garages (21 dual port stations in 2023); all spaces currently provide free electricity included with the standard rate of parking.
- [Municipal E-Fleet](#): The City is transitioning its fleet to EVs as technology improves (19 fleet EVs in 2023, with 176 vehicles deemed suitable for electrification in the 5-year fleet replacement plan).
- [PlanDSM](#): The Comprehensive Plan sets the vision for how Des Moines will grow into the future, including an emphasis on walkable neighborhoods, mixed use developments, and a complete transportation system (update anticipated in 2023).
- [MoveDSM](#): The Transportation Master Plan provides a strategy for achieving the transportation goals in PlanDSM.
- [LiveDSM](#): The Parks and Recreation Comprehensive Plan is designed to enable improvements across the Des Moines park system, including a focus on safe, connected trails.

COMMUNITY EFFORTS

- [DART Climate Action Strategy](#): The strategy sets goals for reducing GHG emissions from DART vehicles and buildings as part of DART's participation in the Federal Transit Administration's Sustainable Transit for a Healthy Planet Challenge.
- [Street Collective Resources](#): Street Collective is a nonprofit organization that supports advocacy, education, and events for active transportation. They also manage the citywide B-cycle bikeshare system.
- [Central Iowa Passenger Transportation Plan](#): This plan promotes coordinated transportation planning programs that further the development of local and regional public transportation systems.

EQUITY & JUSTICE CONSIDERATIONS

Improving the efficiency, accessibility, and sustainability of our transportation network has the potential to create benefits for all Des Moines residents. In particular, those disproportionately impacted by the cost, time, air quality, and quality-of-life burdens associated with our current system could benefit from transportation and land use improvements identified in this solution. However, ensuring that the costs and benefits of these changes are equitably distributed will require targeted approaches, for example through:

- Prioritizing programs and incentives that support transportation system improvements, connectivity, and electrification in areas disproportionately impacted by traffic and air pollution.
- Developing strategies to reduce the up-front cost of low-carbon transportation, for example through reduced transit fares, e-bike incentives, or electric vehicle incentives for low-income households.
- Considering alternative modes to support low-carbon transportation, such as electric carshare
- Ensuring that active transportation options, transit, and electric vehicle charging is accessible to all residents, for example by considering siting, ADA accessibility, language, and cost.
- Developing outreach and information that is accessible to all residents and available in a range of formats and languages.



T-1: Plan for Efficient Land Use and Development



Adopt and implement plans and policies that lead to walkable and transit-oriented developments through mixed land uses, infill development, and sustainable redevelopment and reuse of buildings.

METRICS & TARGETS

Annual vehicle miles traveled per person

- » Decrease annually

Annual vehicle miles traveled

- » 5% reduction by 2030

Efficient development (% of total development applications annually that are mixed-use, redevelopment, infill and/or adaptive reuse redevelopment)

- » Increase annually

COMMUNITY ENGAGEMENT

“Better community master planning to introduce a diversity of uses that are in a walkable neighborhood which starts with flexible zoning assignments and future land use designations. Target locations in each neighborhood with the most potential benefits of having better access to resources.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from transportation



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ T-1A. Plan for Walkable and Transit-Supportive Neighborhoods

NEAR TERM ACTIONS

- ★ T-1B. Continue to Promote Infill, Redevelopment, and Adaptive Reuse
- T-1C. Refine and Educate about Land Development Regulations

MID-TERM ACTIONS

- T-1D. Refine Parking Standards to Support Transit Oriented Development

T-2: Shift Vehicle Trips to Walking and Bicycling



Improve infrastructure, provide education, and develop programs that make it easier and safer for community members to travel by walking, biking, scooters, and other micromobility solutions (including both human-powered and electric options).

METRICS & TARGETS

Bicycle and walking mode share
(% bicycle and walking trips as a means of transportation to work)

- » Increase to 6.6% by 2030

Average annual daily traffic per capita on select routes

- » Monitor/decrease annually

Trail Counts

- » Monitor and increase annually

Walk Score

- » Increase to "Very Walkable" by 2050

Bike Score

- » Increase to "Very Bikeable" by 2050

Sidewalk improvements (miles of sidewalks improved annually)

- » 180 miles of priority sidewalk improvement in 20 years

Bicycle facilities (total miles on-street and off-street)

- » Increase annually (310 miles for full network)

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from transportation



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- T-2A. Advance Sidewalk Policy and Program
- ★ T-2B. Improve Bicycle and Pedestrian Infrastructure

NEAR TERM ACTIONS

- ★ T-2C. Expand Active Transportation Education and Incentives

MID-TERM ACTIONS

- T-2D. Conduct Walkability and Bikeability Assessments
- T-2E. Encourage Micromobility

T-3: Increase Transit Access and Ridership



Improve infrastructure, expand incentive programs, and enhance coordination with other transportation modes to make it easier for community members to travel by transit.

METRICS & TARGETS

Transit mode share (% public transportation as a means of transportation to work)

- » Increase to 3.4% by 2030

Transit ridership (annual unlinked trips/passenger boardings)

- » Increase annually

Transit Score

- » Increase to excellent transit by 2050

COMMUNITY ENGAGEMENT

"I would love to be able to take the bus to and from work but the route is 45 minutes while driving is just 10. This city needs to see the bus for the vital resource it is to connect the city grid and reduce single-occupant driving."

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from transportation

CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed

Goals Supported



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- T-3A. Maintain and Expand Transit Services
- ★ T-3B. Improve Transit Coordination and Engagement
- T-3C. Improve Transit-Supporting Infrastructure

MID-TERM ACTIONS

- T-3D. Improve Multi-modal Transportation Network Integration
- T-3E. Create Transit Ambassador Program
- T-3F. Expand Access to Reduced Transit Fares



T-4: Advance Transportation Electrification, Decarbonization, and Alternative Fuels



Develop infrastructure and programs to support the decarbonization of transportation systems and equipment, including the expansion of hybrid and all-electric vehicles and charging infrastructure, as well as cleaner fuels (e.g., hydrogen, biodiesel) for larger vehicles and airplanes.

METRICS & TARGETS

Community electric vehicle adoption (% of vehicles registered that are electric)

- » 15% of registered vehicles are electric by 2030

Municipal electric vehicle adoption (number of electric vehicles in fleet)

- » At least 170 fleet vehicles replaced with electric models by 2030

Electric vehicle charging stations (number of publicly available chargers)

- » Increase annually

COMMUNITY ENGAGEMENT

“EV charging infrastructure is needed in public spaces as well as assistance for people to install charging infrastructure at home. This can be expensive and ultimately a barrier to electric mobility for some people.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from transportation
- ✓ Supports 24/7 carbon-free electricity



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ T-4A. Electrify Municipal Fleet

NEAR TERM ACTIONS

- T-4B. Expand Zero Emissions Transit and Bus Fleets
- T-4C. Encourage Home Charging
- ★ T-4D. Expand Electric Vehicle Charging Infrastructure
- ★ T-4E. Provide Transportation Electrification Education and Incentives

MID-TERM ACTIONS

- T-4F. Advocate for Airport and Airline Climate Action

LONG-TERM ACTIONS

- T-4G. Pilot Zero Emissions Zones



NATURAL SYSTEMS & WATER RESOURCES

Each of Des Moines' primary climate hazards reflect how the water cycle, our atmosphere, and other natural systems can threaten human health and our built environment. However, natural systems can also adapt to climate changes and provide powerful ecosystems services that improve our resilience to climate risks. Shade trees protect us from the projected increase in heat waves and extreme hot days. Green infrastructure like rain gardens, native plantings, and healthy soil can mitigate flooding and store water that helps protect against drought. This focus area includes solutions that are foundational for achieving our resilience goals and supporting our emissions reduction goals through carbon sequestration.

SOLUTIONS

N-1: Expand Native Ecosystems and a Sustainable Tree Canopy

N-2: Enhance Watershed Management and Source Water Protection

N-3: Reduce Flood Risk

N-4: Increase Water Conservation and Drought Management



RECENT & RELATED EFFORTS

CITY EFFORTS

- Flood Buyout Programs: The City runs a citywide voluntary flood buyout program for properties in the flood plain, as well as involuntary programs when necessary, such as the Fourmile Creek Greenway Project in 2021 which affected 27 properties.
- Sanitary Sewer Separation Projects: The City is implementing projects designed to eliminate combined sewer outfalls that discharge sanitary water to the river.
- [Private Property Protection](#): The City provides subsidies for work that diverts water from the sanitary sewer main to prevent backflow.
- [Stormwater Best Management Practices Program](#): The City provides incentives for property owners to install stormwater best management practices.
- [Street Tree and Tiny Trees Programs](#): The City provides incentives for new tree plantings.
- [Tree Inventory](#): The City maintains a tree inventory that maps trees in Des Moines and estimates associated environmental and economic benefits (51,128 trees in public spaces in 2022).

COMMUNITY EFFORTS

- [Watershed Management Authorities](#): six watershed management authorities in the Greater Des Moines region provide coordinated watershed planning and management
- [Rain Campaign](#): This regional initiative facilitates incentives and education for stormwater management.
- [Central Iowa Regional Drinking Water Commission](#): This group, including Des Moines Water Works, focuses on regional water issues.
- [TreeKeepers](#): This course covers how to maintain urban trees and plan new trees.
- [Polk County Master Gardeners](#): This volunteer program provides advanced training in horticulture in exchange for volunteer service to the community.
- [Iowa State University Food, Energy, Water Systems \(FEWS\) Initiative](#): This program develops analytical skills and social awareness within the complexities of FEWS nexus.

EQUITY & JUSTICE CONSIDERATIONS

Improving the function and resilience of our natural systems and water resources has the potential to minimize existing and future inequities and improve quality of life for all Des Moines residents. However, we will need to be intentional in our approach to implementation to ensure that the costs and benefits are equitably distributed, for example through:

- Prioritizing tree planting and ecosystem improvements in low-income areas, especially those at risk of urban heat island effects
- Prioritizing projects and programs that have a range of co-benefits for disproportionately impacted communities, for example through the creation of recreational opportunities in underserved areas
- Prioritizing flood mitigation for low-income households who may be less able to prepare for and recover from a flood event
- Mitigating the impact on low-income households of any rate increases required to fund water system improvements
- Reducing barriers to water conservation for low-income households, for example through incentives and programs to help with the upfront cost of improvements
- Ensuring that outreach and educational materials are accessible to all residents and available in a range of formats and languages



N-1: Expand Native Ecosystems and a Sustainable Tree Canopy



Invest in growing and protecting Des Moines' network of trees and natural areas, including increasing community education about and public access to the benefits of natural areas.

METRICS & TARGETS

Tree plantings (number per year)

- » 3,800 trees per year

Tree canopy health (% in "fair to excellent" condition)

- » 98% tree canopy in "fair to excellent condition" by 2045

Municipal native landcover additions/ conversions (acres per year)

- » Increase annually

Tree Equity Score

- » Increase annually community-wide

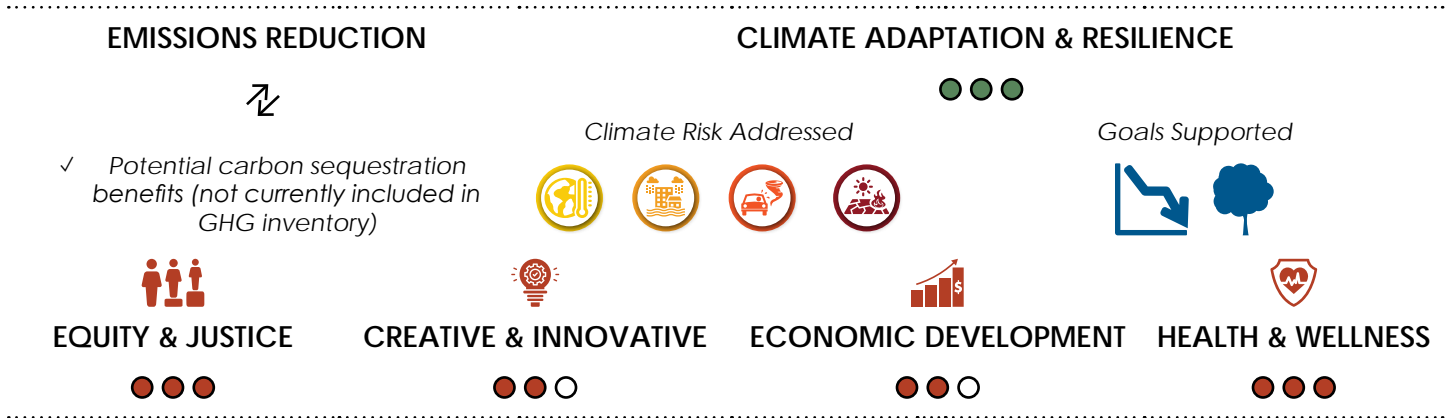
Carbon sequestration from trees and natural landcover (lbs CO₂)

- » Monitor and increase annually

COMMUNITY ENGAGEMENT

"We need to sequester more carbon to fight climate change. Increasing sequestration on public land over a wide scale can make a great difference. We need to be planting native prairie in public ways rather than grass. It doesn't need to be mowed as often or at all and the deep root systems help prevent flooding, sequester more carbon, and will last forever."
 – SURVEY PARTICIPANT

CO-BENEFITS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ N-1A. Implement the Urban Forest Master Plan

NEAR TERM ACTIONS

- ★ N-1B. Refine Tree Planting and Mitigation Standards
- N1-C. Build Public Awareness and Education about Conservation
- ★ N1-D. Manage Public Properties for Multiple Benefits

N-2: Enhance Watershed Management and Source Water Protection



Increase the capacity of Des Moines' landscapes to manage stormwater and protect water quality through policy, education, and regional coordination.

METRICS & TARGETS

Sewer system access (annual number of properties without adequate access to the trunk sewer network)

» Decrease annually

Sanitary sewer overflows (annual number of overflows from preventable causes)

» Decrease from an average of 8 to 6 or less per year

Stormwater best management practice installations (annual number of projects on private property)

» Increase annually

Municipal stormwater best management practice installations (annual number of projects on city property)

» Increase annually

COMMUNITY ENGAGEMENT

“New development needs to include more protection of existing water transport and treatment systems. Fully developed areas need to identify areas for inclusion of natural systems and water quality best management practices.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ N-2A. Educate about Pollution Prevention and Stormwater Management
- ★ N-2B. Advance Master Drainage and Watershed Management Plans

NEAR TERM ACTIONS

- ★ N-2C. Incentivize Best Management Practices for Stormwater and Landcover on Private Properties
- N-2D. Adopt Ordinances that Support Watershed Health and Reduce Pollution

MID-TERM ACTIONS

- N-2E. Collaborate on Regional Water Strategy

N-3: Reduce Flood Risk



Implement projects and programs to mitigate flood risk for existing properties and implement policies to prevent future risk.

METRICS & TARGETS

Structures in the floodplain (number of primary structures within the 100-year floodplain)

- » Decrease annually

Flood buyout program impact (number of properties acquired/demolished through buyout program)

- » Decrease annually

COMMUNITY ENGAGEMENT

“Recognize that an increase of biodiversity and nature in our city plan will mitigate flood risk and will filter and increase water flow into our watershed.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- N-3A. Continue the Floodplain Buyout Program and other Voluntary Flood Mitigation Measures
- ★ N-3B. Advance Flood Mitigation and Stormwater Improvement Projects

NEAR TERM ACTIONS

- N-3C. Complete the Levee Alterations Program



N-4: Increase Water Conservation and Drought Management



Expand existing plans, programs, and educational efforts to support water conservation for indoor uses and landscaping, while ensuring affordable access to water for all community members and preparing for future drought risk.

METRICS & TARGETS

Domestic water consumption (gallons per capita per day)

- » Decrease annually

Drought period (% County in drought monitor categories)

- » Monitor

Municipal facility/property water use (gallons per year)

- » Decrease annually

COMMUNITY ENGAGEMENT

“Plant more trees, water less.”
– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from water treatment



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- N-4A. Maintain and Implement Water Shortage Plan

NEAR TERM ACTIONS

- N-4B. Educate about Water Conservation
- N-4C. Advance Rainscaping and Native Landscaping Program
- N-4D. Improve Water Efficiency and Conservation at Municipal Facilities
- N-4E. Improve Water Benchmarking Program

MID-TERM ACTIONS

- N-4F. Explore Adjustments to Water Rates
- N-4G. Research Water Reuse Opportunities



WASTE MANAGEMENT & REDUCTION

While it can be challenging to measure the climate pollution contributions from materials that are produced outside of Des Moines and used by our community members, there is no denying that the amount of waste we produce, and how we transport that waste, is harmful to our environmental and personal health. Despite the fact that nearly half of Iowa's waste is easily recyclable or compostable (SCS Engineers, 2022), Iowans generate 2.8 million tons of solid waste per year (Iowa Department of Natural Resources, 2022). By cycling used materials back into our economy and recovering food that would otherwise go to waste, we have the opportunity to increase our economic and community resilience.

SOLUTIONS

W-1: Reduce Waste Generation

W-2: Increase Waste Diversion and Recovery



RECENT & RELATED EFFORTS

CITY EFFORTS

- [Residential Recycling](#): The City provides curbside collection for recycling and drop-off recycling site for bulk cardboard.
- [Gold Level Recycling Program](#): The City recognizes super recyclers by providing a yellow lid for their recycling cart.
- [Residential Yard Waste](#): The City provides curbside collection for yard waste.
- [SCRUB Events](#): The City provides free drop-off events for residents to remove household and yard waste and debris, including a compost site for yard and tree debris.
- [Parks Planning for Sustainability](#): The Parks and Recreation Department is committed to robust considerations for materiality, durability, and site suitability – all of which create longer lasting park features and a smaller carbon footprint.

COMMUNITY EFFORTS

- [Iowa Waste Exchange](#): The Iowa Department of Natural Resources operates a data base of available and wanted materials that is free to access
- [Community Fridges](#): Publicly accessible fridges are available for community members to either use to drop off excess food or take free food as needed (15 in 2022).
- [Eat Greater Des Moines Food Rescue Program](#): This program enables easy food donation and volunteer opportunities to collect and redistribute excess food.
- [Food Recovery Network](#): This student-led movement reduces waste on campus and redistributes excess food (Drake University is an active chapter as of 2022).

EQUITY & JUSTICE CONSIDERATIONS

Targeted efforts will be required to ensure that the costs and benefits of sustainable waste management and reduction are equitably distributed, for example through:

- Prioritizing projects and programs that support local businesses and create local jobs.
- Developing targeted strategies to support participation in projects and programs by small businesses.
- Mitigating the cost impact of waste program participation for low-income households
- Considering the location and impact of any new waste handling and/or processing facilities.
- Ensuring that outreach and education related to waste reduction and diversion is accessible to all residents and available in a range of formats and languages.



W-1: Reduce Waste Generation



Collaborate to identify creative ways to reduce waste and use those findings to advocate for and adopt policies that support waste reduction practices.

METRICS & TARGETS

Municipal solid waste generated (tons per year)

- » Decrease annually

Household garbage weight (average per household in pounds)

- » Reduce to 1,700 pounds per year or less

COMMUNITY ENGAGEMENT

“Reducing waste is the biggest step.”
– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



✓ Addresses emissions from solid waste

CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- W-1A. Advance Industry-Specific Waste Solutions
- W-1B. Reduce Waste at Events
- W-1C. Adopt Sustainable Procurement Guidelines

MID-TERM ACTIONS

- W-1D. Launch Resource Libraries and Repair Cafes
- W-1E. Offer Residential Cart Size Options
- W-1F. Institute a Commercial Waste Data Policy



Photo credit: Shelia K-O

W-2: Increase Waste Diversion and Recovery



Adopt policies and implement incentive programs to increase community-wide recycling, composting, and waste recovery.

METRICS & TARGETS

Waste diversion (% of waste diverted from landfill)

- » 90% or greater waste diversion by 2050

Residential recycling contamination (% of collected residential recycling that is contaminated)

- » Reduce to 15% or less

Anaerobic digestion waste recovery (weight/volume of waste processed through anaerobic digestion)

- » Increase annually

Rescued food waste (number participating sites, potentially weight/volume of food waste recovered)

- » Increase annually

COMMUNITY ENGAGEMENT

“Waste education needs to start in school and practiced at a young age followed by programs for parents and the public. Every household and building should be provided with recycling collection, waste, and compost with informational guides to help people understand what goes into what.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Addresses emissions from solid waste



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

ONGOING ACTIONS

- ★ W-2A. Reduce Recycling Contamination
- ★ W-2B. Provide Waste Diversion Options in Public Spaces and at Public Events

NEAR TERM ACTIONS

- W-2C. Update Development Standards for Waste Facilities
- W-2D. Adopt Construction and Demolition Waste Ordinance
- W-2E. Develop a Compost Collection and Distribution Network
- W-2F. Promote and Expand Food Rescue Opportunities
- W-2G. Offer Tree/Branch Disposal

MID-TERM ACTIONS

- W-2H. Broaden Recycling Options
- W-2I. Provide Commercial Waste Diversion Incentives
- W-2J. Expand Bottle Bill Approach
- W-2K. Expand Anaerobic Digestion
- W-2L. Develop a Food Waste Composting Facility

LONG-TERM ACTIONS

- W-2M. Expand Composting Program



FOOD SYSTEMS & SECURITY

Recent extreme weather events and health crises have underscored how critical it is to create a resilient local food system that provides healthy and affordable food for everyone. More than 550,000 tons of food waste is thrown away in the greater Des Moines area every year and 90 percent of food we eat is imported from out of state (Eat Greater DSM, 2022). Des Moines has a strong network of nonprofits and individuals who are passionate about growing a sustainable food system – by coordinating and investing in this work, we can leverage this momentum to support our resilience goals.

SOLUTIONS

F-1: Expand Local Food Production

F-2: Improve Food Security and Nutrition



RECENT & RELATED EFFORTS

CITY EFFORTS

- [Food Security Task Force Report](#): The report provides recommendations for the City to take to promote urban agriculture.
- [FEED DSM](#): The Food Security Task Force led the development of this online toolkit to educate community members about growing local food. A second iteration of this Task Force is underway.
- [Community Gardens](#): The City manages three community gardens.

COMMUNITY EFFORTS

- [Community Fridges](#): Publicly accessible fridges are available for community members to either use to drop off excess food or take free food as needed (15 in 2022).
- [United Way Food Insecurity Initiative](#): This initiative addresses food insecurity in Central Iowa.
- [Des Moines Area Religious Council Food Pantry Network](#): These food pantry partner sites provide a 3-day supply of food once per month to those in need (15 in 2022).
- [Eat Greater Des Moines Resources](#): Eat Greater Des Moines hosts a map of food resources in Des Moines and provides advisory services for starting and operating community fridges, community gardens and farmers markets.
- [Sustainable Iowa Land Trust](#): This partnership of food and agriculture leaders works to provide affordable land access for future healthy food farmers.
- [Lutheran Services of Iowa Global Greens](#): This program connects former refugee farmers with space to grow and sell food.
- [Iowa State University Food, Energy, Water Systems \(FEWS\) Initiative](#): This program develops analytical skills and social awareness within the complexities of FEWS nexus.

EQUITY & JUSTICE CONSIDERATIONS

Improving the resilience of our local food system has the potential to create equitable outcomes for Des Moines' residents and businesses. Many actions within this solution will create inherent equity benefits by improving access to healthy food for underserved and disproportionately impacted communities. However, taking a targeted approach to implementation will help maximize the impact of this solution, for example through:

- Prioritizing projects and programs that benefit local businesses and create local food system jobs.
- Prioritizing access to community growing spaces and programs for disproportionately impacted communities and those without access to outdoor space for food production at home.
- Ensuring that outreach and education related to food access and programs is accessible to all residents and available in a range of formats and languages.



F-1: Expand Local Food Production



Grow Des Moines local food system by coordinating partners, removing policy barriers, and directly investing in supportive resources and infrastructure.

METRICS & TARGETS

Local food assets (number of community gardens, urban farms, farmers markets, and community fridges)

- » Increase annually

Consumption of locally grown food (% of food consumed in Des Moines that is grown within the municipal boundary)

- » 30% of the food consumed by Des Moines community is grown within the city by 2050

COMMUNITY ENGAGEMENT

“The City needs to invest in and protect urban agricultural property, which is often beat out by more taxable commercial development. We need to think about year-round food production as well. Who can the City partner with to make these types of projects a reality?”
 – SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- ★ F-1A. Increase Coordination of Local Food Systems
- ☐ F-1B. Revise City Codes to Support Local Food Production and Access
- ☐ F-1C. Increase Procurement of Local Food in Institutions

MID-TERM ACTIONS

- ☐ F-1D. Invest in Local Food Systems
- ☐ F-1E. Expand Urban Agriculture Opportunities
- ☐ F-1F. Incorporate Edible Plantings at City Facilities

LONG-TERM ACTIONS

- ☐ F-1G. Foster Regional Food Hubs and Market Infrastructure
- ☐ F-1H. Explore Agrihood Development

F-2: Improve Food Security and Nutrition



Work with community members to understand food security needs and opportunities to improve food access, distribution, and storage, especially in emergencies.

METRICS & TARGETS

Food insecurity rate in Polk County

- » Decrease annually

COMMUNITY ENGAGEMENT

"Protecting food systems and increasing food security are critical to ensuring equitable access to food. Target programming toward underserved areas and communities and focus on how education and workforce development can help lift folks up."

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION



- ✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE



Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- ★ F-2A. Reconvene the Food Security Taskforce
- F-2B. Expand Emergency Food Access and Distribution

MID-TERM ACTIONS

- F-2C. Identify Community Garden Sponsorship Opportunities





CLIMATE PREPAREDNESS & RESILIENCE

Achieving community-wide resilience requires building the capacity of all community members to adapt to climate change impacts. Neighborhoods across Des Moines face different levels of risk. This focus area includes solutions that elevate our community capacity and preparedness and strengthen the adaptive capacity of our social and physical systems while increasing resilience in the face of future climate risks and related impacts.

SOLUTIONS

C-1: Amplify Climate-Related Education and Individual and Community Preparedness

C-2: Create Climate Resilience Hubs

C-3: Prepare for Climate Migration and Displaced People



RECENT & RELATED EFFORTS

CITY EFFORTS

- The [Block Challenge Grant Program](#) brings neighbors together to build community.

COMMUNITY EFFORTS

- [Extreme Temperature Centers](#): Polk County designates facilities that guarantee residents access to air conditioning, heat, and shelter during extreme temperature events, including free transportation to and from the centers (19 facilities were designated in Des Moines in 2022).



EQUITY & JUSTICE CONSIDERATIONS

Improving our community's preparedness and resilience will have benefits for Des Moines residents and businesses, particularly those disproportionately vulnerable to the impacts of climate change. Taking a targeted approach to implementation will help maximize the impact of this solution, for example through:

- Prioritizing the creation of resilience hubs and shelters in disproportionately impacted areas of Des Moines.
- Prioritize resources, education, and information that is accessible to all residents, with a focus on disproportionately impacted communities.
- Supporting and empowering the community to address what is most important to them.
- Addressing challenges and shortcomings of previous efforts, including creating accountability and avoiding shifting the burden to those on the front lines of climate change.



C-1: Amplify Climate-Related Education and Individual and Community Preparedness



Implement emergency preparedness programs and communications, ensuring climate impacts are incorporated, to increase all community members' ability to prepare for and respond to disasters.

METRICS & TARGETS

Community preparedness trainings and engagements (annual count)

- » Increase

Discussion of global warming at least occasionally (% of adults)

- » Increase annually

Awareness and perception of City performance on climate change issues

- » Increase awareness and establish feedback loops

COMMUNITY ENGAGEMENT

“Be inclusive of people that do not have knowledge/understanding and provide information in different languages and present it in various ways.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION

- ✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE

Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS

- ★ C-1A. Educate Community Members about Climate Risks and Preparedness
- ★ C-1B. Monitor and Share Climate Data

MID-TERM ACTIONS

- C-1C. Bolster Climate-Related Emergency Communications and Coordination
- C-1D. Improve Municipal Emergency Response Procedures

C-2: Create Climate Resilience Hubs



Develop a network of resilience hubs that provide shelter, services, information, and resources for acute and ongoing climate impacts by leveraging and fortifying existing facilities and partnering with community organizations on new hub formation and management.

METRICS & TARGETS

Resilience hubs (number of designated facilities for climate-related events)

- » Every resident can access a nearby resilience hub by 2030

Municipal facility emergency plans (% of primary facilities with emergency plans)

- » 100% of primary municipal facilities have emergency plans by 2030

COMMUNITY ENGAGEMENT

“We need safe places for our community members and displaced people to go now. Weather events are not slowing down and education/community preparedness education strategy alone is not working. We never think it will happen in our community.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION

- ✓ Potential carbon sequestration benefits (not currently included in GHG inventory)



EQUITY & JUSTICE



CREATIVE & INNOVATIVE



CLIMATE ADAPTATION & RESILIENCE

Climate Risk Addressed



Goals Supported



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

NEAR TERM ACTIONS


- C-2A. Create and Promote Community Resilience Hubs
- C-2B. Build Resilience Networks

MID-TERM ACTIONS

- C-2C. Develop Emergency Plans for Municipal Facilities
- C-2D. Install Backup Energy Generation and Storage at Critical Municipal Facilities

LONG-TERM ACTIONS

- C-2E. Construct Safe Room(s) at Municipal Facilities



SHELTER FROM THE COLD

WARMING CENTER

For temporary relief from the cold, the City of Des Moines has identified the following options. No staff or care services are provided.

Masks are required and will be provided if needed. No food or drink.

- Southridge Mall** (1111 E. Army Post Rd.)
10 a.m. to 9 p.m., Monday through Saturday
Noon to 6 p.m. on Sunday
- Merle Hay Mall** (3800 Merle Hay Rd.)
10 a.m. to 8 p.m., Monday through Saturday
Noon to 5:30 p.m. on Sunday
- Central Library** (1000 Grand Ave.)
9 a.m. to 5 p.m., Monday, Wednesday, Friday
9 a.m. to 7 p.m., Tuesday and Thursday
10 a.m. to 5 p.m. on Saturday

OVERNIGHT SHELTER

For overnight shelter from the cold, Central Iowa Shelter & Services (CISS) is equipped to help and provide care.

Central Iowa Shelter & Services (1420 Mulberry St.)
Staffed 24/7 and open for all-day shelter

CISS offers weather amnesty when the outside temperature is 10 degrees or colder. Weather amnesty extends 48 hours before and after projected cold temperatures.

During weather amnesty, individuals who may not normally be able to seek shelter services are allowed inside and no one is turned away. Care services are provided for those in need. Pets are allowed.

If the downtown shelter reaches capacity, CISS staff will work with non-profit partners, the City of Des Moines and Polk County Emergency Management to make sure all individuals in need are sheltered from dangerous temperatures.

C-3: Prepare for Climate Migration and Displaced People



Position Des Moines as a welcoming city for people relocating due to climate change through planning efforts, economic development strategies, and coalition building.

METRICS & TARGETS

In-migration (annual number of people moving to Polk County from different counties, different states, and abroad)

- » Monitor (and potentially increase mid/long term)

COMMUNITY ENGAGEMENT

“We need safe and equitable places for displaced people to find their footing and access food, shelter, and water. Educating the public on climate strategies and welcoming the displaced.”

– SURVEY PARTICIPANT

CO-BENEFITS

EMISSIONS REDUCTION

✓ *Potential carbon sequestration benefits (not currently included in GHG inventory)*



EQUITY & JUSTICE



CLIMATE ADAPTATION & RESILIENCE

Climate Risk Addressed



Goals Supported



CREATIVE & INNOVATIVE



ECONOMIC DEVELOPMENT



HEALTH & WELLNESS



SUPPORTING ACTIONS

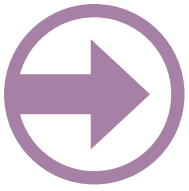
NEAR TERM ACTIONS

- ★ C-3A. Identify Champions and Build Climate Migration Knowledge
- C-3B. Include Climate Migration in Community Planning Efforts

MID-TERM ACTIONS

- C-3C. Explore Climate Migration in Des Moines' Economic Health Strategy
- C-3D. Pursue Certified Welcoming Designation





OUR GAME PLAN



“Take a stronger policy leadership role statewide and nationally. We can’t afford to wait for the state to do more. Now is the time to work on these things and to maximize federal funding opportunities. We need to make sure the city has the staff and financial resources to do this work.”

– Survey Participant



ADAPT DSM is a long-term, **community-wide initiative** to transform our practices and systems, take responsibility for our emissions, and become more resilient to future climate impacts. This section charts out the leadership and collaboration structures necessary to begin implementation of ADAPT DSM. It also establishes a framework to ensure the dynamic, ongoing, and successful evolution of ADAPT DSM. All City of Des Moines departments will play a role in advancing the ADAPT DSM solutions and goals and will need to work collaboratively to integrate climate action considerations.

CLIMATE ACTION CATALYSTS

Recognizing that changing our systems and ways of doing things can be difficult to accomplish all at once, it is helpful to identify some immediate areas of emphasis to initiate momentum and catalyze progress towards achieving the 2030 and 2035 goals. The framework for implementing ADAPT DSM is organized around areas of emphasis or **Climate Action Catalysts** which reflect the recurring concepts and themes from the community and stakeholder engagement process.

The climate action catalysts are intended to serve as foundational activities for the City of Des Moines to initiate and lead, in coordination with other community organizations and partners. These catalytic concepts will help mobilize, amplify, and reinforce the effectiveness of the climate solutions described earlier in this plan, and will help drive progress towards goal achievement.

<p>Provide Climate Action Leadership & Coordination</p>		<p>Continuously Improve Municipal Government's Role in Climate Action</p>	
<p>Expand Climate Action Outreach, Engagement & Capacity</p>		<p>Leverage & Maximize Resources & Capital for Climate Action</p>	





PROVIDE CLIMATE ACTION LEADERSHIP AND COORDINATION

The City of Des Moines Sustainability Program Manager will continue to serve as the project manager for ADAPT DSM implementation. The Sustainability Office will serve as the central coordinator of various implementation actions, establishing partnerships and delegating responsibility to other departments and community partners as necessary, and seeking approval from the City Council and administrative leadership as appropriate.

The Sustainability Office will also be responsible for continuing to convene stakeholder and leadership meetings, overseeing the ADAPT DSM monitoring and reporting activities, and initiating future ADAPT DSM amendments and updates.

The Sustainability Office will form an internal City Sustainability and Resiliency Team, which includes representatives from relevant City departments. The team will meet monthly and be responsible for driving progress on action implementation and supporting tracking and monitoring efforts.

The Sustainability Office will also lead the formation of the Community Climate Allies Committee. This committee will represent a diverse set of voices including vulnerable and frontline community members. This committee will meet quarterly to coordinate plan implementation with key community stakeholders and the public. The committee will support education and outreach to foster partnerships and achieve the plan goals.

Ultimately, the Des Moines Mayor, City Council, and City Manager are responsible for adopting and championing ADAPT DSM, aligning City policies, decisions, and funding to support plan implementation and integration with other citywide planning efforts.



Coordination Playbook

The Coordination Playbook table below summarizes the roles and responsibilities to launch implementation of ADAPT DSM, establish implementation and engagement systems, and drive near-term progress.

2023		
Sustainability Office	City Sustainability and Resiliency Team	Community Climate Allies Committee
<ul style="list-style-type: none"> ❑ Form an internal City Sustainability and Resiliency Team ❑ Form Community Climate Allies Committee ❑ Establish Climate Action Funding Team (as part of or in parallel with the City Sustainability and Resiliency Team) ❑ Manage tracking and reporting systems ❑ Launch communication, events and activities for plan implementation utilizing the Climate Action Toolkit ❑ Report plan progress to City Council ❑ Begin planning an annual climate workshop 	<ul style="list-style-type: none"> ❑ Meet monthly to coordinate action implementation ❑ Drive progress on ongoing and near-term actions, including advancing priorities through departmental work and budget requests/allocations ❑ Collaborate with community partners on action implementation ❑ Contribute to tracking and reporting systems ❑ Develop staff education initiatives and training resources and material 	<ul style="list-style-type: none"> ❑ Meet quarterly to discuss plan implementation with key stakeholders and the public ❑ Advise the City on equitable distribution of funding, program, and project support ❑ Build a list of contacts for a network of community stakeholders ❑ Conduct trainings with stakeholders about various climate topics (decarbonization, stormwater best management practices, transportation mode alternatives, energy efficiency upgrades, etc.)



2024		
Sustainability Office	City Sustainability and Resiliency Team	Community Climate Allies Committee
<ul style="list-style-type: none"> ❑ Lead the development of the first annual report ❑ Host a series of workshops with City Council on each of the plan's focus areas ❑ Convene and liaise with the City Sustainability and Resiliency Team ❑ Convene and Liaise with the Community Climate Allies Committee ❑ Track and coordinate funding opportunities in concert with the Climate Action Funding Team ❑ Manage staffing, volunteer and other resource needs to support plan implementation ❑ Convene annual climate workshop 	<ul style="list-style-type: none"> ❑ Meet monthly to coordinate action implementation ❑ Drive progress on ongoing and near-term actions, including advancing priorities through departmental work and budget requests/allocations ❑ Identify actions that need to be revised and/or modified ❑ Collaborate with community partners on action implementation ❑ Contribute to tracking and reporting systems ❑ Conduct trainings for City Staff 	<ul style="list-style-type: none"> ❑ Meet quarterly to discuss plan implantation with key stakeholders and the public ❑ Continue to advise the City on equitable distribution of support ❑ Hold additional trainings for community stakeholders ❑ Assess additional needs for supporting plan implementation

2025		
Sustainability Office	City Sustainability and Resiliency Team	Community Climate Allies Committee
<ul style="list-style-type: none"> ❑ Lead the development of the annual report ❑ Convene the City Sustainability and Resiliency Team ❑ Prioritize actions for the next 3 years in collaboration with the City Sustainability and Resiliency Team and the Community Climate Allies Committee ❑ Convene annual climate workshop 	<ul style="list-style-type: none"> ❑ Meet regularly to coordinate action implementation ❑ Drive progress on ongoing and near-term actions, including advancing priorities through departmental work and budget requests/allocations ❑ Identify actions that need to be revised and/or modified ❑ Collaborate with community partners on action implementation ❑ Contribute to tracking and reporting systems ❑ Support prioritization of actions for the next wave of plan implementation (2026-2030) 	<ul style="list-style-type: none"> ❑ Meet quarterly to discuss plan implantation with key stakeholders and the public ❑ Continue to advise the City on equitable distribution of support ❑ Hold additional trainings for community stakeholders ❑ Assess additional needs for supporting plan implementation

Tracking and Sharing Progress

Because ADAPT DSM is intended to guide the Des Moines community on climate action for the next three decades through 2050, updates and refinements will be necessary. The overall plan structure and solutions may not change, but the actions and metrics/targets will need to be reviewed and updated as actions are completed, targets are achieved, and new ideas, priorities and technologies emerge.

Regular tracking of our community GHG emissions and the various metrics identified in ADAPT DSM will help us gauge progress towards our emissions reduction, climate adaptation, and resilience goals. Ongoing review of implementation progress, including accomplishments and challenges, will help inform plan evolution and future updates.

Development and distribution of an annual report will help provide transparency about ADAPT DSM progress and impacts. Sharing what's working (and what's not) can help build buy-in for amplifying efforts that are working and/or provide visibility about why we may need to pivot to new approaches. Regularly updating progress and impacts on the City's Performance Measures Initiative is another way to demonstrate the commitment to implementation and continuous improvement.

While ADAPT DSM identifies many metrics and potential data sources, data are not always available at the time, format, or scale needed to inform decision-making. A commitment to ongoing collaboration on and evolution of data tracking tools and resources will help build longevity and innovation into the tracking and reporting process.

PERFORMANCE METRICS DASHBOARD: The City maintains an online dashboard to evaluate the impact of City services. Adding climate action metrics will help increase awareness and accountability of climate action in Des Moines.





EXPAND CLIMATE ACTION OUTREACH, ENGAGEMENT, AND CAPACITY

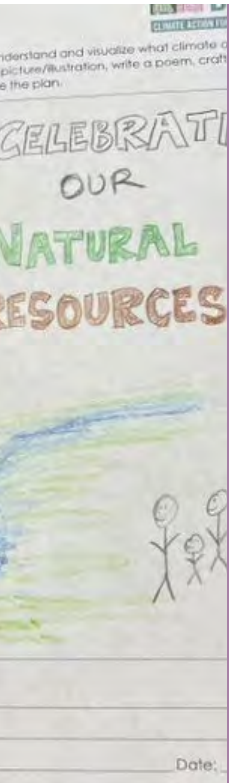
Through ADAPT DSM, the City of Des Moines commenced efforts to include community members in engagement and educational activities around climate action and adaptation. Future outreach must increase awareness of climate change challenges and opportunities in Des Moines, demonstrate how climate change impacts our daily lives. It should also expand understanding of what people can do as individuals and community members to respond and how the City can support them.

Throughout ADAPT DSM implementation, it will be necessary to continue community engagement and two-way communication about ADAPT DSM. Ongoing engagement with community members and organizations to explore participation barriers and refine implementation details will help build trust and equity-centered outcomes. Engaging the youth who were involved in plan development in shaping implementation and their future is a cornerstone of a successful engagement approach.

Ultimately, by convening and working together with community members and organizations, we can continue to identify new ways to collaborate, share and leverage resources, and grow our collective climate action and adaptive capacity.

The Climate Action Toolkit developed as part of the ADAPT DSM planning process is intended to build community awareness and capacity to strengthen plan implementation.

The toolkit includes the following tools (maintained as separate files for ease of use and distribution):



ADAPT DSM PLAN SUMMARY: A 6-page summary of this Climate and Adaptation Action Plan that can be used to introduce and highlight the most essential components of ADAPT DSM to the community.

COMMUNITY CLIMATE ACTION GUIDES: A set of 3, 2-page guides for 1) residents, 2) businesses, and 3) community organizations to understand how climate change might impact their daily lives and actions they can take to reduce their carbon footprint and build resiliency to climate change.

COMMUNITY ENGAGEMENT STRATEGY: A framework for continuing to engage with the Des Moines community around climate action during implementation. The framework includes engagement guiding principles, roles, and a calendar of engagement activities for 2023-2024.

ADAPT DSM SLIDE DECK: A base slide deck that can be used at community meetings to introduce the public to ADAPT DSM and share opportunities to get involved.



CONTINUOUSLY IMPROVE MUNICIPAL GOVERNMENT'S ROLE IN CLIMATE ACTION

The City of Des Moines is one of the metro's largest property owners and managers, overseeing nearly 1.5 million square feet of buildings and facilities on more than 4,000 acres. The City of Des Moines municipal government has a duty to act in the best interest of the community, leveraging taxpayer dollars to judiciously increase public benefit, welfare, and safety. Beyond those responsibilities, the City of Des Moines is committed to leading by example, modeling how organizations and individuals can manage, improve, and adapt facilities and properties to aggressively reduce emissions and increase climate resilience.

By piloting new technologies and integrating best practices, policies, and procedures, the City of Des Moines seeks to address the municipal contributions necessary to achieve ADAPT DSM goals. The lessons learned from municipal efforts will inform, simplify, and accelerate the adoption of emissions reduction and climate adaptation initiatives by other organizations, businesses, and institutions in our community.

A few examples of how the City of Des Moines is leading by example include:

NEW SOLAR-POWERED FACILITIES: The City is developing a solar field on an old landfill site to power a future animal control facility and greenhouse, exhibiting a pathway for carbon neutral new development.

NEW COMMUNITY RECREATION CENTER: The City is constructing a new recreation center at the current location of the Grubb YMCA and Brian Melton Field Park. The project is moving into the design and construction phase, providing opportunities to incorporate building features that minimize emissions and increase resiliency, such as all-electric building systems, electric vehicle charging stations, battery storage, and stormwater management features (e.g., permeable paving, bioretention cells, rain gardens). The new facility is anticipated to be completed in 2026.

BIRDLAND PARK AND MARINA MASTER PLAN: The recently completed Master Plan calls for \$54.4 million in construction improvements to the Birdland Park area, all of which is within the current 100-year flood plain. Demonstrating climate action leadership for this project involves addressing existing and projected flood risks due to climate change impacts, such as more frequent and intense precipitation events.



Integrating Climate Action with Other Efforts

ADAPT DSM is the Des Moines community's broad comprehensive climate action and adaptation plan. As a new resource, it is not yet institutionalized into municipal processes or decision-making. To strengthen the effectiveness of ADAPT DSM and to increase the potential for achieving its vision and goals, it is imperative for other City of Des Moines plans, policies, and programs to align with and integrate the ADAPT DSM core concepts, to the maximum extent possible.

Integration of ADAPT DSM with other planning and policy efforts includes reinforcing the vision and goals, linking goals and metrics, and aligning solutions and actions. Future municipal-led efforts include but are not limited to updates to PlanDSM, GuideDSM, and the development code.

Infusing ADAPT DSM concepts into municipal administration and resource allocation will further increase effectiveness. Potential administrative processes and procedures in which to elevate climate action and adaptation could include budgeting, capital improvement planning, procurement, department and staff reports, employee onboarding and training, and position descriptions and responsibilities.



PLANDSM UPDATE: ADAPT DSM includes multiple actions related to citywide policy. As the City launches the planning process in 2024 to update the Plan DSM Comprehensive Plan, the City can incorporate climate action goals and policy recommendations identified in this plan, including emissions reduction and adaptation goals and planning for future climate migration.

SUSTAINABILITY TRAINING AND EDUCATION FOR STAFF: The solutions and actions in this plan touch every City department, calling for action from all staff members. By providing sustainability training during onboarding and through continuing education, City staff are empowered to support plan implementation and accelerate progress toward goals.





LEVERAGE AND MAXIMIZE RESOURCES AND CAPITAL FOR CLIMATE ACTION

Long-term systems change across our community will require a mix of community member participation, infusion of new resources and investments, and reallocation of resources. To be successful, we will need to work strategically to identify, leverage, and expand resources for implementation.

Throughout the planning process, community members repeatedly expressed support for incentives to remove financial barriers and spur voluntary action at the individual and community scales. Financial resources for incentives could come through a variety of resources, such as the municipal budget, federal programs, and tax incentives¹, utility and service provider programs, philanthropic contributions, grants, and more. To maximize impact, the City of Des Moines may need to dedicate staff resources to ongoing tracking and pursuit of funding opportunities to support ADAPT DSM implementation.



Rather than the City of Des Moines city government serving as the central administrative conductor of all climate-related programs and initiatives, a distributed model where local government resources are used to catalyze and/or fortify other community organizations through public-private partnerships may create more capacity, resilience, and benefits. Clarification of leadership roles and identification of gaps helps reduce duplication of efforts and identify areas for future investment and collaboration.

INTERDEPARTMENTAL CLIMATE ACTION FUNDING TASK FORCE:

To effectively leverage the significant federal and philanthropic climate action funding expected over the next several decades, the City can form a task force with representatives from multiple departments to identify impactful projects for funding and coordinate applications. This task force can also identify and advance creative funding solutions to sustain climate action.



¹ A helpful summary of energy and infrastructure-related federal funding opportunities available to Iowans is available at: <https://iafederalfunding.org/>.

Embracing Collaboration, Partnerships, and Pilot Initiatives

As a community-wide effort, ADAPT DSM cannot be implemented or funded by the City of Des Moines alone. Instead, collaboration across individuals, neighborhoods, businesses, service providers, and community and regional organizations is vital to our success. Together, we must focus our attention on populations and areas most disproportionately impacted by climate change and its impacts, working together to define and implement projects and programs.

By shifting our bias towards action and trying new approaches, we can reduce bureaucratic inefficiencies and foster a culture of continuous improvement. Working towards a shared vision and goals will enable strategic and creative partnership opportunities. Together, we can break down barriers, reduce perceived risk and test new innovations in an environment more amenable to experimentation and pilot initiatives.

Finally, climate change is not limited in geographic scale, and regional collaboration and problem-solving is essential in reducing the various system-level risks and vulnerabilities. We must recognize our leadership role in the region and actively convene, initiate, partner, and contribute to climate action and adaptation solutions beyond our municipal boundary.



Photo credit: Shelia K-O

PRIORITY ACTIONS

This section details the near-term (2023-2025) resource needs, opportunities, and priority actions for ADAPT DSM implementation. The priority action summary table later in this section is organized by climate action catalyst. The table below summarizes the general approach for allocating resources for and investing in implementation, organized by climate action catalyst area.

Climate Action Catalyst	Resourcing Implementation
Providing Climate Action Leadership and Coordination	These actions will be implemented primarily through staff coordination and city policy. Investment beyond staff time may be necessary depending on the action and coordination needs.
Expanding Climate Action Outreach, Engagement, and Capacity	These actions will be implemented primarily through community outreach, marketing, and education/training. City implementation will require staff time plus costs associated with marketing and educational materials. Ultimately, community members will be responsible for the necessary behavior changes and investments, though the City leaders could choose to offer incentives to spur action.
Continuously Improving Municipal Government’s Role in Climate Action	These actions will be implemented primarily through City capital investments, and/or technical/outside resources to support plan/project development or completion. City implementation will require dedicated staff time for project/program administration. See the City’s Capital Improvements Program Budget for capital improvement project details.
Leverage and Expand Resources and Capital for Climate Action	These actions will be implemented primarily through a combination of funding sources, with an emphasis on creative approaches such as public/private partnerships.

NEAR-TERM RESOURCE NEEDS

Implementation of ADAPT DSM will require initial and ongoing investment by the City of Des Moines and the greater community. Over time, many of the solutions and supporting actions are anticipated to provide a positive financial return on investment (ROI) and/or reduce operating and maintenance costs for City government (e.g., energy efficiency, transportation electrification, etc.). The solutions and actions in this plan will also garner positive societal and community outcomes, including increased benefits and savings across health, welfare, and economic sectors. These benefits and savings can be further multiplied by prioritizing and embedding diversity, equity, inclusion, and justice.

Staffing

Initial plan implementation will begin with existing staffing. Staffing needs may grow, and staffing priorities and responsibilities may evolve as implementation progresses. Leveraging dedicated funding strategies, and maximizing external funding and public private partnerships have enabled other communities to accelerate progress in a fiscally responsible and beneficial way. Review and discussion of staffing needs is recommended with annual ADAPT DSM monitoring and reporting.



Program Administration

A dedicated, annual program administration budget would provide foundational resources to implement the engagement and coordination efforts in this plan. These funds could be used for marketing and outreach materials and supplies for community engagement and education efforts. They could also be used to support priority actions through incentives, outside/technical services, and pilot initiatives.

Requests for additional implementation resources (e.g., incentives, consulting services, miscellaneous equipment and supplies, etc.) would be handled through the annual budgeting process, with requests initiated by the department(s) responsible for leading action implementation).

Ongoing program administration could also include the exploration of long-term sustainable funding sources for climate action initiatives (in coordination with the Climate Action Funding Task Force). See Appendix E. Resource opportunities for preliminary funding concepts to consider.

Capital Improvements

The City of Des Moines has a robust Capital Improvements Program (CIP). A capital improvement project is a major expenditure involving all aspects of construction, renovation, and repair of City-owned buildings and infrastructure. A capital improvement project usually has a minimum useful life of 10 years, costs exceeding \$10,000, and is funded in whole or in part through the issuance of bonds, federal funds, state funds, or user fees specifically designated for that purpose.

The CIP Budget includes all the capital improvement projects for the current year and the five fiscal years following. It helps to better plan, prioritize, and coordinate capital improvement projects. Many of the priority actions identified in ADAPT DSM align with the [FY2024 Recommended Capital Improvement Program Budget](#). Considerations for ADAPT DSM actions and goals should be incorporated into future CIP budgets and plans.

NEAR-TERM RESOURCE OPPORTUNITIES

The City of Des Moines, in coordination with the Des Moines Area Metropolitan Planning Organization (MPO) and other partners, is tracking various funding opportunities related to the Infrastructure Investment and Jobs Act (IIJA) of 2021 and the Inflation Reduction Act (IRA) of 2022. The rollout of these opportunities is ongoing and will need to be monitored closely by the City’s interdepartmental funding sub-team. See Appendix E. Resource Opportunities for a summary of potentially applicable resources to support implementation, including IIJA and IRA opportunities.

As of May 2023, two funding initiatives currently under development that are directly related to ADAPT DSM include the U.S. Department of Energy’s [Energy Efficiency and Conservation Block Grant](#) (EECBG) program and the U.S. Environmental Protection Agency’s [Climate Pollution Reduction Grant](#) program. The preliminary conceptual use of these funds is summarized below.

Opportunity	Funding Amount	Funding Recipient	Preliminary Funding Concept & Other Details
EECBG Program	\$245,000	City of Des Moines	Receive a voucher for technical assistance to support energy efficiency improvements in coordination with existing Neighborhood Finance Corporation Energy Advantage deferred loan program.
Climate Pollution Reduction Grant	\$1 million (Phase I); TBD (Phase II)	Polk County (for Des Moines-West Des Moines Metro Area)	Program requirements for Phase I funding include development of a Priority Climate Action Plan (PCAP), due in early 2024; a Comprehensive Climate Action Plan (CCAP), due 2 years from the date of the award; and a Status Report, due at the close of the 4-year grant period. Many of the solutions and actions in ADAPT DSM could be included in Phase I. Phase II implementation grants will be awarded to entities included in Phase I plans, and could provide resources to advance ADAPT DSM actions.
Charging and Fueling Infrastructure Grant	Requested Amount: \$13 million City Match: \$325,000	City of Des Moines	This opportunity provides funding to strategically deploy publicly accessible charging infrastructure and other alternative fuel infrastructure.
USDA Urban and Community Forestry Grant Program	Requested Amount: \$5 million Awarded Amount: \$2.5 million	City of Des Moines	Funding to provide equitable access to trees and nature and the benefits they provide to communities.

PRIORITY ACTION SUMMARY

The priority actions represent “critical path” priorities that are essential to be completed and/or underway before other actions can begin. These are the actions to focus on first and include a mix of ongoing actions that are already underway and new actions to be initiated in the near-term (2023-2025). **This plan prioritizes 35 specific actions to be achieved by 2035.**



Under this 35x35 framework, community and stakeholder input helped elevate high impact actions that can drive our progress toward a more sustainable community. The priority actions share multiple benefits across goals and focus areas, and can leverage city, state, federal, and/or other funding sources to accelerate implementation.

See Appendix D. Action Details for more information about lead department(s) and community partners to support implementation of each priority action. Note that the lead department(s) will collaborate with the City Sustainability and Resiliency Team to request, prioritize, and align resources in accordance with annual City budget and capital improvement planning processes. While near-term implementation will focus on these actions, we will continue to identify opportunities and community need for the remaining actions identified throughout the planning process.

Provide Climate Action Leadership and Coordination

Priority Action
E-2A. Collaborate on and Maintain Clean Energy Implementation Plan
T-3B. Improve Transit Coordination and Engagement
F-1A. Increase Coordination of Local Food Systems
F-2A. Reconvene the Food Security Taskforce
C-1B. Monitor and Share Climate Data

Expand Climate Action Outreach, Engagement, and Capacity

Priority Action
B-1B. Expand Energy Efficiency and Demand Management Tools and Resources
B-1C. Improve Residential Efficiency
B-2B. Advance Building Decarbonization Incentives, Education, and Group Buys
E-1C. Expand Solar Adoption and Incentives
T-1B. Promote Infill, Redevelopment, and Adaptive Reuse
T-2C. Expand Active Transportation Education and Incentives
T-4E. Provide Transportation Electrification Education and Incentives
N-2A. Educate about Pollution Prevention and Stormwater Management
W-2A. Reduce Recycling Contamination
C-1A. Educate Community Members about Climate Risks and Preparedness
C-3A. Identify Champions and Build Climate Migration Knowledge

Continuously Improve Municipal Government's Role in Climate Action

Priority Action
B-1A. Upgrade Efficiency at City Facilities
B-2A. Pilot Municipal Decarbonization Projects
E-1A. Update Development Standards and Permitting Processes for Clean Energy
E-1B. Install Alternative Energy Sources with Storage for Municipal Facilities
T-1A. Plan for Walkable and Transit-Supportive Neighborhoods
T-2B. Improve Bicycle and Pedestrian Infrastructure
T-4A. Electrify Municipal Fleet
T-4D. Expand Electric Vehicle Charging Infrastructure
N-1A. Advance Urban Forest Master Plan Implementation
N-1B. Refine Tree Planting and Mitigation Standards
N-1D. Manage Public Properties for Multiple Benefits
N-2B. Advance Master Drainage and Watershed Management Plans
N-3B. Advance Flood Mitigation and Stormwater Improvement Projects
W-2B. Provide Waste Diversion Options in Public Spaces and at Public Events

Leverage and Expand Resources and Capital for Climate Action

Priority Action
B-1D. Leverage Federal Funding to Fill Gaps in Energy Efficiency Incentives
B-3D. Prioritize Resilient Capital Improvement Projects
E-2B. Advance 24/7 Carbon-free Transition and Management
E-2C. Explore Regional Energy Projects and Programs
N-2C. Incentivize Best Management Practices for Stormwater and Landcover on Private Properties



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GLOSSARY

Key Term	Definition
Alternative energy	Sources of energy and electricity that do not include fossil fuels and emit little-to-no carbon dioxide into the atmosphere. Examples include nuclear energy, wind, solar, and hydroelectric power.
Alternative fuel transportation	The use of non-gasoline/diesel fuel sources for the transportation sector. Sources can include electricity, natural gas, hydrogen fuel cells, and biodiesel.
Beneficial electrification	Replacing direct fossil fuel use (e.g., natural gas, propane, etc.) with electricity in a way that reduces overall emissions and energy costs.
British thermal unit (BTU)	One British thermal unit measures the heat content of fuels or energy sources. Using BTUs allows managers the ability to compare energy use across a variety of sources.
Building decarbonization	Efforts (policies, projects and/or programs) that reduce greenhouse gas emissions from buildings.
Carbon-free electricity	Sources of electricity that do not produce carbon dioxide, such as hydropower.
Carbon offset	A certificate representing the reduction of one metric ton of carbon dioxide emissions.
Carbon dioxide	A naturally occurring gas and a by-product of burning fossil fuels and biomass, as well as from land-use changes and other industrial processes. It is the principal human-caused greenhouse gas that affects the earth's radiative balance. It is the reference gas against which other greenhouse gases are measured.
Carshare	Car rental program where people rent cars for short periods of time, often by the minute or hour.
Climate change	Long-lasting changes in average weather conditions encompassing both increases and decreases in temperature as well as shifts in precipitation, severe weather events, and other features of the climate system.
Clean energy	Energy that comes from zero emission sources that do not pollute the atmosphere when used.
Community solar	Local solar facilities shared by multiple community subscribers who receive credit on their electricity bills for their share of the power produced.
Distributed renewable energy	Technologies that allow renewable energy to be generated at or near where it will be used. This applies to the residential, commercial, and industrial sectors.
Greenhouse gas (GHG)	Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.
Capital improvement	A major expenditure involves all aspects of construction, renovation, and repair of buildings and infrastructure. Typically refers to City-owned buildings and infrastructure. In that context, a project that usually has a minimum useful life of 10 years, costs exceeding \$10,000, and is funded in whole or in part through the issuance of bonds, federal funds, state funds, or user fees specifically designated for that purpose.
Climate action	Activities to reduce greenhouse gas emissions and strengthen resiliency and adaptation to climate-induced impacts.

Key Term	Definition
Climate adaptation	Actions that help communities cope with the effects of rapid climate change.
Climate equity	Climate action that is inclusive of environmental justice and racial and economic equity. Equitable climate actions reduce disparate harms from the effects of climate change by prioritizing communities that are disproportionately impacted. Equitable climate actions also avoid placing unfair burdens on communities that have contributed the least to the greenhouse gas emissions that cause rapid climate change.
Climate migration	The movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a state or across an international border.
Climate mitigation	Human intervention to reduce the human impact on the climate system.
Climate pollution	Emissions of greenhouse gases like carbon dioxide and methane into the atmosphere.
Climate resilience	The ability and extent to which systems can prepare and plan for, absorb, respond to, recover from, and adapt to the effects of climate-related shocks and chronic stressors.
Climate resilience hub/shelter	A facility that supports residents, distributes resources, and coordinates communication while also reducing carbon pollution. Resilience hubs often sprout out of existing community spaces like recreation centers, but nonprofits and faith-based organizations also play host depending on local needs.
Climate risk	Potential adverse consequences for humans and social-ecological systems resulting from the interaction of climate-related hazards with the vulnerabilities of the societies and systems exposed.
Climate vulnerability	The potential to be adversely affected by rapid climate change due to geographic, social, economic, or other conditions. Reference to “vulnerable” populations is in the context of acknowledging system deficiencies rather than judgment of individuals or their neighborhoods.
Drought management	Mitigation efforts and/or a response plan, which can reduce the impact of a drought, an exceptional period of water shortage that impacts ecosystems and people.
Distributed renewable energy	Electricity that is generated from renewable energy sources near the point of use, instead of centralized generation sources from power plants.
Electric vehicle (EV)	A vehicle that uses an electric engine for all or part of its propulsion.
Energy cost burden	Percentage of gross household income spent on energy costs.
Energy demand	Consumption of energy by human activities. Energy demand includes electricity, transportation, and industrial processes.
Energy efficiency	The reduction of energy use through efforts like building insulation, energy-efficient appliances, and more efficient lighting.
Energy (battery) storage	Large batteries made out of materials like lithium ion or lead acid can store electricity until it is needed by the power grid.
Environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to environmental policies.

Key Term	Definition
Flood risk	How likely a specific area is at risk for flooding. Maps by the Federal Emergency Management Association (FEMA) are one tool that communities can use to identify high-risk areas.
Food security	Individuals have physical, social, and economic access at all times to sufficient and nutritious food that meets dietary needs.
Global warming	The increase of global surface temperatures relative to a baseline time period. The most commonly used baseline time period is 1850-1900, which is averaged to remove variations that can occur from one year to the next.
Infrastructure	Fundamental city systems and buildings that serve residents. Infrastructure can refer to water and sewer lines (public works), but also roads, bridges, and fire facilities.
Kilowatt (kW)	A measure of 1,000 watts of electrical power.
Kilowatt hour (KWh)	A unit of electricity consumption.
Local food production	Food that is produced in close geographic proximity to where it is consumed, often within 400 miles.
Megawatt (MW)	A unit of electric power equal to 1 million watts.
Metric tons carbon dioxide equivalent (MTCO₂e)	A unit of measure for greenhouse gas emissions. The unit "CO ₂ e" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one-unit mass of carbon dioxide (CO ₂), based on the global warming potential (GWP) of the gas.
Microgrid	A local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously.
Micro-mobility	Transportation using lightweight vehicles such as bicycles or scooters, especially electric ones that may be borrowed as part of a self-service rental program in which people rent vehicles for short-term use.
Native ecosystems	Naturally occurring plants and animals that support insect and bird life.
Net-zero emissions	Balance between the amount of greenhouse gases that are produced and the amount reduced and removed from the atmosphere.
On-site solar	Roof-top and ground-mounted solar systems installed at the property of the entity that owns or leases the system.
Power purchase agreement (PPA)	A financial agreement where the customer invests in a renewable energy project in exchange for a portion of the renewable energy credits (RECs) generated. The seller builds or installs the renewable energy generation project and the buyer pays for the energy that is generated on a per unit basis with the cost of the seller's investment factored in.
Renewable energy	Energy generated from fuel sources that naturally regenerate over a short period of time. Examples of these fuel sources include sunlight, wind, moving water, biomass, and geothermal. New and existing energy sources that are generally non-reliant on fossil or carbon-based fuels including solar, wind, geothermal and new small-scale hydro-electric facilities. This list is not exhaustive and other renewable energy technologies or practices may be considered on a case by case basis. In the future, this interpretation could be modified based on advances in energy technology, regulatory changes or other relevant reasons.

Key Term	Definition
Renewable energy credit (REC)	When 1 MWh of renewable energy is created, 1 renewable energy credit (REC) is created. RECs are considered currency used to measure renewable energy produced and used to meet renewable energy requirements or goals. RECs represent the environmental benefits associated with energy produced from a renewable source, such as wind or solar.
Science-based target (SBT)	The reduction of greenhouse gases in line with the latest recommendations from the Intergovernmental Panel on Climate Change (IPCC) to meet commitments outlined in the Paris Agreement to keep warming below 1.5 °C.
Social cost of carbon	A measure of the economic harm from the impacts from emitting carbon dioxide in the atmosphere.
Solar photovoltaic (PV)	Solar cells/panels that convert sunlight into electricity (convert light, or photons, into electricity, or voltage).
Source water protection	Efforts that mitigate, maintain, or improve the quality of drinking water sources.
Transportation electrification/ decarbonization	Involves shifting cars, trucks, and buses from fossil fuels to electric sources. This applies to all sectors including personal, commercial, and governmental uses.
Transit-oriented development	Dense and walkable spaces near transit. In its most ideal form, transit-oriented development utilizes mixed use of commercial, residential, office, and entertainment to create spaces that are vibrant and equitable.
Tree canopy	Mature leafy green trees that provide shade to a community. A town's tree canopy can provide additional benefits like wildlife habitat and stormwater mitigation.
Utility-scale clean energy	Very large renewable electricity installations (e.g. greater than 1 MW) that are implemented by the utility and fed directly into the utility's electric grid. These installation projects do not require a utility customer to opt-in to receive electricity from these sources.
Vehicle miles traveled (VMT)	A measure of the amount of travel for all vehicles in a geographic region, over a given period (typically one year). It is the sum of all miles traveled by all vehicles.
Water conservation	The act of using water efficiently to avoid waste. Water conservation activities can include things like adding low-flow plumbing fixtures.
Watershed management	Efforts aimed at defining and addressing existing or future water issues from a variety of pollution sources. The management plan is defined by the needs of the community and often focuses on water quality.
Waste diversion	The process of reducing waste delivered to the landfill. Waste diversion can be accomplished via recycling, composting, waste reduction, or reuse.
Waste generation	The amount of materials in a community discarded. This often includes landfill items as well as those items that are eventually recycled and composted.
Waste recovery	The act of diverting waste from the landfill by activities like recycling.

APPENDICIES

The following ADAPT DSM appendices are available as separate files:

Appendix A. Community Risk and Vulnerability Assessment

Appendix B. Technical Analysis Summary

Appendix C. Solution Co-Benefits

Appendix D. Action Details

Appendix E. Resource Opportunities

Appendix F. Engagement Summary

Appendix G. Climate Action Toolkit

