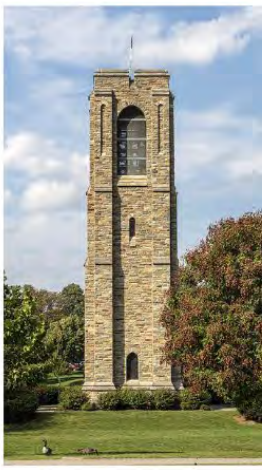
Frederick Community-Wide Climate and Energy Action Plan



October 2025

FREDERICK COUNTY, MARYLAND 1748

FREDERICK
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FREDERICK COUNTY GOVERNMENT

OFFICE OF THE COUNTY EXECUTIVE

Jessica Fitzwater
County Executive

John K. Peterson, Chief Administrative Officer

Dear Frederick County Community,

I am proud to introduce Frederick County's first Community-Wide Climate and Energy Action Plan (CEAP). This plan builds off the hard work our community invested to develop the 2021 Climate Response and Resilience Report. The CEAP creates accountability. It adds local assessments, measurable goals, and new data integration. The science is clear: climate change is already affecting our region through hotter summers, intense storms, and shifting weather patterns. Preparing for these challenges and reducing harmful actions is necessary.

Climate action also creates opportunities. By investing in energy efficiency, renewable energy, cleaner transportation, and smarter land use, we can strengthen our economy and stay competitive. This CEAP aligns with state, regional, and international standards, including the Metropolitan Washington Council of Government's Climate and Energy Action Plan.

We want everyone to be part of climate solutions. Equity and inclusion are our priorities. Throughout 2025, hundreds of residents, businesses, and nonprofits helped to shape this plan. That is the Frederick County way. We aim to ensure all community members can share in the benefits of cleaner air, lower energy costs, and healthier living environments.

Your voices shaped this vision, and your continued participation will bring it to life. Over the next year, we will focus on building community partnerships, advancing initiatives, and establishing milestones. We will collaborate with local organizations, businesses, and residents to launch pilot projects on energy efficiency, renewable energy, and climate resilience. Forming an inclusive advisory group will guide decision-making and ensure equity remains central.

Frederick County Government prides itself in leading by example. In 2023, we released our Climate and Energy Action Plan for Internal Government Operations, committing to sustainability goals. Our work shows that good environmental practices make economic sense. This new plan extends that approach to the community. Together, we can demonstrate the business case for "going green"—lower costs, stronger resilience, and new opportunities for innovation.

Climate action is a shared responsibility. This plan belongs to all of us, and its success depends on our collective effort. By working together, Frederick County can remain a place where families thrive, businesses grow, and natural resources are preserved. Thank you for joining us. I look forward to our progress together.

With gratitude and commitment,

Jessica Fitzwater
Frederick County Executive

Michael C. O'Connor
Mayor

FREDERICK
OFFICE OF THE MAYOR

Oct. 22, 2025

Dear Frederick City Community,

Climate change is a part of everyday life here in the City of Frederick — and that's why our efforts to expand on the work of the Climate Emergency Mobilization Workgroup (CEMWG) are so important. This *Climate and Energy Action Plan (CEAP)* reflects ideas from City and County residents and staff, representing our shared commitment to a more resilient and adaptive community.

Grounded in local data, the CEAP provides a clear baseline to help inform achievable goals for our future. Continuing the vision of the CEMWG, this plan builds upon their foundation by incorporating additional partners and significant community input — because every resident has a role to play in implementing it.

Partnerships are critical to building a stronger, more sustainable Frederick. Community organizations, local leaders, and residents will all be key in turning ideas into action. We will look to our partners to help bring neighborhoods together around common goals that make Frederick an even better place to live, work, and play.

In 2021, the City released its *Climate Action Plan for Government Operations* to address the impacts of climate change in City-owned facilities. That plan showed that going green can deliver both environmental and economic benefits. With this broader community plan, we aim to demonstrate the same potential for all who call Frederick home.

Climate change is already shaping our community, but the CEAP offers a shared path forward — one that reflects the voices of all residents, neighborhoods, and businesses across our City and County. I look forward to taking these next steps toward a more sustainable and resilient future, together.

Sincerely,
Michael O'Connor

Mayor, City of Frederick

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Glossary & Acronyms

AACE	Access to Abundant Clean Energy
AACF	Asian American Center of Frederick
AEO	Annual Energy Outlook
AIM Act	American Innovation and Manufacturing Act
ALICE	Asset Limited, Income Constrained, Employed
AQI	Air Quality Indicators
BAU	Business-as-usual
BEPS	Building Energy Performance Standards
BEV	Battery-electric vehicles
CCAP	Comprehensive Climate Action Plan
CDI	Critical Digital Infrastructure
CEMWG	Climate Emergency Mobilization Workgroup
CHERISH	Cumulative Harms to Environmental Restoration for Improving our Shared Health
CNG	Compressed natural gas
CRRR	Climate Response and Resilience Report
CRS	Community Rating System
CRVA	Climate Risk and Vulnerability Analysis
CSNA	Climate Solutions Now Act
DEE	Division of Energy and Environment
DOT	Department of Transportation
EPA	Environmental Protection Agency
EUI	Energy Use Intensity
EV	Electric vehicles
FEMA	Federal Emergency Management Agency
Fossil Fuels	A general term for organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years.[i]
GGRA	Greenhouse Gas Emissions Reduction Act
GHG	Greenhouse gas

GPC	Global Protocol for Community-Scale Greenhouse Gas Inventories
GWP	Global warming potential
HFC	Hydrofluorocarbons
HHFCM	Habitat for Humanity of Frederick County, Maryland
HMCAP	Hazard Mitigation and Climate Adaptation Plan
HVI	Heat Vulnerability Index
ICEV	Internal combustion engine vehicles
ICLEI	Local Governments for Sustainability
IRA	Inflation Reduction Act
LEAP	Local Energy Alliance Program
LEED	Leadership in Energy and Environmental Design
LMI	Low- and moderate-income
MARC	Maryland Area Rail Commuter
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MEA	Maryland Energy Administration
MMT	Million metric tons
MWCOG	Metropolitan Washington Council of Governments
NFIP	National Flood Insurance Program
NRCS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
REC	Renewable Energy Certificate
RENEW	Responding to Emergency Needs from Extreme Weather
RPS	Renewable Portfolio Standard
STRIDE	Strategic Infrastructure Development and Enhancement
USCP	U.S. Communities Protocol for Accounting and Reporting Greenhouse Gas Emissions
USDA	United States Department of Agriculture
VMT	Vehicle miles traveled
WAP	Weatherization Assistance Program

ZEHES	Zero-Emission Heating Equipment Standard
ZEV	Zero-Emission Vehicle

Executive Summary

What Is the CEAP?

The Climate and Energy Action Plan (CEAP) for the City of Frederick and Frederick County is a data-backed, community-focused plan to take decisive steps toward a bright future in Frederick. Frederick is not waiting for the worst impacts of climate change, energy demands, and other stressors to take hold. Community members, businesses, nonprofit partners, and government agencies are working together to turn innovative ideas into actions to improve daily life across Frederick. This plan aims to align those actions, propose new and needed solutions, and achieve Frederick's core goals around climate mitigation and resilience.

The CEAP is a direct partnership between the City of Frederick, Frederick County, and the Metropolitan Washington Council of Governments. This collaboration is a prime and unique example of how regional partnerships can enhance climate action, especially when community members and local experts come together to provide direct feedback and guidance. Six technical working group meetings, 18 in-person public engagements, and a survey with over 650 responses all provided crucial input during the CEAP development.

This CEAP also builds upon the suite of previous plans and assessments that the City, County, and regional partners have already accomplished. In 2020, the City of Frederick Mayor and Board of Alderman, and the Frederick County Council adopted a Climate Emergency Resolution, which resolved to cut greenhouse gas emissions to half of 2010 levels no later than 2030 and reduce levels 100% by 2050. To guide the work, the governments established an independent volunteer-based Climate Emergency Mobilization Workgroup (CEMWG). The workgroup's Climate Response and Resilience Report (CRRR) offers recommendations based on the work of over 70 volunteers, who together invested 18,500 hours over the course of a year. The CRRR provided a basis for many of the strategies and actions pursued in this CEAP.

This CEAP takes a necessary next step, building on the strong foundation provided by those previous community-wide efforts. Frederick's local plans need to meet specific standards to be included in regional climate plans developed by the Metropolitan Washington Council of Governments. They must quantify greenhouse gas (GHG) emissions from different sectors and include plans to mitigate emissions consistent with regional goals. They must also include a climate risk and vulnerability assessment using local climatological data and predictions, and a resilience plan to address the identified risks and vulnerabilities. This CEAP incorporates those elements, aligning with state, regional, and international standards and incorporating localized data and analyses.

Aligning efforts across the region and state is critical for achieving progress through climate action. In 2019, the Metropolitan Washington Council of Governments received international recognition from the Global Covenant of Mayors as one of four regions in the United States leading the way on mitigating climate change. The Climate and Energy Action Plan created by the Metropolitan Washington Council of Governments in 2020 was submitted to the Global Covenant of Mayors as

the first regional plan in the United States to meet the Paris Agreement. While the federal government is no longer part of the agreement, the state and region still are, and the City and County's emissions reduction goals are consistent with this agreement. This CEAP also aligns with the goals of Maryland's Climate Pathway Report published by the Maryland Department of the Environment (MDE) in June 2023, which affirms the State's goal to achieve 60% reduction of GHG emissions by 2031 relative to 2006 levels, and attain a net-zero economy by 2045.

This CEAP comes at a time of rapid and significant changes at local, state, regional, and national levels. The federal government has eliminated and significantly scaled back programs to track and reduce greenhouse gas emissions and implement cleaner sources of energy. The State of Maryland is pushing for more local energy generation in Maryland and more energy from renewable sources to combat rising energy costs and address the state's status as a net importer of electricity. State emissions standards for buildings are rapidly evolving. The state of Maryland has also embraced the data center industry with its policies, but has not yet developed policies to address greenhouse gas emissions from electricity use and generators. The strategies and actions in this CEAP are designed to be flexible and responsive to shifting circumstances, but they will also evolve as the national, state, regional, and local climate landscape continues to change.

Frederick's Climate Risks and Vulnerabilities

Climate change is already affecting communities in Frederick. Extreme heat, flooding, and severe weather have worsened in the region since the 1950s. These trends are projected to accelerate (see Table 1).

This plan includes a "Climate Risks and Vulnerabilities Assessment" in line with MWCOG's regional climate planning that identifies key climate hazards and associated risks in Frederick based on local data. Looking forward, Frederick's climate in 2080 is predicted to look and feel like today's climate in northeastern Louisiana:

- By 2050, maximum temperatures could increase by 5.3-6.6°F, and minimum temperatures could increase by 5.0-6.4°F, and 50% of the land area in Frederick is already either highly or very highly vulnerable to extreme heat.
- Precipitation events are expected to become less frequent but more intense, with an increase in short-duration, high-intensity events, increasing the risk of flooding. The number of days per year with more than 1 inch of precipitation is projected to increase from a historical average of 4.7 days per year to 5.1-5.8 days by 2050 and 5.7-6.8 days by 2080.

Table 1. Summary of Projected Changes in Key Climate Hazards for Frederick County (U.S Federal Government, 2023).

Hazard	Projected change in severity	Projected change in frequency
Extreme heat	+	+
Heavy Precipitation	+	+
Drought	+	+
Winter storms	+	+/-

Frederick cannot wait to act. These challenges present opportunities to not only prepare for tomorrow but also make life in Frederick better today.

Frederick aims to protect communities from the negative consequences of climate change by achieving the following resilience goals (Figure 1). These resilience goals are founded on those articulated in the City of Frederick Comprehensive Plan, in Livable Frederick (Frederick County's comprehensive plan), and in the Climate Response and Resilience Report (CRRR). Each of these goals are covered by a proposed resilience strategy in this CEAP (summarized in Table 4 further below).

Figure 1. Frederick's Resilience Goals.

Infrastructure and the Built Environment

- A sustainable, multi-modal transportation system that ensures safe, efficient, reliable, and affordable mobility for all community members.
- Reliable and efficient water, sewer, and stormwater infrastructure that supports sustainable growth, protects natural resources, ensures clean water, and minimizes environmental and human health impacts.
- A resilient and reliable energy supply that meets the demands of homes, businesses, and emergency services.

Health and Well-Being 	• Accessible parks, recreation, and cultural landmarks that enrich the community. • A healthy environment with fresh air, safe water, and reliable medical services to promote community well-being. • A diverse and vibrant economy that creates employment opportunities, reduces financial insecurity, and ensures long-term community prosperity.
Emergency Management 	• Proactive and reliable emergency services to support the community during crises.

Greenhouse Gases in Frederick

The strategies and actions outlined in this CEAP are designed to respond directly to current climate data in Frederick and project future trends.

This CEAP evaluates GHG emissions by sector in Frederick County and the City of Frederick based on 2018 data, the latest year with reliable data available at the time of this plan's development. Frederick County and the City both partnered with MWCOG to develop inventories of GHG emissions for the years 2005, 2012, 2015, 2018, and 2020.[1] While the 2020 inventory offers valuable insights, its emissions profile was influenced by temporary disruptions related to the COVID-19 pandemic, including reduced travel and changes in energy use, so 2018 was used as the base year for this analysis. Where available, more recent utility data from 2023 was incorporated to improve estimates of building energy consumption and enhance the accuracy of emissions projections.

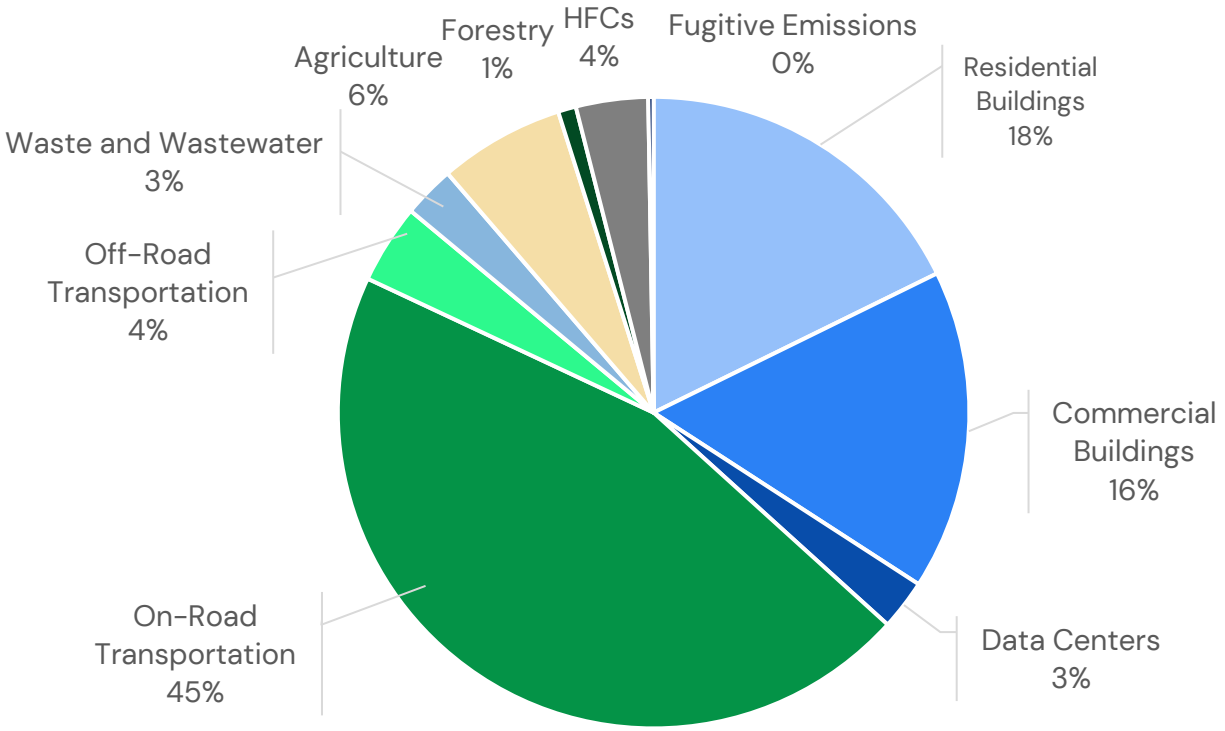
In 2018, total gross GHG emissions in Frederick County were estimated at 3.6 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), representing a 37% reduction from 2005 levels, despite 17% growth in the County's population. Those 2018 emissions were roughly equivalent to the annual emissions from 840,000 gasoline-powered passenger vehicles. Emissions from the City of Frederick are included within the Countywide inventory, but this CEAP also includes a focused analysis of emissions trends within the City (Figure 7).

Emissions in Frederick County come from a variety of sectors (Figure 2). Transportation was the largest contributor to the County's gross emissions in 2018, contributing roughly 45% of the total. Residential and commercial buildings accounted for an additional 34%, while the remainder of emissions came from sources including solid waste, wastewater treatment, agriculture, and fugitive

[1] These inventories were prepared using ICLEI's ClearPath Community-Scale Inventory Module and are compliant with the U.S. Communities Protocol for Accounting and Reporting Greenhouse Gas Emissions (USCP) and Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC). For more details, see MWCOG's Greenhouse Gas Emissions Inventories Methodology Guide.

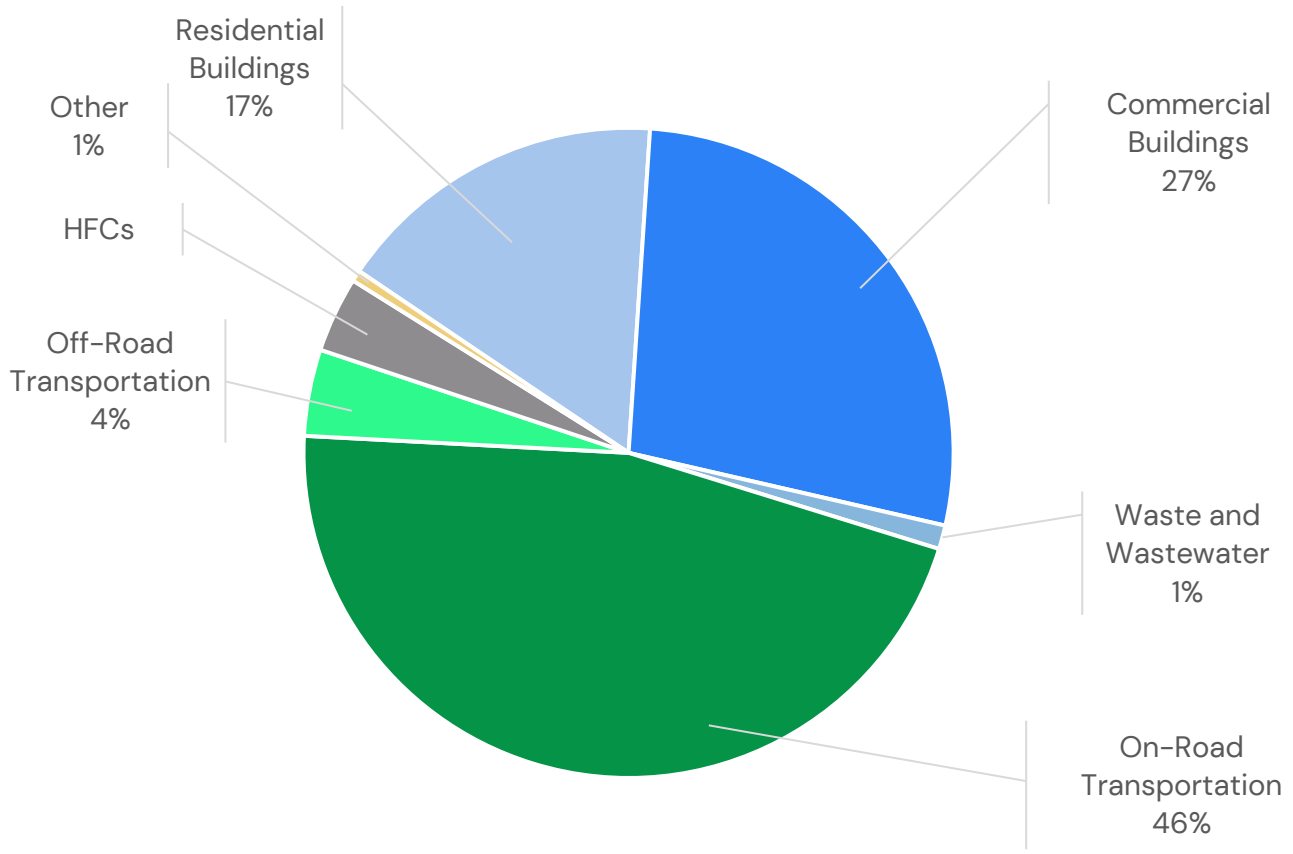
emissions. The largest reduction occurred in the commercial buildings sector, driven by decreased electricity emissions intensity due to a cleaner regional power grid.

Figure 2. Frederick County 2018 GHG Emissions by Activity ($MMTCO_2e$).



Although the City of Frederick's GHG emissions are included in the Countywide inventory, this CEAP also provides a focused analysis of emissions trends within the City, reflecting its distinct urban profile and development patterns (Figure 3). The same methodology and "Business as Usual" (BAU) assumptions used in the County analysis were applied to estimate emissions for the City. In 2018, total gross GHG emissions in the City of Frederick were estimated at 1.05 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), representing a 20% reduction from 2005 levels. Transportation was the City's largest source of emissions in 2018. Residential and commercial building energy use accounted for the next largest shares, reflecting energy demand in homes, offices, and retail spaces.

Figure 3. City of Frederick 2018 GHG Emissions by Activity ($MMTCO_2e$).



*Other includes emissions from agriculture and data centers.

Business As Usual Scenario: What Will Frederick Emit If No Action Is Taken

This CEAP estimates Greenhouse Gas Emissions in Frederick County through 2050 under a "Business as Usual" (BAU) scenario using the 2018 inventory as the base year and incorporating historical data from 2019 to 2023 where available. The BAU scenario (Figure 4, Table 2), accounts for key drivers such as population growth, housing and commercial development, existing state policies around electrical grid decarbonization — including the State of Maryland's Renewable Portfolio Standards (RPS), which require that about 50% of the electricity consumed in MD comes from renewable sources by 2030 — and IRA tax credits, but does not include any additional emission reductions from future climate initiatives. The BAU was developed before the current federal administration rolled back many of the existing tax credits for rooftop solar, electric vehicles, and other climate-supportive incentives, so Frederick's emissions in the future will be more significant than the figures shown here unless those incentives are reinstated. A summary of BAU assumptions is provided in Appendix A.

Under the BAU scenario, the County's emissions are projected to increase 36% by 2050 compared to 2018 levels. This projected growth is primarily driven by increased electricity use in data centers (see further discussion of this below).

Figure 4. Frederick County BAU Emissions Projections.

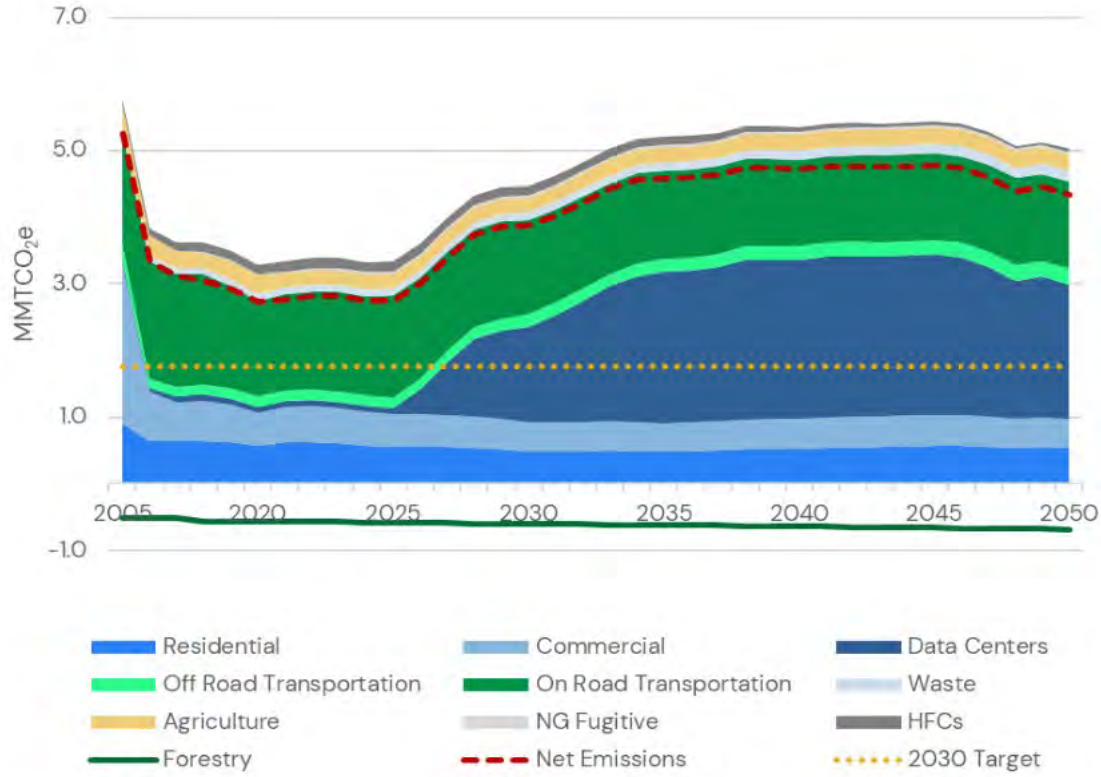


Table 2. BAU Emissions by Sector ($MTCO_2e$).

Emissions Sector	2005	2018	2030	2050
Buildings	3,308,791	1,246,090	927,327	980,694
Data Centers	67,363	93,763	1,433,867	2,007,373
Transportation	1,911,049	1,799,910	1,594,358	1,549,645
Waste and Wastewater	118,966	96,799	117,659	159,483
Agriculture	281,991	234,596	191,188	195,776
Forestry	(515,858)	(563,520)	(600,507)	(681,599)
Hydrofluorocarbons and Refrigerants	83,035	134,732	139,615	40,471

Emissions Sector	2005	2018	2030	2050
Fugitive Emissions from Natural Gas Distribution	7,323	9,918	6,683	7,209
Total Gross Emissions	**5,824,259**	**3,649,424**	**4,440,123**	**4,964,036**
Total Net Emissions	**5,262,661**	**3,052,287**	**3,810,191**	**4,259,052**

The BAU and Data Centers in Frederick County

The Metropolitan Washington region is the world's leading data center hub, with nearby Loudoun County, Virginia, hosting the highest concentration of data centers globally. Data centers can bring significant economic benefits, including tax revenue and jobs, and are key to the world's technology and digital economy. However, the computing equipment can use significant amounts of electricity, depending on the service it is providing. Some data centers also use water for cooling, and those that do can require significant amounts, though many are not using fresh, potable water. Data centers consume 10 to greater than 50 times the energy per floor space of a typical commercial office building.[ii]

Several large-scale data centers have already been approved in the county, including a 2 GW campus expected to become fully operational by 2035. Data center growth largely drives the overall 36% increase in GHG emissions by 2050 compared to 2018 levels in the BAU scenario. While as of 2018, data centers made up just 3% of Frederick County's estimated 3.6 million metric tons of gross emissions, they are projected to make up around 40% of Frederick County's estimated 5.0 million metric tons of emissions by 2050 if no mitigating actions are taken. These projections include existing square feet of data centers already built in Frederick at the time of this CEAP's publication, the 2 GW campus referenced above, 1.2 million square feet of approved future data centers and 1.4 million square feet of data centers planned but not yet permitted at the time the analysis was conducted in January 2025. Most of the projected emissions from data centers in the BAU scenario come from the 2 GW campus. The permitted and planned square feet make up 11% of 2050 data center emissions.

Reducing emissions from data centers will be crucial to meeting emissions reductions goals. This will require powering data centers with cleaner electricity, and Frederick is heavily reliant on state leadership to successfully implement more aggressive grid decarbonization policies to do so. The state has supported data center growth in MD through its State tax policies. Strong state policies will be needed to ensure those data centers do not produce emissions at the scale projected in the BAU.

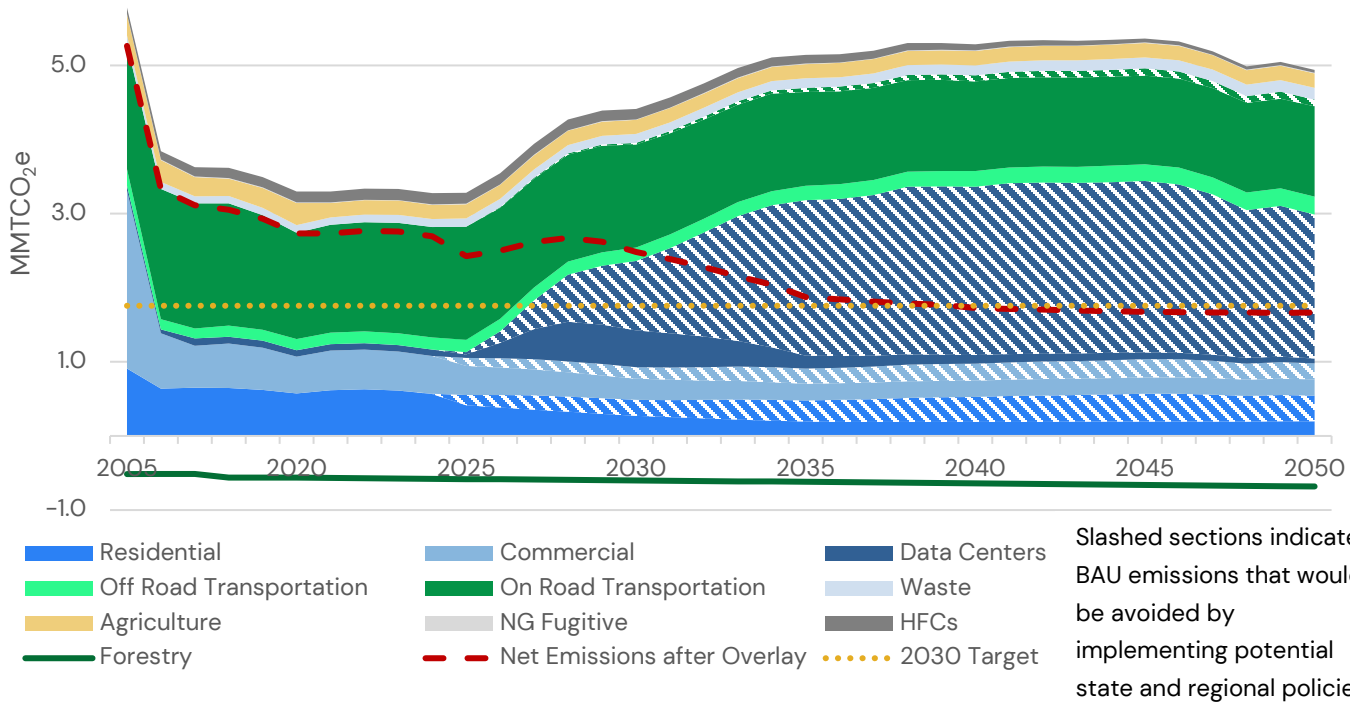
The BAU modeling assumes Maryland meets its RPS goal of about 50% of the state's electricity coming from renewable sources by 2030, and that all states in Regional Greenhouse Gas Initiative (RGGI) do not exceed their electricity emissions caps. However, MD and RGGI are both exploring

more aggressive electricity emission reduction pathways that would have substantial implications for Frederick's electricity emissions, listed in Table 3.

Table 3. Comparison of Current and Potential Policies that Could Reduce GHG Electricity Emissions in the BAU Scenario.

Current Electricity Emissions Policies (BAU - Figure 4)	Potential Electricity Emissions Policies (Figure 5)
• MD Renewable Portfolio Standards (RPS) attainment: about 50% of the electricity consumed in MD comes from renewable sources by 2030 • Attainment of RGGI targets for each state in the PJM region	• Strengthening of MD's existing RPS target to 100% clean electricity by 2035, as described in Gov. Wes Moore's Executive Order 01.01.2024.19 [iii] • Strengthening RGGI to achieve a zero-emissions cap by 2035 [iv]

Figure 5. Frederick County BAU Emissions, with Emissions that Would be Reduced if Potential State and Regional Electricity Policies Were Passed.



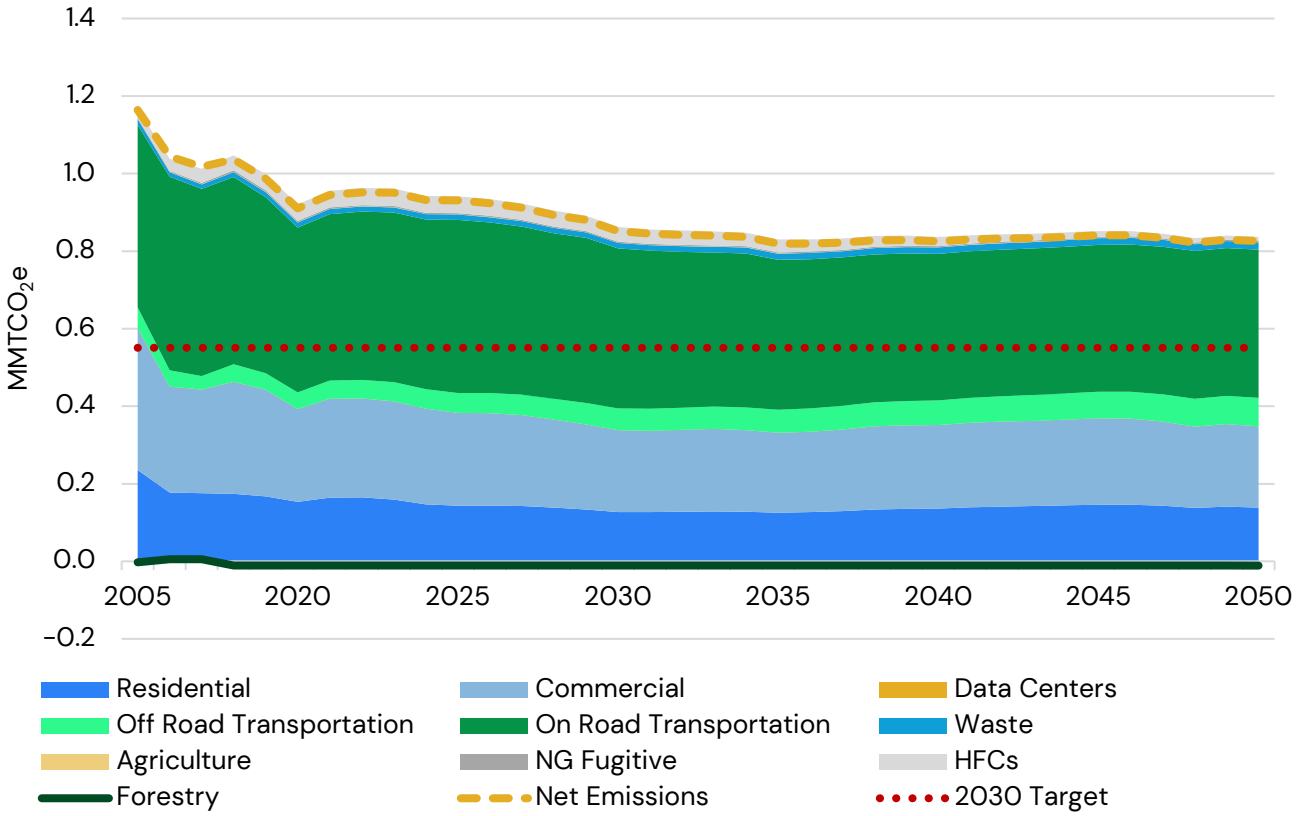
If MD and RGGI pass and successfully implement these regulations, the impact will be huge—they will reduce Frederick County's net BAU GHG emissions by 61% annually by 2050, compared to BAU without them. The slashes within each sector in Figure 6 illustrate the potential BAU emission reductions that would result from these state policies. Table 3 describes the regulations that the state of Maryland and RGGI would need to pass and implement for the BAU in Figure 5 to become a

reality. Other states have already adopted similarly aggressive regulations; for example, the Commonwealth of Virginia has committed in law to achieving 100% carbon-free electricity by 2050.

City of Frederick BAU

This CEAP includes a BAU specific to the City of Frederick in line with the methodology and assumptions for the County's BAU. Sectoral trends in transportation, buildings, and waste are generally consistent with those observed at the county level (Figure 6).

Figure 6. City of Frederick BAU Emissions Projections.



Climate Strategies for Frederick

This CEAP includes strategies to prevent climate change from worsening by mitigating the emissions predicted in the BAU scenario, and strategies to protect against the worst impacts of climate change predicted in this CEAP's Climate Risks and Vulnerabilities Assessment. These strategies respond directly to local data and the results of those analyses conducted for the CEAP and also achieve other co-benefits to improve daily life in Frederick. The strategies (Table 4) are separated into two key goal categories:

- **Mitigation strategies prevent worsening high emissions trends.** Frederick City and County aim to mitigate or reduce rates of GHG emissions. While Frederick cannot reduce these emissions single-handedly, the strategies in this CEAP represent a fair share of reductions consistent with

regional and international commitments. Together, efforts across the globe aim to stop the impacts of climate change at the source of the problem: Greenhouse gas emissions from non-natural sources. Reducing GHGs slows the rate of warming which is causing increasing temperatures, flooding, and other forms of severe weather.

- **Resilience strategies protect against climate hazards and impacts.** Building resilience and adapting to climate impacts directly helps the local community, ecosystems, and economy prepare for and respond to the impacts of climate change, such as extreme weather events and shifting temperatures. These strategies focus on strengthening infrastructure, protecting natural resources, and enhancing social systems to reduce vulnerability and ensure long-term sustainability.

Table 4. Overview of the CEAP Mitigation and Resilience Strategies for Frederick.

Sector	Strategy
Mitigation Strategies	
Buildings	B1: Accelerate Deep Building Energy Efficiency and Electrification.
Power	P1: Accelerate Development of Distributed Renewables and Battery Storage.
Transportation	T1: Reduce Emissions from On-Road Light-Duty Vehicles.
	T2: Reduce Vehicle Miles Traveled.
Waste	W1: Encourage Waste Diversion.
Agriculture	A1: Reduce Methane Emissions from Livestock.
	A2: Reduce Emissions from Agricultural Soils.
Natural and Working Lands	NWL1: Conserve and Expand Urban Tree Canopy.
	NWL2: Conserve and Manage Natural Resources.
Resilience Strategies	
Infrastructure and Built Environment	IBE1: Reinforce Transportation Infrastructure.
	IBE2: Enhance Resilience in Water Supply.
	IBE3: Accelerate Green & Resilient Infrastructure.
Health and Well-Being	HW1: Increase Urban Green Spaces.
	HW2: Protect Worker Health and Safety.
	HW3: Increase Access to Cooling Infrastructure.
	HW4: Enhance Food System Resilience.

Sector	Strategy
Emergency Management and Resilience	EMR1: Connect People to Resources.
	EMR2: Increase Education and Awareness.

The strategies summarized in Table 4 each include specific actions that can be taken by community members, government, nonprofit partners, and businesses or other private actors to help achieve the overall strategy. Many of these actions are already happening in Frederick, and this plan supports their continued improvement, based on community feedback, expanding existing efforts and programs where possible.

Outcomes for Greenhouse Gas Emissions Reductions

Through the 2020 Climate Emergency Resolution, both the City and County set targets to reduce GHG emissions 50% by 2030 and 100% by 2050 (from baseline levels measured in 2010). **If the strategies in this plan are successfully implemented, Frederick can reduce its 2050 GHG emissions by 96% from business-as-usual (BAU) levels.** The remaining 4% reduction will require technological changes that do not exist today.

Figure 7 illustrates the emission reductions modeled for each sector in a "wedge chart", which should be read from top to bottom. The uppermost line represents the BAU emissions trajectory. Each colored "wedge" below shows the estimated emission reductions achieved by implementing strategies in a specific sector where the CEAP proposes action.

Figure 7. Mitigation Scenario Absolute Emissions.

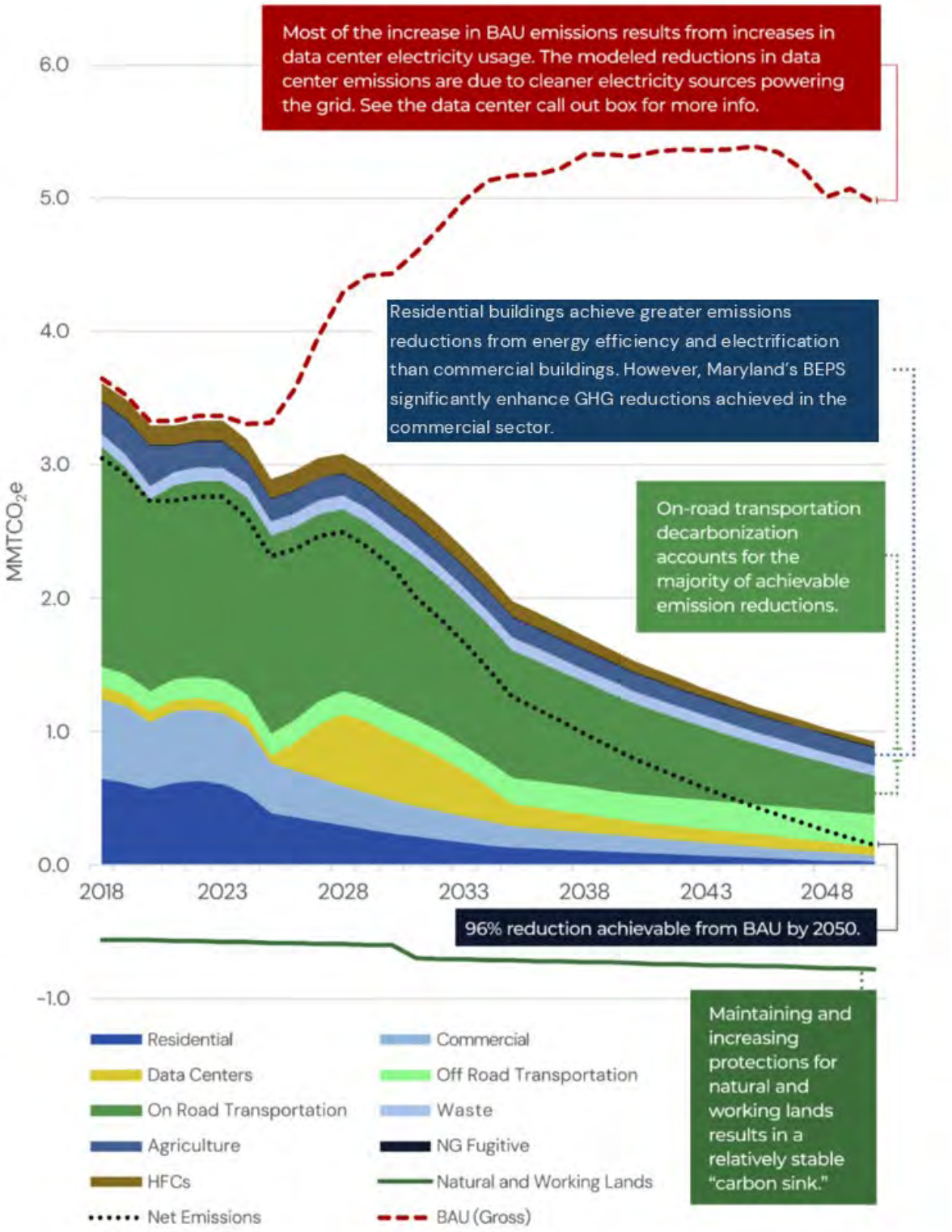


Table 5 shows the emission reductions modeled in the Mitigation Scenario by sector. Frederick cannot achieve this Mitigation Scenario alone. Achieving these emissions reductions will require strong leadership at the state level, particularly to drive the decarbonization of MD's electricity grid. The share of electricity in the grid coming from cleaner sources like solar, wind, and nuclear power has a significant impact on how much Frederick emits in the buildings, power, and data centers sectors.

Table 5. Modeled Emission Reductions and 2018 Emissions Baseline ($MTCO_2e$).

Emissions Sector	Baseline	Reductions	
	2018	2030	2050
Buildings	1,246,090	441,364	907,479
Transportation	1,799,910	140,514	1,017,204
Waste	96,799	13,773	84,166
Agriculture	234,596	14,325	12,327
Forestry	(563,520)	19	95,932
Data Centers	93,763	936,915	1,941,956
Rooftop Solar		21,616	29,925

As Figure 7 shows, the largest reductions in the Mitigation Scenario come from data centers. Reducing emissions from data centers will be crucial to meeting Frederick's emission reduction goals. While Frederick will need state leadership to achieve these reductions, local and regional work is also underway to regulate data center growth and identify and model measures to reduce emissions from data centers throughout the Metropolitan Washington region.

Frederick County regulates the data center industry more than any other use permitted in the County. In May 2025, the Frederick County Council approved bill number 25-05 to create a Critical Digital Infrastructure (CDI) siting ordinance with stricter design requirements for data centers. The regulations enacted at the local level include zoning restrictions, development and design criteria, and permitting requirements. County Executive Jessica Fitzwater introduced legislation, Council Bill 25-09, to significantly limit where data centers could be developed within the county through the creation of a Critical Digital Infrastructure Overlay Zone, primarily near the former Eastalco aluminum plant north of Adamstown where current infrastructure exists. Without these changes, any industrially zoned land in Frederick County would have been subject to data center development. The County Executive has introduced a map to establish the Critical Digital Infrastructure Overlay Zone consisting of approximately 0.6% of County land mass. The Frederick County Council is currently considering the map, with a final vote on the overlay expected by the end of 2025.

Frederick County is also partnering with MWCOG and other jurisdictions in the region to develop detailed recommendations for mitigating the impacts of data centers on emissions, as part of MWCOG's forthcoming Comprehensive Climate Action Plan. The recommendations developed

through this partnership will need to be modeled to assess their relative impacts on emissions reductions from data centers. At the time of this CEAP's publishing, this regional work is still in progress, so detailed modeling of the impacts of different measures for reducing data center emissions is not included in this plan. This modeling will be developed and shared publicly moving forward. This CEAP uses state policies for grid decarbonization as the basis for reductions from the data center industry's electricity use.

Beyond data centers, the buildings and transportation sectors will be key for both the City and County to reduce their emissions (Table 5). Implementing the buildings-sector strategy outlined in this CEAP (B1. Accelerate Deep Building Energy Efficiency and Electrification) can reduce Frederick's emissions in the building sector by 90% (1.20 MMT CO_2e) by 2050, using 2018 as the baseline year. In transportation, implementing strategies T1 and T2 in this CEAP for EV deployment and reducing vehicle miles traveled can decrease transportation emissions by 70% (1.27 MMT CO_2e) by 2050.

Implementing this CEAP in the Current Federal Climate Context

Local governments play a critical role in addressing climate change, but uncertainty at the federal level currently poses new challenges to taking many of the actions outlined in this CEAP. The current federal administration has rolled back critical federal programs and funding to incentivize and otherwise support electric vehicle (EV) adoption, deployment of EV charging infrastructure, energy-efficiency programs, deployment of solar, wind, and battery projects, environmental justice, disaster relief, and many other climate mitigation and resiliency measures. This loss of funding and lack of stability make it significantly more difficult for local governments to plan, secure funding, and implement long-term climate and energy projects, while at the same time necessitating a more robust and urgent local government policy response.

Local leadership remains essential in the face of these challenges—increasingly, local governments are stepping up where federal support is uncertain or insufficient. This CEAP reflects a commitment to advancing local solutions that are resilient to external shifts. It prioritizes flexibility and cross-sector collaboration to ensure that our community continues making progress, even amid a turbulent federal policy landscape. It also relies more on state policies and programs to help with the execution of its goals.

The Community Vision for Action in Frederick

Beyond reducing GHG emissions and building resilience, the CEAP strategies prioritize maintaining Frederick's character while pursuing solutions to make the region greener, more affordable, more accessible, healthier, and more resilient to climate stressors. Frederick residents are ready for solutions on energy efficiency, waste reduction, flood prevention, and many other climate and energy issues. For the Frederick community, beyond reducing greenhouse gas (GHG) emissions, climate action means:

- Creating healthier communities where folks can walk, bike, bus, and ride easily and safely to their destinations.

- Cultivating new and existing green spaces that are both pleasant to enjoy and reduce heat, flooding, and air pollution.
- Tackling cost and other barriers for those who want more energy-efficient homes and renewable energy options to maintain comfortable, affordable living and workspaces.
- Planning for and protecting against the impacts of increasing heat and flood risks across the region.
- Preparing for population increases, growth in energy demand, and other pressing issues, so that Frederick can maintain its rich history and have a bright future.

These priorities are clearly centered on making improvements for daily life in Frederick, and this plan is designed to accelerate Frederick's progress toward the goals and outcomes to both reduce emissions and increase resilience.

The CEAP is a plan of action for all of Frederick, and everyone has a role to play for it to succeed. Every action matters: community actions are highlighted throughout the document for those beginning their sustainability journey. While a clear set of strategies and actions are presented within the document, they will also realistically continue to evolve—just as these actions evolved out of previous plans—as new opportunities and challenges arise. Together, progress toward a bright future in Frederick is achievable.

Introduction

The City of Frederick and Frederick County have partnered to create the first community-wide Climate and Energy Action Plan (CEAP). With support from the Metropolitan Washington Council of Governments (MWCOG) and a team of climate, energy, and engagement consultants, the CEAP takes Frederick's climate goals and transforms them into tangible actions. The CEAP outlines strategies and actions to reduce greenhouse gas emissions and increase climate change resilience, readying Frederick to tackle the impacts of climate change.

This CEAP is meant to address the actions everyone in our community can take to reduce GHG emissions and build our collective resilience to climate impacts. Local governments, community members, businesses and institutions, the school system, and nonprofits all have a role to play in climate action in Frederick, and it will take collective effort to meet the goals in this plan.

Using the latest climate data for Frederick, these strategies and actions can have a meaningful impact across sectors. The CEAP provides a foundation for developing these actions further, not an endpoint. The City of Frederick and Frederick County will use the actions outlined in this CEAP to establish new partnerships and expand existing collaboration, prioritize actions and set specific timelines, seek funding where possible, and develop metrics and track progress.

Collaboration for Impactful Planning

This collaboration between the City of Frederick, Frederick County, and MWCOG is a prime and unique example of how regional partnerships can enhance climate action. Each entity faces distinctive challenges, yet their shared geography and overlapping communities allow them to create a cohesive and effective climate strategy. This collaboration also made it possible to build upon the previous assessments and planning that the City, County, and other entities have already accomplished. In particular, the Climate Response and Resilience Report (CRRR) by the Climate Emergency Mobilization Workgroup (CEMWG) played a pivotal role in Frederick's climate planning, offering detailed strategies and enhancing cooperation between Frederick jurisdictions to effectively tackle climate challenges.

CEAP Actors & Terminology

Throughout this CEAP, "Frederick" refers collectively to the community that lives and works throughout Frederick County and the City of Frederick. "the City" specifically denotes the City of Frederick government, while "the County" refers to Frederick County Government. When written in lowercase —"city" or "county"— refer to the geographic areas within each jurisdiction. MWCOG is a regional organization composed of local governments and officials from the Washington, D.C. metropolitan area.

Cities and counties often face shared environmental challenges that require coordinated solutions. Partnership between the City and County on climate action allows each to:

- build resilience against climate impacts by addressing vulnerabilities that span across municipal boundaries;
- ensure consistent and efficient action to reduce GHG emissions across jurisdictions;
- pilot new policies and technologies at a greater scale; and
- leverage a wider range and breadth of shared expertise, knowledge, and resources.

Frederick, with its mix of urban and rural areas, has developed diverse goals that include improving stormwater management, reducing urban heat islands, increasing the use of renewable energy sources, and electrifying public transit options. Many of these touch on greenhouse gas emissions and climate impacts and are described in more detail below. MWCOG provides a platform for collaboration, offering resources, data, and policy frameworks that help local governments align their climate actions with broader regional goals. MWCOG's coordination role is essential for maximizing how local efforts contribute to regional sustainability. All three entities worked in partnership to educate, engage, and obtain input from invested stakeholders, the local community, and other interested parties during the development of the Frederick CEAP.

The Frederick community is the final critical collaborator in developing this CEAP. The City and County recognize that their community members' involvement and leadership are key to driving meaningful change in Frederick. Community members' input is woven throughout the plan to ensure that the needs and perspectives of community members are incorporated into the planning and implementation processes (engagement efforts are detailed below and in Appendix A). Active ongoing participation from community members will be crucial moving forward. The City and County will continue to expand collaboration with the community to create sustainable outcomes across the region.

Frederick's Climate and Energy Landscape

Existing goals, policies, plans, and initiatives, from local initiatives to statewide policies, collectively shaped the framework of the CEAP.

Local Climate and Energy Goals

The City, County, and MWCOG remain committed to addressing climate change, with recent plans and initiatives in the City and County pushing the needle forward to reduce emissions and strengthen resilience. In 2008, MWCOG and local governments across the metropolitan Washington D.C. area established the regional GHG emission reduction goals of 10% below business-as-usual (BAU) projections by 2012 (back down to 2005 levels); 20% below 2005 levels by 2020; and 80% below 2005 levels by 2050. MWCOG and its member jurisdictions have met goals to date and are working toward future goals. The region's ability to meet the 2012 target demonstrates that GHG reductions are achievable even as the region's population and economy grow.

In March and July 2020, the City and County adopted more aggressive climate goals through a Climate Emergency Resolution in response to a community-led request for immediate local

responses to current and future threats of climate change. As a part of a suite of four Climate Emergency Resolutions, the new goals aim to:

Reduce GHG emissions to 50% of 2010 levels by 2030 and 100% of 2010 levels by 2050.

Additionally, the Livable Frederick Master Plan, updated in 2019, sets forth the goal for GHG emission reductions to 80% below 2005 levels by 2050.

State Climate and Energy Goals

Maryland has a history of climate and energy planning with goals that have influenced local climate planning. The Maryland Department of the Environment (MDE) published its first Climate Action Plan in 2008 which set forth several GHG emissions reduction goals including achieving a 90% reduction by 2050. This target has since been updated by a series of ambitious statewide climate goals. Maryland's Climate Solutions Now Act of 2022 requires a 60% reduction in GHG emissions by 2031 (from 2006 levels) and net-zero emissions by 2045. MDE published the Maryland Climate Pathway Report in June 2023 that reaffirms the codified target of 60% reduction by 2031. Furthermore, in December of 2023, Maryland published its Climate Pollution Reduction Plan which reaffirmed the state's commitment to achieving net-zero emissions by 2045 and outlined measures to reach that goal.

While these statewide targets provide direction for local municipalities, discrepancies can arise between state ambitions and what is feasible at the city and county levels. Frederick faces unique challenges compared to other areas in Maryland, especially given its recent population growth of over 7%, exceeding local and national averages.[v] Recognizing these realities, Frederick's local climate targets are designed to be ambitious and achievable, while supporting Maryland's broader climate goals.

Several newer Maryland laws work in parallel to modernize the state's energy systems and reduce emissions across sectors. These include:

- Climate Solutions Now Act of 2022 (SB 528)
- Next Generation Energy Act of 2025 (HB 1035)
- Renewable Energy Certainty Act of 2025 (HB 1036)

For the City and County, some of these laws will require and incentivize updates to local building codes, transportation planning, and permitting processes, while also opening up new funding opportunities for clean energy projects and programs that support climate resilience. They position Frederick to play a proactive role in Maryland's broader climate strategy while addressing local environmental and community needs.

Federal Climate Context

Local governments play a critical role in addressing climate change; however, uncertainty at the federal level currently poses new challenges to taking many of the actions outlined in this CEAP. The current federal administration has rolled back critical federal programs and funding to incentivize and otherwise support electrical vehicle (EV) adoption, deployment of EV charging infrastructure, energy-efficiency programs, deployment of solar, wind, and battery projects, environmental justice, disaster relief, and many other climate mitigation and resiliency measures. This loss of funding and lack of stability makes it significantly more difficult for local governments to plan, secure funding, and implement long-term climate and energy projects, while at the same time necessitating a more robust and urgent local government policy response.

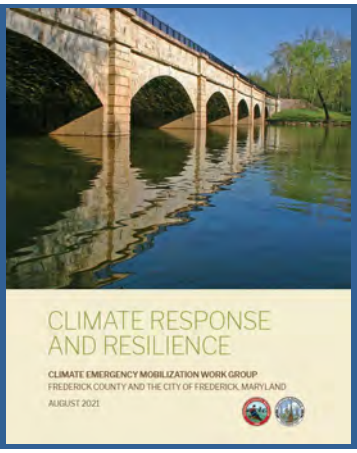
Local leadership remains essential in the face of these challenges—and increasingly, local governments are stepping up where federal support is uncertain or insufficient. This CEAP reflects a commitment to advancing local solutions that are resilient to external shifts. It prioritizes flexibility and cross-sector collaboration to ensure that our community continues making progress, even amid a turbulent federal policy landscape. It also leans more heavily on state policies and programs to help with execution of its goals.

Frederick's Climate and Energy Plans and Progress

While the CEAP is the first community-focused plan to address both climate and energy issues to meet regional and international standards, the County and the City have existing plans and active programs for transportation, energy, climate, natural resources, and more that served as a basis for this plan.

The plans described below play a critical role throughout nearly every section of the CEAP in laying the foundation for Frederick's commitment to promoting sustainability, reducing greenhouse gas emissions, improving transportation and infrastructure, and enhancing community resilience.

The 2021 Climate Response and Resilience Report (CRRR) is a foundational document for the City of Frederick and Frederick County in their efforts to collaboratively address climate change and enhance community resilience. It provides a framework to establish leadership structures, set building performance standards, and accelerate the deployment of renewable energy sources. The collaborative approach emphasized in the report provides an important foundation and is a precursor to the 2025 Frederick CEAP.



Frederick County's Community-wide Electric Vehicle Readiness Plan (2023): Prepares the county for EV adoption by planning for expanded charging infrastructure, proposing EV-friendly policies and implementation strategies, and identifying equity considerations and policy recommendations.

Frederick County's Climate and Energy Action Plan for Internal Government Operations (2023): Identifies strategies to meet ambitious emissions reduction targets for Frederick County Government operations in line with the countywide targets of 50% by 2030 and net-zero by 2050, including energy-efficient building upgrades, renewable energy use, and transitioning the County's vehicle fleet to EVs.

Frederick County's Hazard Mitigation and Climate Adaptation Plan (2022): Provides an assessment of Frederick's vulnerability to natural hazards, identifies critical areas for climate risk reduction, and proposes both immediate and long-term strategies to enhance community resilience.

The City of Frederick's Climate Action Government Operations Plan (2021): Identifies current sources of GHG emissions in City operations as well as opportunities for reducing emissions and proposes strategies for increasing climate resilience in City operations.

Frederick County's Comprehensive Energy Plan (2021): Focuses on renewable energy generation, cost savings, and GHG reduction by increasing energy efficiency in buildings, vehicle fleets, and utilities.

Frederick County's Livable Frederick Master Plan (2019): Provides a framework designed to guide the long-term growth and development of Frederick County, currently the fastest growing county in MD. Growth pressures and land-use decisions could have a significant impact on Frederick's GHG emissions and

resilience to climate impacts. Livable Frederick emphasizes sustainable, healthy, and vibrant community building. The "Making our Environmental Vision a Reality" section includes land, water, air, climate and energy, and corresponding goals and initiatives. The plan integrates public input to prioritize actions that enhance overall quality of life and community resilience.

All plans considered in the CEAP are detailed in Appendix C along with the CEAP strategies and actions that are supported by these plans.

The County's Division of Energy and Environment, and the City of Frederick's Sustainability Department, in collaboration with other departments, are dedicated to a balanced approach to economic, social, and ecological well-being. The following are a few notable initiatives that inform the strategies in this CEAP:

The City's Low Impact Landscaping Ordinance promotes sustainable landscaping practices by encouraging community members and businesses to use native and drought-tolerant plants, reduce lawn areas, and minimize the use of chemical fertilizers and pesticides. The goal is to conserve water, reduce stormwater runoff, and create habitats that support local wildlife, including pollinators and birds.

In partnership with Compost Crew, **the City** offers a free curbside composting service to community members. This program makes it easy for households to divert food scraps and other compostable materials from the landfill. **The County** promotes backyard composting by selling compost bins and offering free educational classes. Frederick County also produces and offers a compost product called "Revive Compost," made from processed yard waste and is available for purchase in bulk at the yard waste recycling site.

The City's Tree Frederick program is a cost-sharing initiative that encourages community members to plant native trees on their properties. By covering a portion of the planting costs, the City helps make tree planting more accessible and affordable. This program supports urban reforestation, improves air quality, reduces urban heat, and enhances the overall beauty and biodiversity of the community. The **County** participates in Maryland's Tree-Mendous program, a statewide initiative that provides native trees for planting on public lands, with the County partnering with local organizations and volunteers to enhance green spaces, improve air quality, and support wildlife habitats through community tree planting events. In addition, **the County's** Creek ReLeaf Program increases forested areas on both public and private lands by offering landowners forest planning and tree planting services and compensation through establishing permanent conservation easements.

In **the City**, the Weatherization Program provides energy audits, insulation, air sealing, and other home improvements to help low- and moderate-income households reduce utility bills and improve indoor comfort. The City also offers annual tax credits for high-performance buildings and is upgrading municipal facilities with energy-saving measures like LED lighting. In **the County**, the Green Homes Program provides incentives and assistance to households to reduce their energy use and costs, access solar and other clean energy, and navigate available programs. The Power Saver Retrofits Program offers free energy-efficiency upgrades— such as heating, ventilation, and air conditioning (HVAC) improvements and appliance replacements— for income-qualifying households. The County's Green Homes Challenge empowers residents to take voluntary eco-friendly actions within their homes, track their progress, and get recognized for their sustainability efforts.

This CEAP proposes new actions but also builds on this existing work to increase the capacity and effectiveness of ongoing policies and programs.

Community-Forward Engagement

The CEAP is first and foremost, a plan for communities across Frederick. To ensure that this plan reflects the needs and desires of the community, the CEAP team engaged with the public and technical experts from January to May of 2025.

Public Engagement

The County and City designed the CEAP public engagement process to intentionally remove barriers, increase accessibility, and empower community members to shape the plan. This approach prioritized making engagement not only widespread but also equitable and resulted in a collaborative community-driven plan. The outreach team engaged with communities across Frederick through in-person events hosted by the City and County, in places like popular shopping centers through pop-up events, and via virtual surveys. During these activities and events, the CEAP team shared updates on the draft plan, educated the public on climate change topics facing the Frederick community, offered the public opportunities to ask questions, and integrated feedback from the public to help shape the plan.

Unfortunately, approximately one month into this collaborative effort, the current federal administration terminated the environmental justice grant that would have funded the involvement of nonprofits with deep existing community relationships. This decision was not due to any actions or missteps by the partner organizations or their staff but rather a broad federal rollback of environmental justice funding at the direction of the Trump Administration. This unexpected loss of support significantly impacted the County's ability to equitably resource community-driven participation during the CEAP process. Despite this, the City and County led extensive outreach for the CEAP, which included the following:

In-Person Engagement: The City and County hosted in-person events to provide background information on the CEAP, answer questions, and gather feedback, primarily between April and May of 2025. Community-based organizations, as well as City and County staff, held nine informal pop-up tabling events and nine public meetings, during this period to share status updates and solicit feedback from community members to inform the plan's development. In total, over 500 people were engaged during these events

Virtual Engagement: For the project's duration, the City and County websites housed content for the public to learn about upcoming engagement events and take a survey on their climate action preferences. Additionally, emails and social media shared CEAP information, distributed surveys, promoted events, and answered questions. An additional 662 responses were collected by an online survey.

Community Partnerships: Historically marginalized and underserved communities often bear the brunt of climate impacts while lacking meaningful access to decision-making processes. To help bridge this gap, Frederick County initially partnered with community-based organizations—Asian American Center of Frederick (AACF), Habitat for Humanity of Frederick County (HHFCM), and Mobilize Frederick—to support inclusive engagement during the development of the CEAP. These organizations were selected for their ongoing work within disproportionately impacted communities, ensuring that community voices would be represented by trusted, culturally competent messengers. As noted above, the loss of supporting federal funding ultimately limited the involvement of these organizations.

For a detailed methodology with outcomes of the public engagement, see Appendix A.

Advisory Groups and Technical Expertise

In addition to the thorough community engagement programming described above, Frederick consulted technical experts, regional partners, other government agencies, building councils, and MWCOG personnel in developing the CEAP. Between January and March 2025, the Advisory Group conducted meetings to share information, update participants on CEAP progress, and review the plan before the final review. As part of the development of the Climate Risk and Vulnerability Assessment and resilience strategies and actions, the County and City of Frederick created the **Risk and Resilience Advisory Group,** bringing together key community-based organizations and partners to help understand their climate-related concerns and identify areas where and how the County and City can act to strengthen community resilience to climate risks.

How Can Community Members Take Action?

Tackling climate change starts at the local level, and every community member has a role to play. This Climate Action Plan focuses on practical actions that can be taken to reduce greenhouse gas (GHG) emissions and increase resilience to climate impacts. Whether it is making energy-efficient choices, preparing for extreme weather, or supporting green infrastructure, these steps are

designed to be accessible and achievable. The tables that follow (Table 6 and Table 7) outline specific actions community members can take to contribute to a more sustainable, climate-ready community. Many of these actions can be taken as part of Frederick County's Green Homes Challenge at www.frederickgreenchallenge.org. The County also offers program navigator support for some of these actions.

Table 6. Summary of Mitigation Actions.

Sector	How Community Members Can Take Action
Buildings	•Join local group-buying campaigns for renewable energy systems. • Apply for financial assistance or rebates to install insulation, air sealing, or energy-efficient appliances. • Schedule a home or business energy audit through local or state programs.
Power	• Explore the County's Solar Blueprint and incentive options to see if solar would be a good fit for your home or business. • Commercial property owners: Begin constructing solar on your property by July 4, 2026, or place the project in service by the end of 2027 to receive the federal 30% Investment Tax Credit (ITC) before it is eliminated. • Advocate for solar on public sites. • Join or promote a solar co-op. • Apply for state funding for residential and commercial clean energy projects from the Maryland Energy Administration. • Build momentum by spreading the word on the benefits of solar energy.
Transportation	• Take the bus! Buses are currently free. Visit Transit Routes & Schedule Information | Frederick County MD - Official Website Understand where existing chargers are located (e.g., using apps like PlugShare or Google Maps). • Explore electric utility time-of-use rates to reduce the cost of home charging. • Apply for state incentives and grant funding for electric vehicles (EVs) or charging infrastructure from the Maryland Motor Vehicle Administration and Maryland Energy Administration. • Advocate for public EV charging infrastructure, transit, and biking and walking infrastructure. • Support and/or apply for local policies and incentives. • Educate and encourage others. • Choose active transportation instead of driving. • Utilize and encourage others to use public transit. • Carpool with family, friends, neighbors, and/or coworkers. • Stay engaged in local planning processes.
Waste	• Participate in curbside composting where available or use County composting drop offs. • Reduce individual food waste (plan meals, use leftovers, donate unopened, unexpired food to local food banks). • Encourage local businesses and organizations to partner with composting and recycling programs to reduce waste.

Sector	How Community Members Can Take Action
Agriculture	• Buy from farms that implement methane-reducing feed strategies. • Educate yourself and others on the benefits of adopting climate-smart feed practices. • Advocate for incentive programs related to this strategy. • Plant native vegetation and/or forested buffer along waterways. • Abide by the Maryland lawn fertilizer law for home lawns and agricultural lands, or explore non-fertilizer options for lawn management. • Support Frederick farmers by shopping locally and promoting policies that protect sustainable farmland.
Natural & Working Lands	• Plant trees on private property. • Participate in local tree programs such as Tree Frederick and Creek ReLeaf. • Apply for state funding for tree planting projects such as MDOT's Urban Tree Grant Program. • Protect existing trees. • Support local ordinances that protect mature trees and require tree planting in new developments. • Support local native plant nurseries. • Advocate for native landscaping in public spaces. • Participate in community planting days. • Convert lawns to native plants meadows where goals match the need.

Table 7. Summary of Resilience Actions.

Resilience Categories	How Community Members Can Take Action
Infrastructure and the Built Environment	• Use permeable pavements around your home, such as in driveways. • Avoid traveling when flash flood warnings are issued. • Never drive through flood waters. Turn around- don't drown! • Install a rain barrel in your yard to collect rainwater for at-home gardening. • Reduce the use of lawn fertilizers and pesticides. • Maintain septic tanks properly. • Avoid toiletries with microplastics to prevent contaminating local water supplies. • Participate in local stream and river clean-up events. • Apply for financial assistance or rebates to install insulation, air sealing, or energy-efficient appliances. • Learn more about installing small-scale nature-based solutions around your home, like green roofs, bioswales, or riparian buffers. • Buy a tree for your yard through Tree Frederick. • Plant rain gardens with native species to prevent runoff.
Health & Well-Being	• Buy a tree for your yard through Tree Frederick. • Sign up for emergency alerts to get notified about extreme heat events through AlertFC or CoFAlert. • Participate in community air quality monitoring programs. • Learn about workplace best practices for protecting workers from extreme heat, such as shifting work hours to cooler times of day, taking frequent breaks in air conditioning, and drinking plenty of water. • Learn the warning signs of heat stress and check in on vulnerable colleagues and neighbors during heat waves. • Learn about and tell your neighbors about public places in your community that offer air conditioning in the summer, like libraries and rec centers. • Reduce individual food waste (plan meals, use leftovers, donate unopened, unexpired food to local food banks). • Volunteer with organizations that collect and redistribute surplus food. • Volunteer with community gardens and local farms to support local food systems.
Emergency Management	• Volunteer with local resilience organizations. • Learn more about what to do during climate emergencies through online resources from City and County Emergency Management. • Facilitate conversations about climate change and natural hazards in your home and workplace. • Put together a “go bag” with essential items like medication, shelf-stable foods, first-aid, and batteries to prepare for emergencies that require evacuation. · Sign up for emergency alerts through CoFAlert or AlertFC.

Figure 8. Organizations with Representation in the CEAP Advisory Group.

Frederick County Health Department

Frederick County Public Schools

Dewberry Design-Builders Inc.

Community Living, Inc.

Citizens for Responsible Growth

Asian American Center of Frederick

Mobilize Frederick

Centro Hispano de Frederick

Frederick County Farm Bureau

Frederick County Transit

Frederick County Sustainability Commission

Asbury Methodist Church

The City of Frederick Planning Department

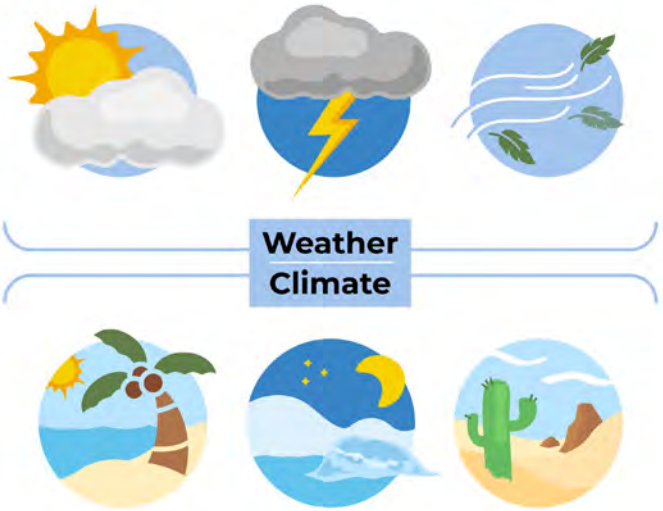
Frederick County Division of Emergency Management

Climate Trends

Frederick is already feeling the effects of climate change, from heavier rainstorms to hotter summer months. This section outlines climate trends in Frederick through **1. Understanding some climate change fundamentals, 2. Examining greenhouse gas emissions in Frederick,** and **3. Assessing Frederick's climate risk and vulnerabilities.**

Climate Change Fundamentals

Weather and climate are two terms that are often interchanged, but they have very different meanings. Weather refers to atmospheric conditions at a particular time in a particular location, including temperature, humidity, precipitation, cloudiness, wind, and visibility. On the other hand, climate is the average weather pattern over a longer period (usually 30 years or more) in a specific area. These climate patterns are easier to project because they apply to larger areas over longer periods of time, while weather conditions, hour-to-hour, day-to-day, present more forecasting challenges. This is why scientists can estimate how high temperatures might rise by 2030, or what rainfall averages will look like by 2050, even though the local weather service may not be able to tell folks for certain if they can expect rain or sunshine during their week.

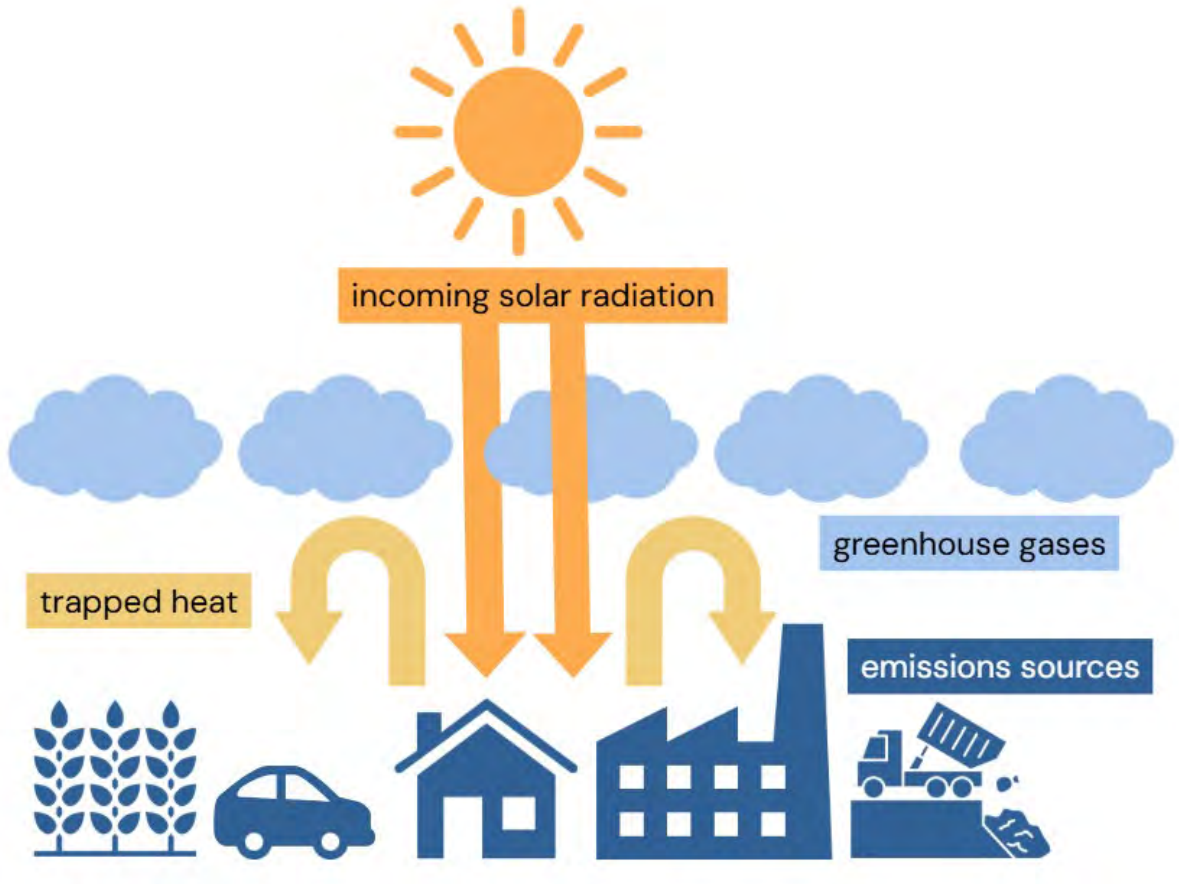


Climate change and variability refer to long-term shifts in temperature and weather patterns. While some of these changes have occurred naturally on 100,000-year timescales or more due to changes in Earth's rotation, orbit, and tilt, the dominant driver of climate change since the 1800s has been human activity. Scientists began to accurately identify the origins of human-caused climate change in the 1970s and 1980s, disproving the commonly held belief that our current period of global warming was resulting from natural climate variability as the Earth came out of a "little ice age." [vi]

Global warming is an increase in Earth's average surface temperature because of an increase in

the concentration of GHG in the atmosphere. While this is a driver of overall climate change, it is only a part of the puzzle. Other changes in the climate include warming of the ocean; increasing frequency, duration, and magnitude of extreme weather events; and increasing variability in precipitation and temperatures.

Figure 9. The Greenhouse Gas Effect.



Human-caused climate change results from a range of activities, particularly:

- Burning fossil fuels: Cars and factories, for example, release emissions when they burn coal, oil, and gas.
- Destruction of natural systems that absorb carbon, called **carbon sinks**: Forests, wetlands, and oceans, naturally pull CO_2 out of the atmosphere and store it, but when these are damaged or removed, the ability to absorb GHG emissions goes with it.
- Agriculture: Farming practices often release methane and nitrous oxide.

There are both natural and human-caused sources of GHG emissions.[2] The rapid rise in emissions from human activities has intensified the **greenhouse gas effect**. As these emissions accumulate, more of the sun's radiation gets "trapped" in the atmosphere (Figure 9). This process causes **global**

[2] GHG emissions include CO_2, methane, and nitrous oxide.

warming, as these emissions absorb more solar radiation and trap more heat, thus causing the planet to get hotter.

Emissions inventories and projections provide insight into the current status and future estimates of GHG emissions, which can be used to help identify necessary actions to achieve emission reduction goals and mitigate climate change. The next section provides an overview of Frederick's GHG inventory.

A **climate hazard** is the potential of an event or trend that could cause damage and loss, including health impacts and damage or loss to property, infrastructure, livelihoods, and ecosystems. Figure 10 provides a list of the four hazards of focus in this CEAP.

Figure 10. Climate hazards in Frederick.

Direct vs. Indirect Impacts of Climate Hazards

Direct impacts are immediate and physical effects, such as: • Heatwaves causing heatstroke or death. • Flooding damaging homes and roads. • Droughts reducing crop yields. • Wildfires destroying forests.	**Indirect impacts** are ripple effects that result from the direct impacts, such as: • Worsening of chronic conditions like heart disease and asthma due to extreme heat. • Economic losses from disrupted supply chains. • Food insecurity due to decreased crop yields.

Frederick's Climate Risks and Vulnerability Assessment (CRVA)

Climate change is impacting communities in Frederick now. Projected changes in climate and extreme weather events are likely to continue posing long-term challenges for the region. Drawing from the findings of the 2021 City of Frederick Climate Action Plan for Government Operations, the Frederick County Hazard Mitigation and Climate Adaptation Plan, the 2023 Frederick County Climate and Energy Action Plan for Internal Government Operations, and the 2021 Climate Response and Resilience Report, the CRVA informs this CEAP by identifying key climate hazards and associated risks. The CRVA also supported the identification and prioritization of resilience strategies and actions. The CRVA, presented in the following section, focuses on the main climate hazards affecting Frederick, namely **extreme heat, flooding, drought, and winter storms**, and highlights key risks to communities from these hazards.

Changing Climate Conditions: What Climate Risks Does Frederick Face?

Frederick County's 2022 Hazard Mitigation and Adaptation Plan identifies inland flooding and winter storms as high-risk hazards for the county, and drought and extreme heat as medium-risk hazards. These climate hazards, shown in Table 8, are likely to continue posing a risk to the region's communities as they get worse in the coming decades.

- Extreme heat days are likely to increase in both severity and frequency, and average temperatures are projected to increase.
- Heavy precipitation events and flooding are projected to increase in severity and frequency.
- Other hazards, like droughts and winter storms, are anticipated to continue impacting the community and may get worse due to climate change.

Key Terms

Hazard: A weather or climate-related variable such as extreme heat, flooding, drought, or winter storms, that could create a risk.

Resilience: The ability of a community (or its systems) to anticipate, prepare for, respond to, and recover from climate hazards.

Risk: Potential threats to the community due to climate hazards, including direct physical threats to community members (such as, heat stress from extreme heat) as well as those stemming from damage or disruption to infrastructural assets or services (such as, unsafe driving conditions on flooded roads).

Vulnerability: The susceptibility of communities (and the assets and services it depends on) to adverse effects from climate hazards. Based on differences in exposure, sensitivity, and adaptive capacity, vulnerability can vary across population groups, locations, and infrastructure systems.

Table 8. Summary of Projected Changes in Key Climate Hazards for Frederick County (U.S. Federal Government, 2023).

Hazard	Projected change in severity	Projected change in frequency
Extreme heat	+	+
Heavy precipitation	+	+
Drought	+	+
Winter storms	+	+/-

Extreme Heat

Historical & Future Trends

Since the early 2000s, average annual temperatures in Maryland have increased by over 1.5°F.[vii] In Frederick County, from 1950 to 2010, the average daily maximum and minimum temperatures have increased by 0.03°F and 0.36°F per decade, respectively.[viii] Extreme heat is also becoming more frequent and severe. The average annual number of days with maximum temperatures above 90°F has increased from 17 days per year (1994-2013) to 44 days in 2022.[ix] Additionally, in 2020, a study on urban heat island effect found that temperatures in the city were significantly higher than temperatures recorded at nearby rural sites within the county, especially during the day.[x]

Annual average temperatures in Frederick County are projected to rise significantly.

By 2050, maximum temperatures could increase by 5.3-6.6°F and minimum temperatures could increase by 5.0-6.4°F.[xi]

Additionally, extreme heat is projected to increase both in severity and frequency.[xii] By 2050, Frederick County is expected to experience an average of 62 days over 90°F and 26 days with maximum temperatures over 95°F.[xiii] Cooling degree days (**days with average temperature above 65°F)** are **projected to rise**, increasing demand for air conditioning, while heating degree days (**days with average temperature less than 65°F**) are **expected to decrease** in the county, potentially reducing future heating needs.[xiv]

Key Risks & Vulnerabilities

Key risks from extreme heat on Frederick community resources are summarized in Table 9. These include inputs received from this plan's Risk and Resilience Advisory Group.

Table 9. Key Heat Risks & Vulnerabilities in Frederick.

Community Resource	Key Risks
Transportation	• Heat stress and discomfort for cyclists, pedestrians, and transit riders during travel. • Heat-related service disruptions and asset damage, increasing wait times, travel times, and delays for car and public transit users. • Reduced vehicle performance, increasing emissions, and raising vehicle operating costs for owners. • Maintenance and repair costs are increasing due to heat-related damage to pavements and rail infrastructure.
Water, Sewer, and Stormwater	• Increase in power outages and damage to water, sewer, and stormwater infrastructure, disrupting services and increasing the risk of water contamination, impacting public health and safety. • Increased temperatures leading to more evaporation, depleting the surface water supply and decreasing water treatment efficiency.
Housing, Buildings, and Facilities	• Hotter temperatures in more urbanized areas (urban heat island effect). • Increased risk of power outages in residential homes and community facilities, leading to increased exposure to heat and related health impacts, particularly for low-income households with little flexible income for health care. • Increased electricity usage and energy bills, especially for older buildings that are not energy efficient.
Energy	• Decreased system reliability and an increase in power outages.
Emergency Management & Response	• Heat stress among community members and emergency responders, overburdening emergency personnel and reducing efficiency in responses. • Increased temperatures stressing the safe operating limits for emergency response vehicles and reducing efficiency in responses.
Natural and Cultural Resources	• Limited access to natural and cultural resources during high heat events, especially for vulnerable populations, due to risk of heat stress. • Degradation of water quality due to warmer temperatures and harmful algae blooms. • Increased prevalence of invasive insect and plant species. • Greater stress on native biodiversity.
Human Health and Safety	• Increase in heat-related illnesses like heat stress and heat stroke, especially in more sensitive populations (such as the elderly, the

Community Resource	Key Risks
	unhoused, and people who do not have access to indoor air conditioning, and outdoor workers). • Increased temperatures leading to favorable conditions for ozone-producing chemical reactions, increasing asthmas and chronic respiratory diseases. • Greater exposure to vector-borne diseases due to longer mosquito and tick seasons. • Reduced opportunities for outdoor exercise due to hot temperatures.
Economy	• Heat stress reducing worker efficiency and leading to lost wages for workers and impact incomes. • Loss of agricultural yields may increase food prices and limit income for agricultural workers.

Understanding How Heat Affects Our Most Vulnerable Communities

Extreme temperatures can impact Frederick's communities in various ways, with not all people and places affected equally. During the same event some people may experience mild inconveniences, whereas others may face serious health, economic, and social consequences. To better understand which locations within the county are more vulnerable to extreme heat, the project team used an indicator-based, spatial analysis to evaluate vulnerability to extreme heat impacts. Indicators were scored, weighted, and combined into a **Heat Vulnerability Index (HVI),** with a vulnerability score assigned to each census block group within the county. The HVI considers three dimensions of vulnerability – exposure, sensitivity, and adaptive capacity. For more information about how the HVI was developed, see Appendix B.

The team aggregated exposure, sensitivity, and adaptive capacity scores into total HVI scores on a scale ranging from *very high, high, medium,* to *low*. A census block group with a higher score on the vulnerability rating scale represents an area where the community is likely to be more vulnerable to effects of extreme heat.

Key Findings

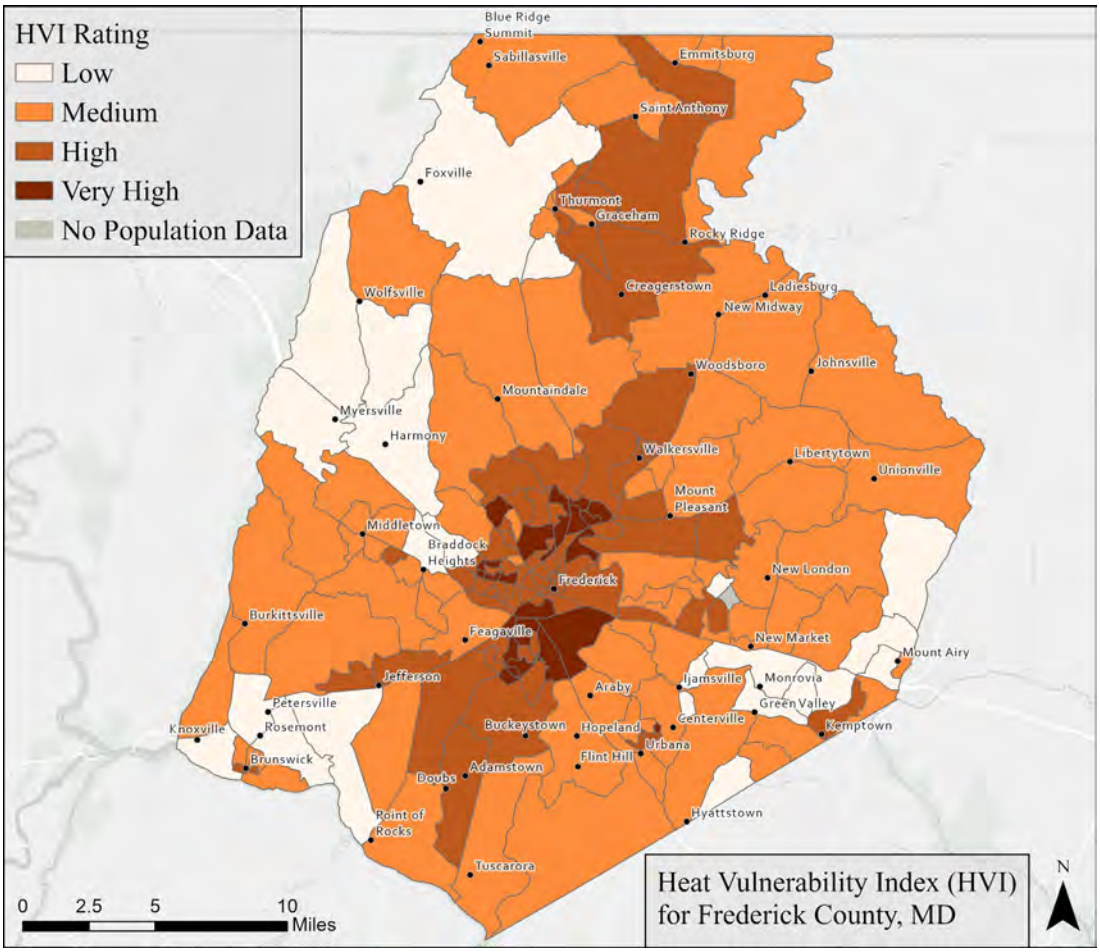
- Most parts of the county show medium vulnerability to extreme heat.
- The City of Frederick and the area immediately around the City are very vulnerable to extreme heat, mostly due to higher exposure (driven by the urban heat island effect) and sensitivity in those areas.
- Areas of high vulnerability on the northern side of the county, like Thurmont, Emmitsburg, and Creagerstown, as well as on the southern side, like Adamstown and Jefferson, are also due to higher surface temperatures.
- Pockets of lower vulnerability around Wolfsville, Myersville, and Harmony, are due to more shade tree cover.

- Lower vulnerability around Mount Airy, Monrovia, Green Valley is mostly driven by lower sensitivity scores, pointing to lower proportion of socio-economically disadvantaged and other sensitive population groups in these areas.

50% of the land area in Frederick is either highly or very highly vulnerable to extreme heat.

Figure 11 shows the aggregate HVI rating map for census block groups in Frederick County.

Figure 11. HVI Rating Map for Census Block Groups in Frederick County, MD.



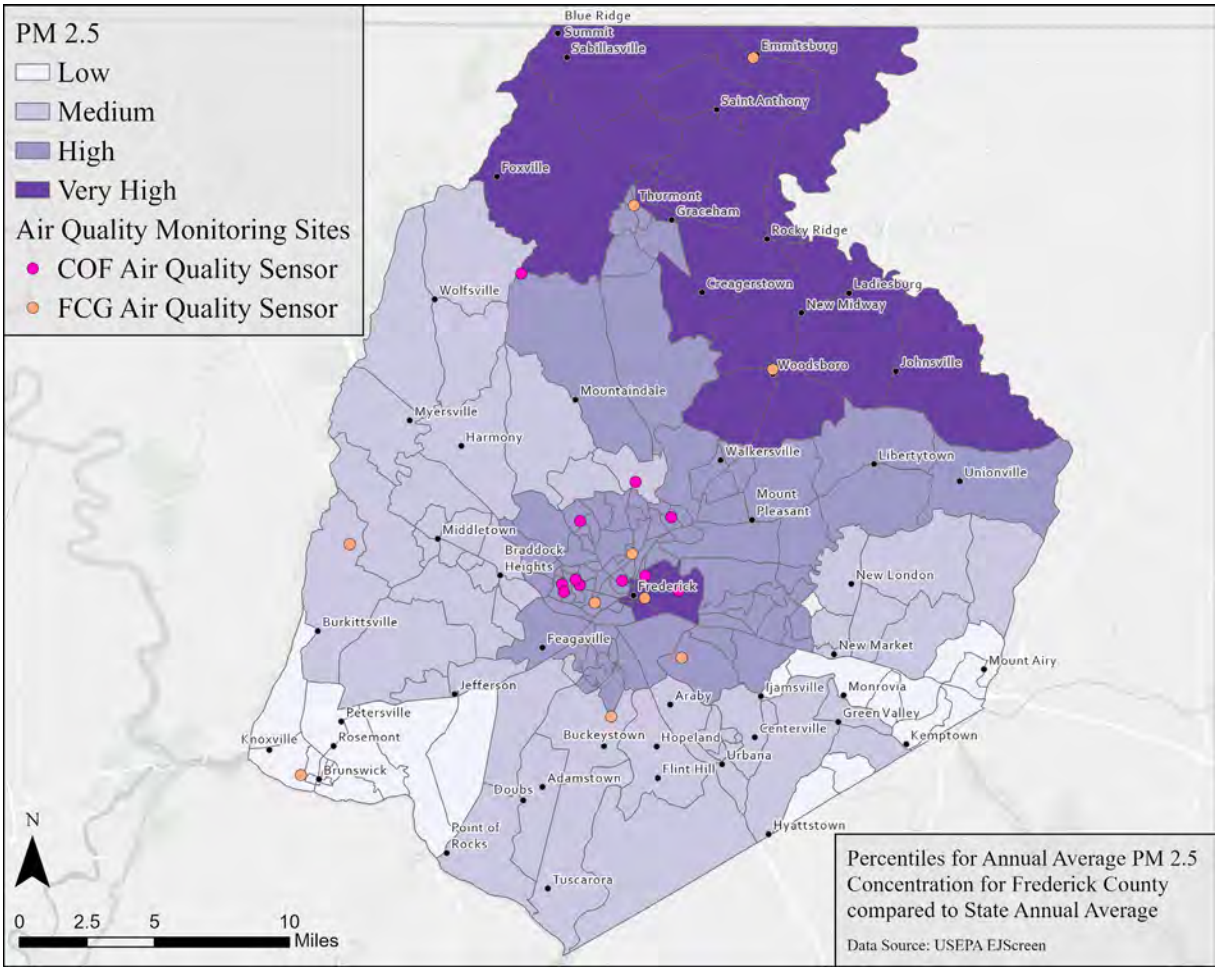
Extreme Heat & Air Quality

Extreme heat and heat waves often lead to poor air quality, compounding health risks like heat stress, asthma, and heart conditions.[xv] High temperatures may also lead to more frequent droughts, wildfires, both of which increase particulate matter (PM10 and PM2.5).[xvi] The combination of heat stress from extreme heat events and poor urban air quality can pose significant health risks to vulnerable populations, including those with preexisting health conditions, young children, the elderly, and socially isolated individuals.[xvii] For example, community members located in portions of

the City of Frederick that have a high HVI rating as well as high annual average PM 2.5 concentrations may experience raised health risks.

The projected increase in the frequency and severity of extreme heat events is likely to worsen existing air pollution levels in Frederick's communities.[xviii] In addition to heightened health risks, worsened air quality can also have environmental consequences, such as reduced visibility and damage to agricultural crops and forests.[xix]

Figure 12. Annual Average PM 2.5 Concentrations (in percentile) for Census Block Groups in Frederick County Compared to Maryland Annual Average in 2020; Dots Represent Locations of Frederick County (FCG) and City of Frederick (COF) Air Quality Sensors.



Heavy Precipitation & Inland Flooding

Historical & Future Trends

Historically, Maryland receives an average of 40-50 inches of precipitation annually. In addition, Frederick County has been impacted by significant floods, with 15 major flood-related disaster declarations since 1953, and 85 recorded flash floods since 1996.[xx] These extreme flood events have

caused significant damage to transportation infrastructure, homes, and community resources like parks and playgrounds. (See Figure 13 as an example.)

Annual average precipitation in Maryland is projected to increase by 5-10% over the 21st century relative to the late 20th century under a high emissions scenario.[3] In Frederick County, precipitation events are expected to become less frequent but more intense, with an increase in short-duration, high-intensity events, increasing the risk of flooding.[xxi] The number of days per year with more than 1 inch of precipitation is projected to increase from a historical average of 4.7 days per year to 5.1-5.8 days by 2050 and 5.7-6.8 days by 2080.[xxii]

Figure 13. Flood damage to Jefferson Pike in 2021.

Due to increases in temperature and precipitation, Frederick's climate in 2080 is predicted to look and feel like today's climate in northeastern Louisiana.[xxiii]

Key Risks & Vulnerabilities

Key risks from heavy precipitation events and inland flooding on Frederick community resources are summarized in Table 10. These include input received from the CEAP Risk and Resilience Advisory Group.

Table 10. Key Risks from Heavy Precipitation and Flooding by Community Resource.

Community Resource	Key Risks
Transportation	• Increased wait times, travel times, and delays for car and public transit users due to flooding-related service disruptions and asset damage. • Flooded streets (such as East 9th Street in the City of Frederick) or other assets (such as the parking lot at the Brunswick Maryland Area Rail Commuter [MARC] station), creating dangerous and unreliable conditions for pedestrians, drivers, and public transit users. • Severe flooding isolating vulnerable populations, reducing access to emergency services and essential resources. • Flooding disruptions to bus service in areas where rerouting is logistically difficult or impossible.

[3] The projected multimodal mean temperature increase at the end of the 21st century (with respect to a base period of 1901-1960) is 8.3°F under RCP8.5, a higher emission scenario.

Community Resource	Key Risks
Water, Sewer, and Stormwater	• Flooding overwhelming water, sewer, and stormwater infrastructure (including wastewater treatment plants) and leading to public health risks from water contamination.
Energy	• Decreased system reliability and increase in power outages.
Housing, Buildings and Facilities	• Flood damage to residential homes leading to property loss and forcing community members to evacuate homes, disrupting daily life, and threatening their safety and well-being. • Flood damage to County facilities forcing closures and limit access and functionality of critical services. • Property damage from flooding, especially impacting low-income community members and small businesses.
Emergency Management & Response	• Flooding leading to impassable roads and dangerous driving conditions, increasing response times and limit access to affected communities. • Increased need for rescue during flash floods, straining available resources.
Natural and Cultural Resources	• Limited access to parks in floodplains (such as Baker Park). • Cascading ecosystem impacts due to water contamination. • Increased risk of landslides due to Frederick's topography, especially when paired with heavy precipitation or flooding.
Human Health and Safety	• Road closures due to flood events limiting access to basic needs like food and medicine and critical facilities like hospitals, delaying emergency services. • Flood events causing garbage, debris, and toxic pollutants to enter and contaminate water supplies. • Mold growing in flooded buildings, leading to health concerns and complications. • Risk of drowning and increased injury increase in flood zones during extreme flood events.
Economy	• Flooding leading to business closures and disrupting incomes. • Higher insurance premiums or taxes to fund flood recovery efforts increasing financial strain. • Damage to livestock, crops, and soil resulting in financial losses for the agriculture sector.

Drought

Historical & Future Trends

Frederick County experienced **12 droughts from 1996 to 2024**, often lasting several months.[xxiv] Since 2000, the county has experienced two extreme droughts (categorized as D3)[4], occurring in 2001 and 2007. More recently, in November 2023 and August 2024, approximately 40% of the county experienced severe drought conditions (D2).[xxv]

Climate projections suggest that precipitation events will likely become more variable, with increased periods of low or no precipitation. While overall precipitation levels might rise slightly, this variability, coupled with warmer temperatures, is expected to **increase the severity and frequency of droughts in Frederick County**.[xxvi] In addition to more variable precipitation events, higher temperatures are expected to increase the rate of soil moisture loss during dry spells.[xxvii]

Key Risks & Vulnerabilities

Key risks from droughts on Frederick community resources are summarized in Table 11. These include input received from the CEAP Risk and Resilience Advisory Group.

Table 11. Key Risks from Drought by Community Resource.

Community Resource	Key Risks
Water, Sewer, and Stormwater	• Drought conditions impacting communities' access to safe drinking water, especially for households that depend on wells.
Natural and Cultural Resources	• Drought conditions drying vegetation, including loss of shade trees in parks and outdoor spaces, creating uncomfortable conditions for users. • Wildfire risk increasing, especially when drought is paired with extreme heat.
Economy	• Reduced agriculture yields and damage to livestock increasing food prices and resulting in job losses for farm workers. • Reduced water supply impacting businesses and services that rely on water (breweries, hospitals, etc.).

[4] The U.S. Drought Monitor uses a five-category system to describe drought conditions, Abnormally Dry (D0), Moderate (D1), Severe (D2), Extreme (D3), and Exception (D4) Drought. Drought categories show assessments of conditions related to dryness and observations of how much water is available in streams, lakes, and soils compared to usual for the same time of year.

Winter Storms

Historical & Future Trends

According to the National Centers for Environmental Information, Frederick County experienced **265 severe winter weather events between 1996 and 2021**, with an average of 10.6 events per year.[xxviii] The region also experienced **polar vortex events** in the winters of 2013-2014 and 2016-2017.[5] [xxix] However, in the winter of 2023-2024, Frederick County experienced 25% less snowfall than the historical seasonal average.[xxx]

Figure 14. Twelve inches of snow in Frederick, March 2015.

Increasing temperatures are expected to lead to more rain and ice and less snow in the winter months.[xxxi] However, **when winter storms do occur, they could be more intense** than they have been historically. Research suggests that disruptions to the polar vortex, which is linked to warming temperatures in other regions, may increase the intensity and frequency of extreme cold events across much of the U.S., including Frederick County.[xxxii]

Key Risks & Vulnerabilities

Key risks from winter storms on Frederick community resources are summarized in Table 12. These include input received from the CEAP Risk and Resilience Advisory Group.

[5] The polar vortex are winds that circle the North Pole. When the polar vortex is in a stable state, it maintains its circular shape and stays at extreme northern latitudes. However, warmer air moving northward from the equator can disrupt the stability of the polar vortex, pushing it off the North Pole and bringing warmer air to lower latitudes. For more information see: NOAA. "Understanding the polar vortex." Accessed November 2024. https://scijinks.gov/polar-vortex/.

Table 12. Key Risks from Winter Storms by Community Resource.

Community Resource	Key Risks
Transportation	• Increased delays and travel times for car and public transit users due to winter-related service disruptions and asset damage. • Ice and snow accumulation on streets create dangerous and unreliable conditions for pedestrians, drivers, and public transit users. • Extreme cold and ice/snow accumulation isolating vulnerable populations, reducing access to emergency services and essential resources.
Water, Sewer, and Stormwater	• Power outages and damage to water and sewer infrastructure disrupt services and increase the risk of water contamination. • Extreme cold temperatures cause water pipes to freeze and burst, disrupting the water supply in the community. • Snowmelt overwhelming stormwater systems and cause flash floods and damage in the community.
Housing, Buildings and Facilities	• Power outages during winter storms leaving the public without heat and essential services. • Damage to buildings due to ice and snow accumulation creating safety hazards for the public and disrupting community services.
Energy	• Decreasing system reliability and increasing power outages.
Emergency Management & Response	• Winter storms causing impassable roads and dangerous driving conditions that can increase response times and limit access to affected community members. • Increased need for rescue during winter storms and icy conditions can strain available resources. • Increased power outages, impacting emergency management operations.
Natural and Cultural Resources	• Winter storms causing damage to parks and recreational facilities can limit access for users.
Human Health and Safety	• Road closures due to winter storm events limiting access to critical facilities and delay emergency services. • Exposure to extreme cold, especially among unhoused communities.
Economy	• Damage to businesses and transportation disruptions leading to business closures, labor disruptions, and losses in revenue. • Damage to crops and negative impacts to livestock health and well-being disrupting the agricultural sector.

Greenhouse Gases in Frederick

To better understand what climate and energy actions Frederick should take, this CEAP includes a GHG inventory analysis identifying the share of emissions coming from different sources in Frederick, and "Business as Usual" (BAU) projections to identify where Frederick can take impactful climate action for GHG reductions. Table 13 lists the key sectors for GHG emission sources and sinks.

Table 13. Key Emission Sources and Sinks by Sector.

Sector	Emission Sources and Sinks
Buildings 	GHG emissions from energy used in residential and commercial buildings. In the residential sector, energy is primarily used for space heating and cooling, lighting, water heating, and appliances. In the commercial sector, emissions are increasingly driven by electricity demand from data centers, in addition to traditional uses such as lighting, HVAC, and equipment.
Transportation 	GHG emissions from energy used by on-road vehicles (passenger cars, buses, and trucks), off-road equipment (such as construction and landscaping machinery), aviation, and commuter rail. On-road transportation is the County's largest source of emissions.
Waste 	Methane and nitrous oxide emissions from solid waste disposal (primarily landfilling) and wastewater treatment. These emissions result from the decomposition of organic materials in anaerobic conditions.
Fugitive Natural Gas 	Methane that leaks from the natural gas distribution system, largely driven by the volume of natural gas consumed within the County.
HFCs 	Emissions from refrigerants primarily used in air conditioning and refrigeration. HFCs are potent greenhouse gases, often hundreds to thousands of times more powerful than CO_2 on a per-ton basis.
Agriculture 	GHG emissions from livestock management (manure and digestive processes) and soil management (e.g., irrigation practices and fertilizer use).
Natural and Working Lands 	Net carbon sequestration from forests, tree canopy, and other vegetated areas that absorb more carbon than they emit. This sector acts as a GHG sink, partially offsetting emissions from other sources.

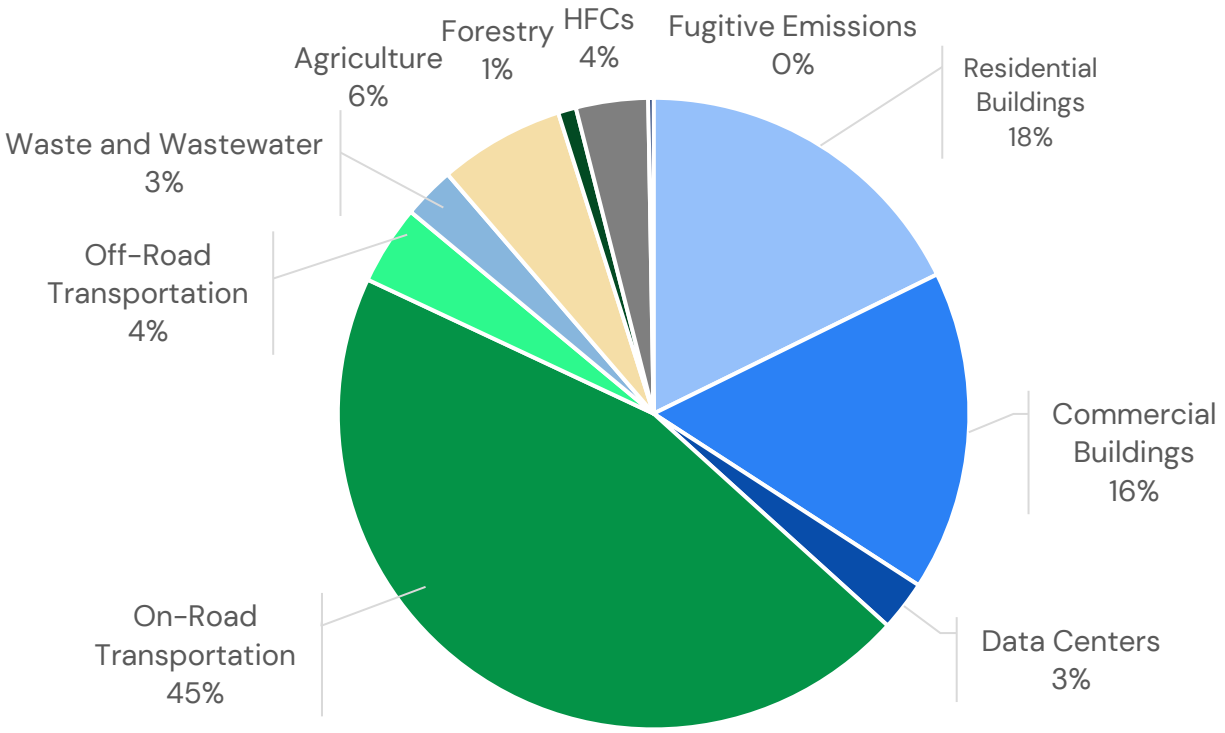
GHG Inventory: What has Frederick Emitted?

This CEAP evaluates emissions by sector in Frederick County and the City of Frederick based on 2018 data, the latest year with reliable data available at the time of this plan's development. Frederick County partnered with MWCOG to develop inventories of the County's and City's GHG emissions for the years 2005, 2012, 2015, 2018, and 2020.[6] While the 2020 inventory offers valuable insights, its emissions profile was influenced by temporary disruptions related to the COVID-19 pandemic, including reduced travel and changes in energy use. To ensure that long-term projections reflect more typical patterns of activity, the City and County selected 2018 as the baseline year for forecasting future emissions and evaluating the potential impact of proposed climate actions. Where available, more recent utility data from 2023 was incorporated to improve estimates of building energy consumption and enhance the accuracy of emissions projections.

In 2018, total gross GHG emissions in Frederick County were estimated at 3.6 million metric tons of carbon dioxide equivalent ($MMTCO_2e$)—roughly equivalent to the annual emissions from 840,000 gasoline-powered passenger vehicles. On a per capita basis, the County's gross emissions were around 20% lower than the regional average across MWCOG. While Frederick's forestry sector continues to generate emissions through logging, land conversion, and equipment use, it remains a net carbon sink thanks to Frederick's forests, which absorb and store more carbon dioxide than the sector releases. After accounting for carbon sinks from forests and tree canopy, the County's net GHG emissions were estimated at 3.1 $MMTCO_2e$.

[6] These inventories were prepared using ICLEI's ClearPath Community-Scale Inventory Module and are compliant with the U.S. Communities Protocol for Accounting and Reporting Greenhouse Gas Emissions (USCP) and Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC). For more details, see MWCOG's Greenhouse Gas Emissions Inventories Methodology Guide.

Figure 15. Frederick County 2018 GHG Emissions by Activity ($MMTCO_2e$).



Transportation was the largest contributor to the County's gross emissions, contributing roughly 45% of the total. Residential and commercial buildings accounted for an additional 34%, while the remainder of emissions came from sources including solid waste, wastewater treatment, agriculture, and fugitive emissions (Figure 15).

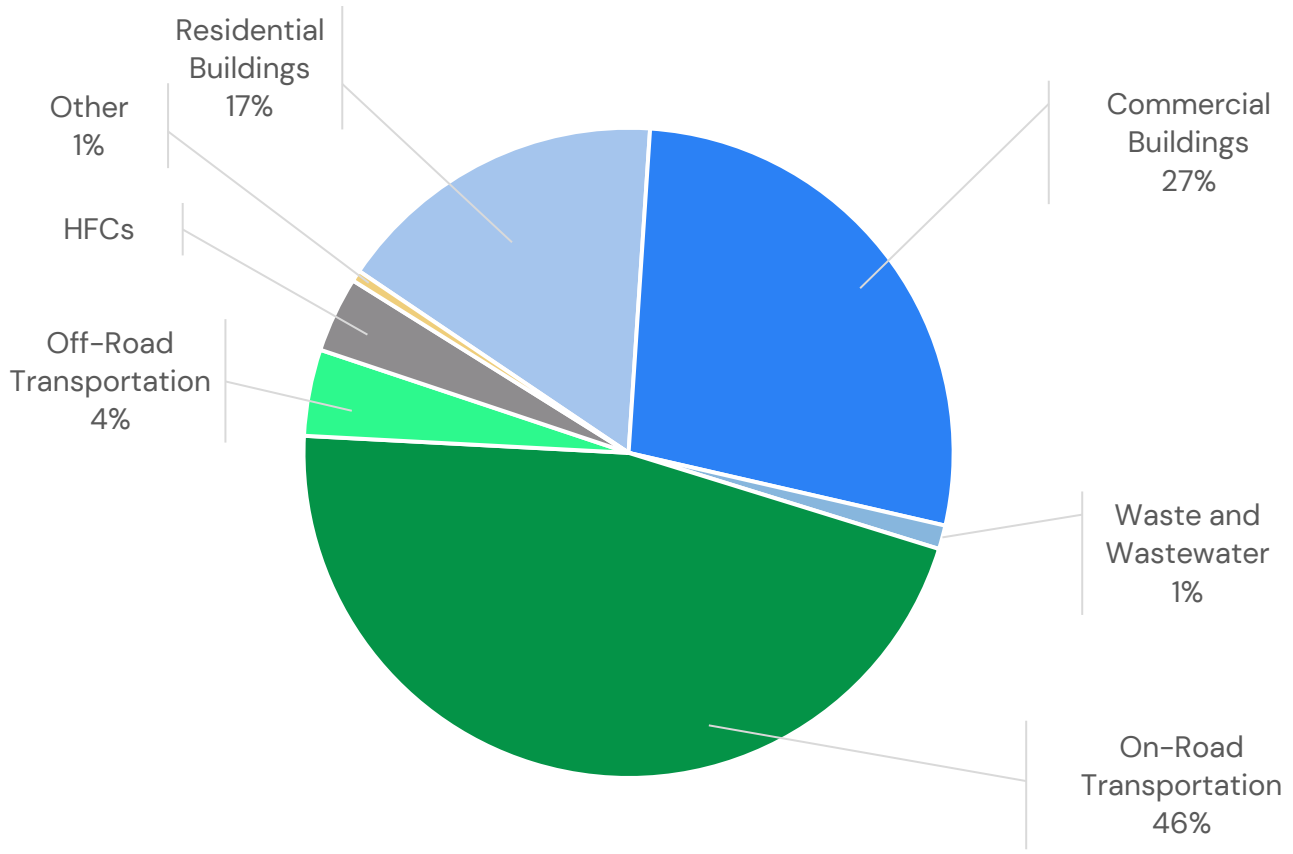
From 2005 to 2018, the County's total gross emissions declined by 37% despite 17% growth in the County's population. The largest reduction occurred in the commercial buildings sector, driven by decreased electricity emissions intensity due to a cleaner regional power grid.

City of Frederick GHG Inventory

Although the City of Frederick's GHG emissions are included in the Countywide inventory, this section provides a focused analysis of emissions trends within the City, reflecting its distinct urban profile and development patterns. The same methodology and BAU assumptions used in the County analysis were applied to estimate emissions for the City.

In 2018, total gross GHG emissions in the City of Frederick were estimated at 1.05 million metric tons of carbon dioxide equivalent ($MMTCO_2e$), representing a 20% reduction from 2005 levels. On a per capita basis, the City's gross GHG emissions were approximately 11% lower than the County's. After accounting for the City's share of carbon sequestration from forests and tree canopy, net emissions were approximately 1.03 $MMTCO_2e$. Figure 16 below shows the sector breakdown of these emissions.

Figure 16. City of Frederick 2018 GHG Emissions by Activity ($MMTCO_2e$).



*Other includes emissions from agriculture and data centers.

Transportation was the City's largest source of emissions in 2018, underscoring the region's dependence on personal vehicle use despite relatively dense development. Residential and commercial building energy use accounted for the next largest shares, reflecting energy demand in homes, offices, and retail spaces. The remaining emissions are attributed to solid waste, wastewater treatment, HFCs, fugitive emissions, and agricultural activity. Given that the City has very little undeveloped land, agriculture and forestry play a minimal role in the City's emissions profile, especially in contrast to the broader County.

The County BAU: What Will Frederick Emit in the Future If No Action Is Taken?

This CEAP estimates Greenhouse Gas Emissions in Frederick County through 2050 under a BAU scenario using the 2018 inventory as the base year and incorporating historical data from 2019 to 2023 where available. The BAU scenario accounts for key drivers such as population growth, housing and commercial development, existing state policies around electrical grid decarbonization—including the State of Maryland's Renewable Portfolio Standards (RPS), which require that about 50% of the electricity consumed in MD comes from renewable sources by 2030—and IRA tax credits, but does not include any additional emission reductions from future climate initiatives. **The BAU was developed before the current federal administration rolled back many of these tax**

credits, so Frederick's emissions in the future will be more significant than the figure shown here unless those incentives are reinstated. A summary of BAU assumptions is provided in Appendix A.

Under the BAU scenario, the County's GHG emissions are projected to increase 36% by 2050 compared to 2018 levels.

Under the BAU scenario, the County's emissions are projected to increase 36% by 2050 compared to 2018 levels. Key trends from the BAU are described below:

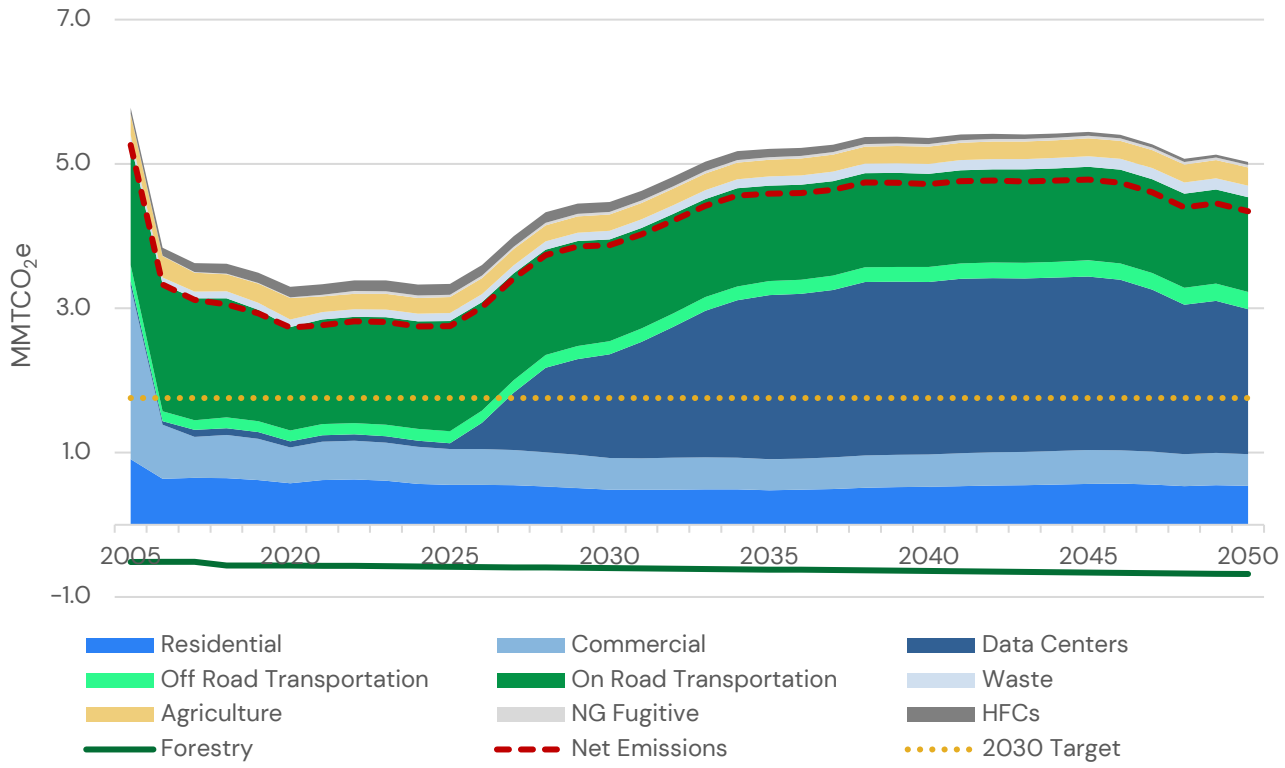
- Increased electricity use, primarily by future data centers, is a driver of increased emissions (see further discussion of this below).
- On-road transportation is projected to become the second-largest source of emissions by 2050, contributing approximately 28% of total gross emissions. Emissions from this sector are expected to decline by 14% relative to 2018 levels, primarily due to increased adoption of EVs and improvements in fuel economy.
- The residential and commercial buildings sector is expected to remain a major source of emissions. Although continued grid decarbonization is projected to lower emissions intensity, total energy consumption in these sectors is anticipated to grow as the county's population and employment base expand.
- Emissions from the solid waste sector are also projected to rise as population growth increases overall waste generation.
- Agricultural emissions are expected to grow gradually, following historical trends tied to livestock populations.
- The forestry and land-use sectors are projected to remain a net sink for GHG emissions due to carbon sequestration by vegetation and soils. However, the carbon sequestration potential of county forests is expected to decline by 2050, largely because of development and land conversion.

Table 14. BAU Emissions by Sector ($MTCO_2e$).

Emissions Sector	2005	2018	2030	2050
Buildings	3,308,791	1,246,090	927,327	980,694
Data Centers	67,363	93,763	1,433,867	2,007,373
Transportation	1,911,049	1,799,910	1,594,358	1,549,645
Waste and Wastewater	118,966	96,799	117,659	159,483
Agriculture	281,991	234,596	191,188	195,776
Forestry	(515,858)	(563,520)	(600,507)	(681,599)

Emissions Sector	2005	2018	2030	2050
Hydrofluorocarbons and Refrigerants	83,035	134,732	139,615	40,471
Fugitive Emissions from Natural Gas Distribution	7,323	9,918	6,683	7,209
Total Gross Emissions	**5,824,259**	**3,649,424**	**4,440,123**	**4,964,036**
Total Net Emissions	**5,262,661**	**3,052,287**	**3,810,191**	**4,259,052**

Figure 17. Frederick County BAU Emissions Projections



The BAU and Data Centers in Frederick County

The Metropolitan Washington region is the world's leading data center hub, with nearby Loudoun County, Virginia, hosting the highest concentration of data centers globally. Data centers can bring significant economic benefits, including tax revenue and jobs, and are key to the world's technology and digital economy. However, the computing equipment can use significant amounts of electricity, depending on the service it is providing. Some data centers also use water for cooling, and those that do can require significant amounts, though many are not using fresh, potable water.

Several large-scale data centers have already been approved in the county, including a 2 GW campus expected to become fully operational by 2035. Data center growth is a driver for the overall 36% increase in GHG emissions by 2050 compared to 2018 levels in the BAU scenario (see further discussion in the Climate Strategies for Frederick section below). These projections incorporate the square footage of existing data centers already operational in Frederick at the time of this CEAP's publication, the 2 GW campus referenced above, approved future data centers totaling 1.2 million square feet, and 1.4 million square feet of data centers planned but not yet permitted at the time the analysis was conducted in January 2025. Most of the projected emissions from data centers in the BAU scenario come from the 2 GW campus. The additional permitted and planned data center square footage contributes 11% of 2050 data center emissions.

Data center electricity consumption estimates and projections carry a high degree of uncertainty. Data on actual data center electricity consumption is not publicly available. Thus, historical, current, and future electricity consumption estimates are based on existing, permitted, and future expected data center square footage and capacity. See Appendix B for more details about how the county's data center

Reducing emissions from data centers will be crucial to meeting emissions reductions goals. This will require powering data centers with cleaner electricity, and Frederick is heavily reliant on state leadership to successfully implement more aggressive grid decarbonization policies to do so. The state has supported data center growth in MD through its State tax policies. Strong state policies will be needed to ensure those data centers do not produce emissions at the scale projected in the BAU.

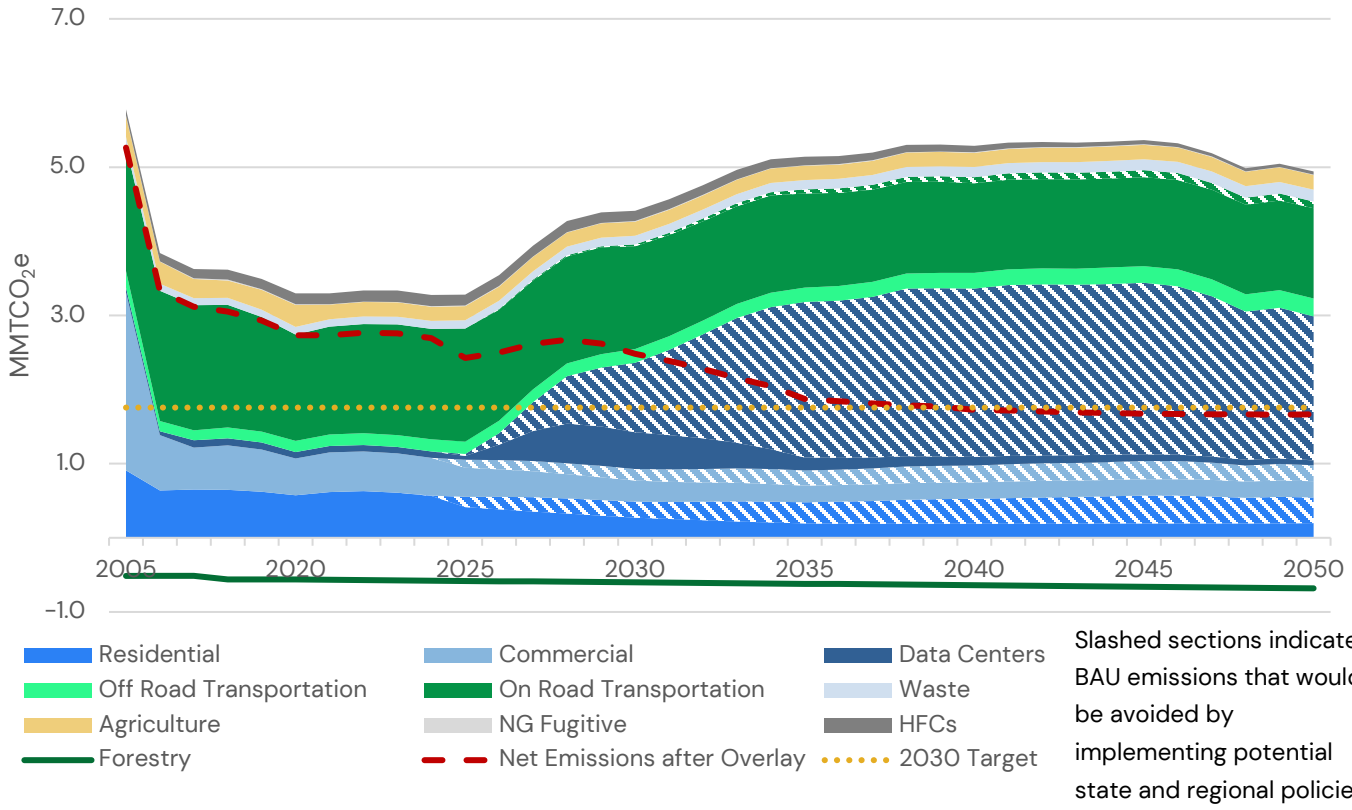
The BAU modeling assumes Maryland meets its RPS goal of about 50% of the state's electricity coming from renewable sources by 2030, and that all states in Regional Greenhouse Gas Initiative (RGGI) do not exceed their electricity emissions caps. However, MD and RGGI are both exploring more aggressive electricity emission reduction pathways that would have substantial implications for Frederick's electricity emissions, listed in Table 15.

If MD and RGGI pass and successfully implement these regulations, the impact will be huge—they will reduce Frederick County's net BAU GHG emissions by 61% annually by 2050, compared to BAU without them. The slashes within each sector in Figure 18 illustrate the potential BAU emission reductions that would result from these state policies. Table 15 describes the regulations that the state of Maryland and RGGI would need to pass and implement for the BAU in Figure 15 to become a reality. Other states have already adopted more aggressive regulations; for example, the Commonwealth of Virginia is committed by law to achieve 100% carbon-free electricity by 2050.

Table 15. Comparison of Current and Potential Policies that Could Reduce GHG Electricity Emissions in the BAU Scenario.

Current Electricity Emissions Policies (BAU – Figure 17)	Potential Electricity Emissions Policies (Figure 18)
• MD Renewable Portfolio Standards (RPS) attainment: about 50% of the electricity consumed in MD comes from renewable sources by 2030 • Attainment of RGGI targets for each state in the PJM region	• Strengthening of MD's existing RPS target to 100% clean electricity by 2035, as described in Gov. Wes Moore's Executive Order 01.01.2024.19 [xxxiii] • Strengthening RGGI to achieve a zero-emissions cap by 2035 [xxxiv]

Figure 18. Frederick County BAU Emissions, with Potential Avoided Emissions.



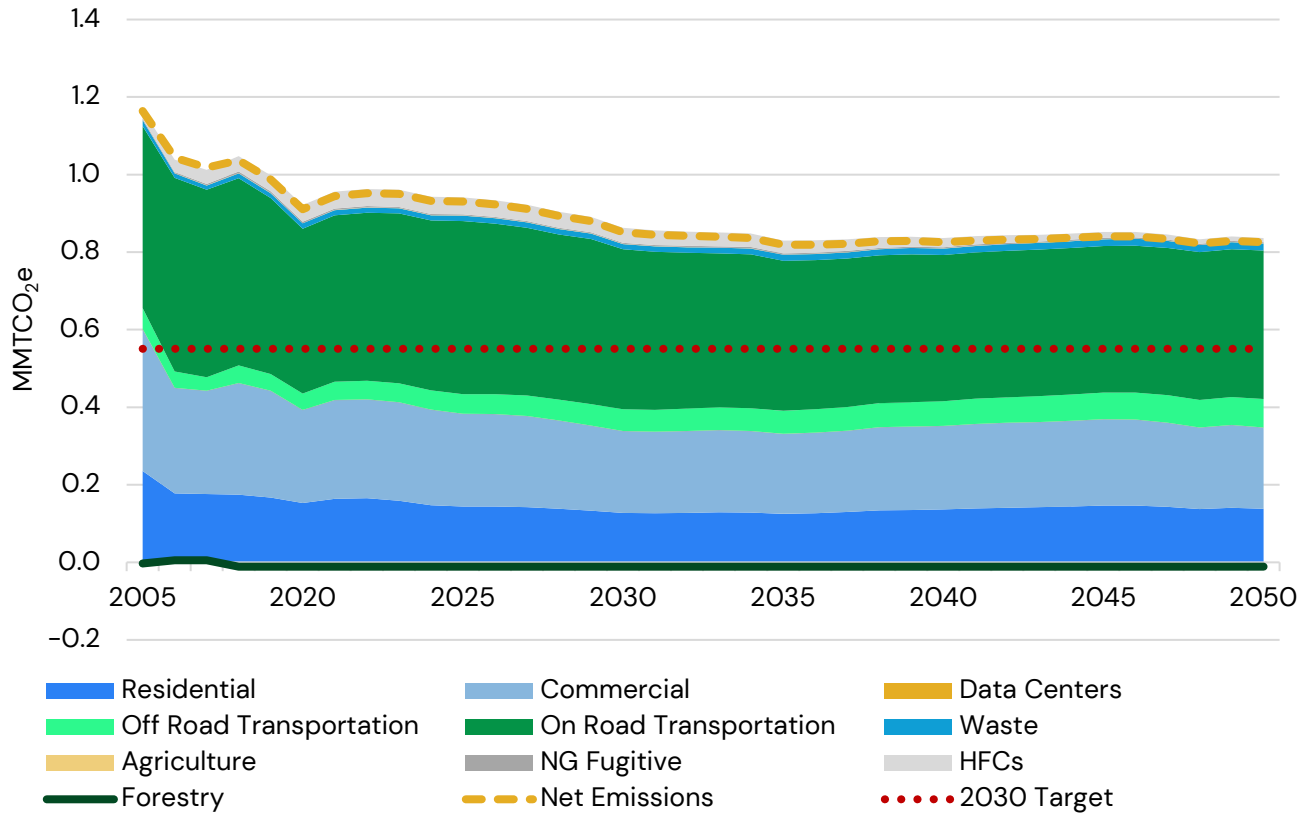
City of Frederick BAU

This CEAP includes a BAU specific to the City of Frederick in line with the methodology and assumptions used for the County's BAU. Sectoral trends in transportation, buildings, and waste are generally consistent with those observed at the county level (see Figure 19). However, there are key distinctions; the City's projections do not include emissions from data center development, which contributes significantly to future Countywide emissions growth, because data centers are not

expected to be developed in the City. Emissions from agriculture and forestry remain limited due to the City's land-use profile and minimal undeveloped land.

Under the BAU scenario, the City's total GHG emissions are projected to decline by 20% by 2050 relative to 2018 levels.

Figure 19. City of Frederick BAU Emissions Projections.



Climate Strategies for Frederick

Frederick faces notable climate challenges, but these challenges also present opportunities to mitigate climate change, build resilience to climate impacts, and achieve other beneficial goals for the community.

Table 16. Overview of the CEAP Mitigation and Resilience Strategies for Frederick.

Sector	Strategy
Mitigation Strategies	
Buildings	B1: Accelerate Deep Building Energy Efficiency and Electrification.
Power	P1: Accelerate Development of Distributed Renewables and Battery Storage.
Transportation	T1: Reduce Emissions from On-Road Light-Duty Vehicles. T2: Reduce Vehicle Miles Traveled.
Waste	W1: Encourage Waste Diversion.
Agriculture	A1: Reduce Methane Emissions from Livestock. A2: Reduce Emissions from Agricultural Soils.
Natural and Working Lands	NWL1: Conserve and Expand Urban Tree Canopy. NWL2: Conserve and Manage Natural Resources.
Resilience Strategies	
Infrastructure and Built Environment	IBE1: Reinforce Transportation Infrastructure. IBE2: Enhance Resilience in Water Supply. IBE3: Accelerate Green & Resilient Infrastructure.
Health and Well-being	HW1: Increase Urban Green Spaces. HW2: Protect Worker Health and Safety. HW3: Increase Access to Cooling Infrastructure. HW4: Enhance Food System Resilience.
Emergency Management and Resilience	EMR1: Connect People to Resources. EMR2: Increase Education and Awareness.

This plan presents strategies to both mitigate Frederick's GHG emissions and build Frederick's climate resilience (summarized in Table 16). Mitigation strategies reduce or prevent the emission of GHGs to limit the magnitude and rate of climate change by, for example, promoting renewable energy, enhancing energy efficiency, supporting sustainable transportation, and implementing green infrastructure. On the other hand, resilience strategies prepare for and adapt to the impacts of climate change, ensuring that communities and ecosystems can withstand and recover from extreme weather events and other

climate-related challenges. Resilience strategies include developing disaster preparedness plans, improving infrastructure to withstand extreme weather, engaging communities in resilience planning, adopting flexible land-use policies, and more.

By tailoring strategies to Frederick's specific greenhouse gas emissions profile and localized climate risks, this CEAP provides a comprehensive framework for both mitigating future climate impacts and enhancing the community's resilience to current and emerging environmental challenges.

Strategies Structure

Each strategy included in this CEAP has been evaluated using a consistent set of criteria to ensure comparability and alignment with Frederick's climate and energy goals.

Table 17 introduces the elements included in each strategy, including GHG reduction levels, resilience goals achieved, outcomes for community values, investment level, implementing partners, hazards addressed, and implementation timelines. This standardized approach allows stakeholders to quickly understand the relative impact and feasibility of each strategy.

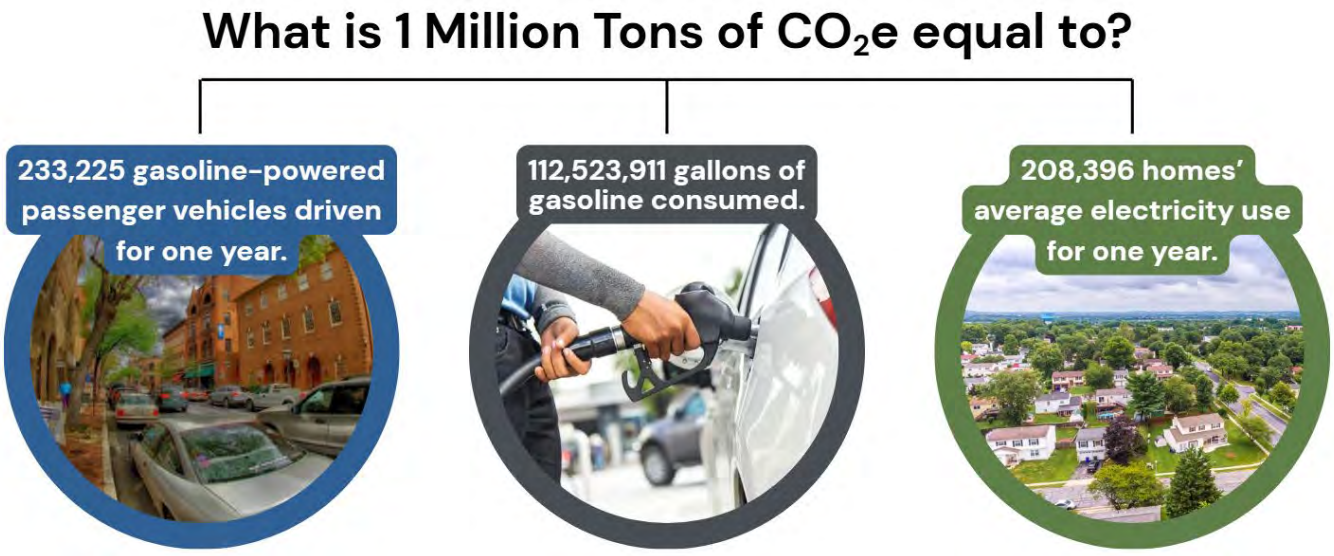


Table 17. Elements Included in Each CEAP Strategy.

Strategy Element	Description	Criteria
GHG Reduction Level	Strategies were assessed for their potential to reduce GHG emissions, categorized into three tiers: high, medium, and low. These estimates reflect the anticipated cumulative reductions over the planning horizon and are aligned with the City and County's long-term climate targets. *What is 1 million CO_2e? See above.*	🍃🍃🍃 >1 million MT CO_2e 🍃🍃 500,000-1 million MT CO_2e 🍃 <500,000 MT CO_2e
Outcomes for Community Values	Community input played a central role in shaping the strategies presented in this plan. Through stakeholder engagement, community members and local organizations identified key priorities such as equity, affordability, health, and environmental quality. These responses were reviewed by the CEAP team, and these call-outs highlight high-priority outcomes voiced by participants.	
Investment Level	Each strategy includes an estimated investment level, reflecting both capital and operations and maintenance costs. While these estimates are preliminary, they provide a useful indication of the financial resources required and help guide funding and budgeting decisions.	**$$$** >$1,000,000 **$$** $100,000-$1,000,000 **$** <$100,000
Implementing Partners	While the City's Sustainability Department and the County's Department of Energy and Environment will play active and key roles in implementing each strategy, successful execution depends on many public and private entities. Partners listed in this section are not formally committed at this stage but are well-positioned to support implementation based on their expertise, resources, and alignment with the plan's objectives.	
Hazards Addressed	For resilience strategies, the CEAP also identifies the specific climate hazards each action is designed to address. Strategies may address one or more hazards and contribute to many resilience goals. See hazard key in the Resilience Strategies overview.	
Implementation Timeline	Each strategy is assigned an anticipated implementation timeline based on its complexity, readiness, and alignment with other planned initiatives.	Long-term: > 5 years Mid-term: 1 – 5 years Near-term: < 1 year

Mitigation Strategies

The CEAP team conducted a series of activities to develop GHG mitigation scenarios and nine mitigation strategies. Drawing on existing resources from MWCOG, prior City and County plans, and relevant state policies, the CEAP team synthesized information from a wide range of climate-related documents. These included GHG emissions inventories, existing and planned reduction measures, and supporting data from local and regional climate action and sustainability plans. The team also reviewed commonly implemented GHG reduction strategies as well as emerging technologies. Additionally, the team identified and leveraged publicly available datasets to support the identification, prioritization, and quantification of mitigation measures based on their estimated GHG reduction potential (categorized as low, medium, or high).

If all the modeled strategies are fully implemented, Frederick County can reduce its 2050 GHG emissions by 96% from BAU levels.

GHG reductions for specific strategies were modeled for the transportation, residential, and commercial buildings, electric power, waste, agriculture, and natural and working lands (NWL) sectors. Although data centers are projected to be the County's largest source of emissions under the BAU scenario, specific reduction strategies for this sector were not modeled separately for this analysis. This analysis also does not capture how technology changes in the data center industry may change their emissions. The Metropolitan Washington Council of Governments, as part of EPA's Climate Pollution Reduction Grant program, is updating elements of its Climate and Energy Action plan. This Comprehensive Climate Action Plan (CCAP), currently under development and expected to be finalized in December 2025, includes a strategy to address emissions from data centers in the region. Frederick County, Loudoun County, and other local governments with significant data center development are collaborating on the workgroup for this project. At this time, future emissions projections from electricity used at data centers reflect emissions intensity of the regional electric grid based on state policies to reach net-zero emissions from electricity. The state and regional policies needed to drive the emissions intensity reduction are described in Table 15 in the CEAP's Climate Trends chapter. Further discussion is located in the Data Centers subsection in the Mitigation Strategies chapter.

Figure 20 illustrates the emission reductions modeled for each sector in a "wedge chart", which should be read from top to bottom. Sector-level BAU trends are also illustrated in Table 18. The uppermost line represents the BAU emissions trajectory. Each colored "wedge" below shows the estimated emission reductions achieved by implementing strategies in a specific sector. The "Additional Actions" wedge between the sector wedges and the "Remaining Net Emissions" line represents further reductions required to achieve net-zero emissions in addition to the modeled strategies (see Figure 21 and Table 19). These additional reductions could come from future actions such as electrifying off-road equipment (e.g., lawnmowers, leaf blowers).

To model emission reductions, the CEAP team used utility and demographic data from both jurisdictions, along with BAU, to inform a measurement approach using the CO_2Sight™ decarbonization platform.[7] This platform enabled sector-specific modeling for buildings, industry, transportation, and power sectors through 2050. For non-energy sectors not included in the platform, such as land use, the team conducted customized analyses using publicly available data. For more, see Appendix B: Methodologies.

All strategies were aligned with existing City and County goals to ensure consistency with local priorities and stakeholder expectations. For each strategy, the CEAP team identified equity considerations and potential community benefits to guide inclusive and impactful climate action.

Table 18. BAU Emissions by Sector ($MTCO_2e$).

Emissions Sector	2005	2018	2030	2050
Buildings	3,308,791	1,246,090	927,327	980,694
Data Centers	67,363	93,763	1,433,867	2,007,373
Transportation	1,911,049	1,799,910	1,594,358	1,549,645
Waste and Wastewater	118,966	96,799	117,659	159,483
Agriculture	281,991	234,596	191,188	195,776
Forestry	(515,858)	(563,520)	(600,507)	(681,599)
Hydrofluorocarbons and Refrigerants	83,035	134,732	139,615	40,471
Fugitive Emissions from Natural Gas Distribution	7,323	9,918	6,683	7,209
Total Gross Emissions	**5,824,259**	**3,649,424**	**4,440,123**	**4,964,036**
Total Net Emissions	**5,262,661**	**3,052,287**	**3,810,191**	**4,259,052**

Table 19. Modeled Emission Reductions and 2018 Emissions Baseline ($MTCO_2e$).

Emissions Sector	Baseline	Reductions	
	2018	2030	2050
Buildings	1,246,090	441,364	907,479
Transportation	1,799,910	140,514	1,017,204
Waste	96,799	13,773	84,166
Agriculture	234,596	14,325	12,327
Forestry	(563,520)	19	95,932
Data Centers	93,763	936,915	1,941,956
Rooftop Solar		21,616	29,925

[7] CO_2Sight is a collection of proprietary ICF tools, models, data, workflows, and information. It is a framework and supporting assets for ICF's decarbonization work.

Figure 20. Mitigation Scenario Absolute Emissions.

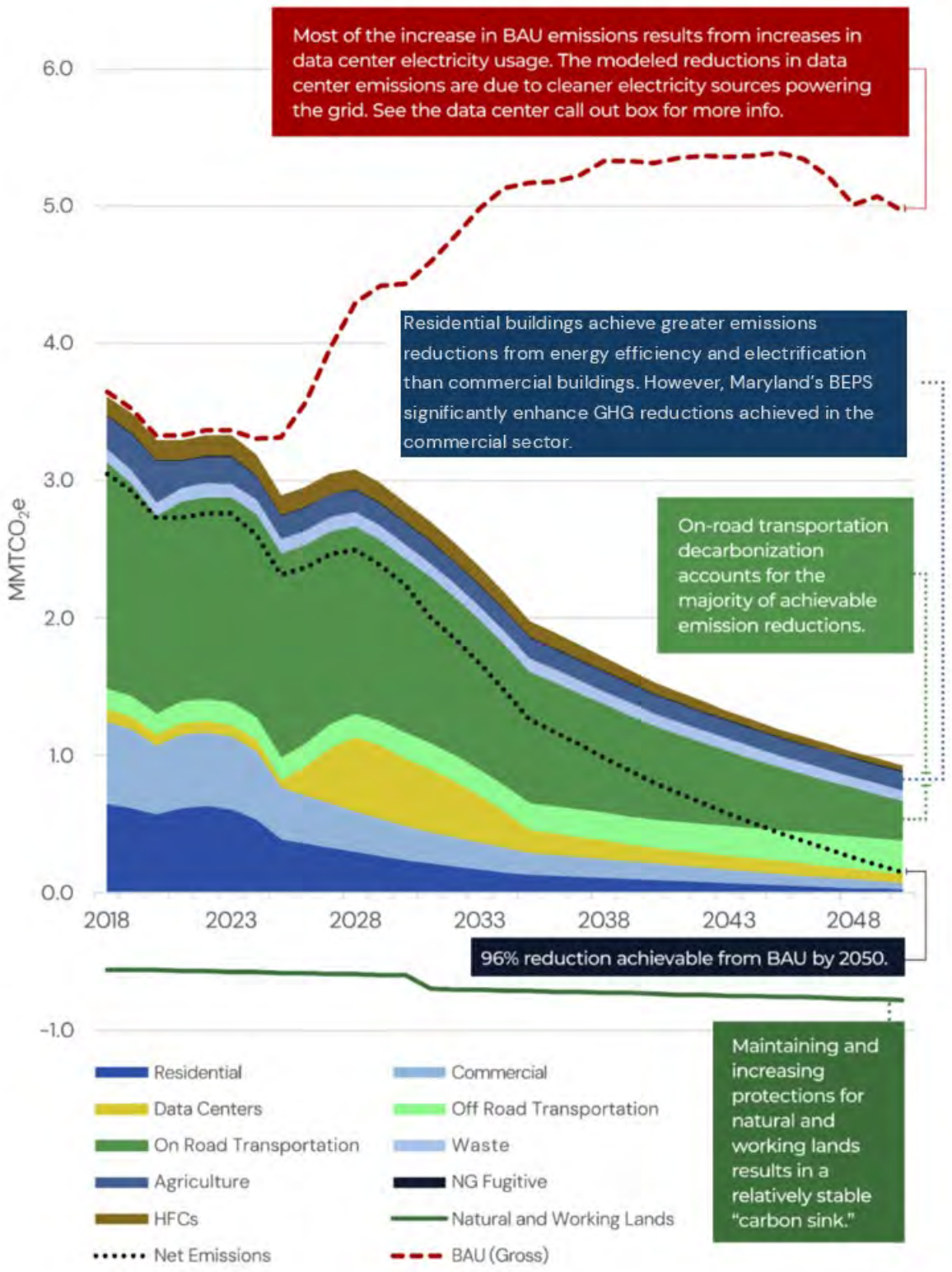
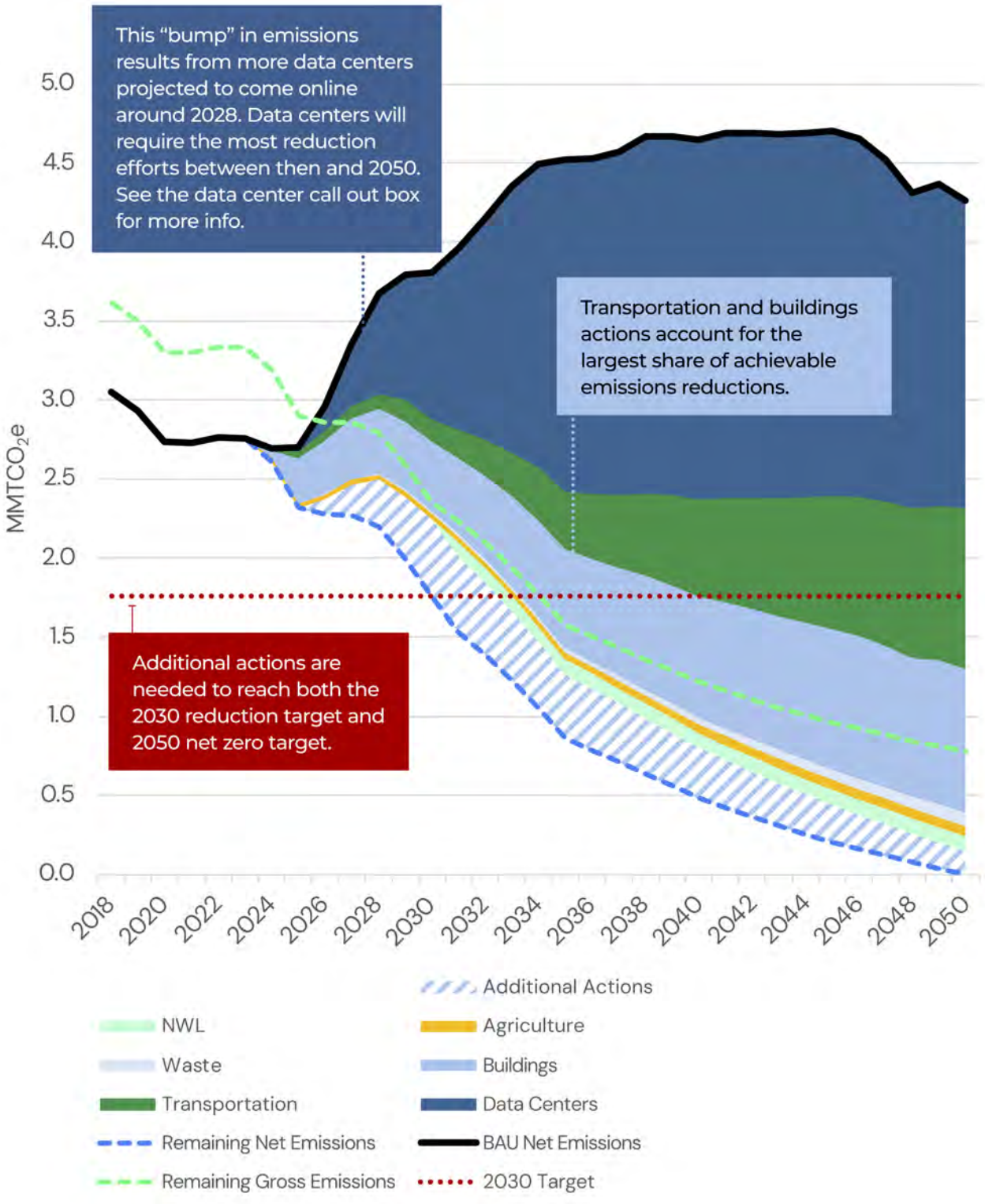


Figure 21. Modeled Emission Reductions by Mitigation Strategy.



Buildings

Buildings are a major source of GHG emissions in Frederick, with 34% of emissions in 2018 attributed to commercial and residential buildings. These emissions are primarily due to the energy used for heating, cooling, lighting, and powering appliances and equipment. Estimates suggest that U.S. residents spend around 90% of their time indoors[xxxv], making these spaces significant not only for climate change but also for communities' health and quality of life. Frederick's facilities, including office buildings, schools, apartments, theaters, recreational centers, train stations, airports, athletic facilities, museums, parking garages, airport hangars, water treatment plants, wastewater treatment plants, pump stations, outdoor recreation spaces, streetlights, and traffic signals, all contribute to energy consumption in this sector.

Enhancing the energy efficiency and sustainability of buildings represents a critical area for reducing GHG emissions. By prioritizing high-performance design, construction, and retrofitting practices, communities in Frederick can significantly lower energy consumption and reduce their carbon footprint. **With the following strategies implemented, Frederick can reduce its emissions in the building sector by 90% by 2050, using 2018 as the baseline year**. Given the long operational lifespan of buildings, early investment in improved standards can lead to lasting environmental, economic, and public health benefits.

Table 20. Strategies in the Buildings Sector.

Strategy	GHG Reduction Potential
B1: Accelerate deep building energy efficiency and electrification in new buildings and retrofits for existing buildings	

Frederick's Mitigation Progress

Frederick has taken meaningful steps to reduce GHG emissions in the building sector. The County's Division of Energy and Environment supports energy-efficiency programs with support from the Maryland Energy Administration. With funding from state and federal sources and implementation support from community partners, the County leads retrofitting efforts. The City of Frederick complements these initiatives by delivering energy-efficiency services to the public, offering tax credits for high-performance buildings, leading by example by upgrading municipal appliances, and conducting energy audits on City facilities.

Statewide, Maryland has enacted policies and supported programs to reduce building emissions by improving building performance standards, regulating building appliances, and funding residential energy-conservation programs for homeowners and renters in Maryland. These initiatives align with the 2021 CRRR's recommendations to transition toward sustainable homes.

The following programs and legislation are foundational for the CEAP's building sector strategies.

- The County's Power Saver Retrofits Program: Provides free assessments of residential energy use and implements energy-saving home improvements for income-qualifying households, saving participants $780/year on average. In 2024, the program renovated 60 low- to moderate-income homes.
- Potomac Edison's Home Performance with ENERGY STAR® Program: Offers $100 energy evaluation by a Building Performance Institute-certified Home Energy Expert. If recommended upgrades are implemented, Potomac Edison offers rebates to lower installation costs.
- Potomac Edison's Quick Home Energy Checkup: Offers an in-home energy-efficiency assessment and subsequent recommendations with a potential for Potomac Edison customers to receive up to $200 in energy-saving at no additional cost.
- The County's Green Homes Program: Includes Appliance Rebates Program, the Green Compass tool, and the Green Homes Challenge, all of which encourage community members to improve household energy efficiency.

What are folks in Frederick saying about Buildings?

High Energy Costs: Folks across Frederick are feeling the sting of higher energy rates and are motivated to pursue energy saving measures and collective change for lower costs.

Inequitable Growth: Frederick is experiencing rapid growth, particularly in areas where growth had not been observed over the last two decades. Folks are concerned about rising costs and higher property taxes and energy demand that are making it harder to stay in Frederick.

Preserving Frederick's Character: Folks remain enthusiastic about conservation programs that aim to maintain existing natural landscapes. There is also broad support for programs that help community members staying in Frederick, as it draws in newer community members at higher levels than previously seen. Community members are interested in learning more about initiatives that support the safe use of natural lands, building efficiency upgrades, and ways to grow without compromising Frederick's distinct character in the region.

- The City's Weatherization Program: Offers home energy-efficiency improvements (such as adding insulation and replacing old appliances) for LMI households in Frederick, Carroll, and Washington Counties, saving $372/year on average.
- Maryland's Building Energy Performance Standards (BEPS): Implemented under the 2022 CSNA, this legislation requires large buildings to achieve net-zero direct emissions by 2040. [xxxvi]
- Maryland's Zero-Emission Heating Standard (ZEHES): Although this standard is not currently in effect, it would create emission standards for newly manufactured residential furnaces, boilers, and water heaters.
- EmPOWER Maryland Energy Efficiency Act: Financially supports Marylanders to incentivize energy efficiency and conservation efforts. Since 2012, EmPOWER has reduced annual electricity consumption by over 2 million megawatt-hours (MWh), generating an estimated $3.7 billion in lifetime savings for ratepayers. [xxxvii]
- Maryland Energy Administration (MEA): Funds and incentivizes improving energy efficiency across sectors. For example, in 2024, the Frederick County Public School system was awarded $103,000 to design plans for improving energy efficiency, along with an additional $92,000 to outline a path toward achieving carbon-neutral building operations. [xxxviii]

Challenges Posed by Federal Actions

Current federal legislation will make it more challenging for community members to take action to reduce emissions from their homes and lower their energy costs. For example, President Trump's "One Big Beautiful Bill Act" will eliminate a $3,200 tax credit for efficiency improvements like insulation, windows, and heat pumps as of December 31, 2025.

Equity Considerations

Frederick's residential and commercial buildings directly impact community members' living and working conditions. These spaces influence health outcomes, costs of living, and quality of life, all of which have profound impacts on equity outcomes. Since most people spend approximately 90% of their time indoors, whether at home, school, or work, these spaces play a critical role in shaping the overall well-being and health of our communities. Inferior indoor environments, especially those with unmaintained ventilation systems, inefficient heating and cooling, or outdated appliances—can contribute to a range of serious health issues, including asthma, respiratory diseases, heart conditions, and even cancer. [xxxix]

Access to reliable, resilient, and affordable energy and weatherized spaces is key to reducing these known health impacts. This is particularly important considering certain neighborhoods face higher energy burdens, aging housing stock, and increased vulnerability to climate-related risks. For low- and moderate-income households, economic stressors such as high utility bills can force families to choose between paying for food, medication, or housing. In extreme cases, high energy burdens and energy insecurity can lead to eviction and contribute to rising rates of unhoused individuals.

Improving a building's energy efficiency, through new construction or retrofitting existing structures, can reduce utility costs for homeowners, renters, and community members living in multifamily households. Upgrades to buildings can lead to better indoor air quality, enhance the community's overall resilience to

extreme weather, and can create new jobs for technicians needed to support energy-efficiency programs.

Inaction in this sector risks allowing energy burdens, health disparities, and climate vulnerabilities in Frederick's underserved communities to persist or worsen over time. The strategies in this sector support climate goals while simultaneously addressing existing risks and inequities.

Mitigation Strategy B1: Accelerate deep building energy efficiency and electrification in new buildings and retrofits for existing buildings.

To advance building energy efficiency and electrification, this strategy supports energy audits and expands outreach to help residents learn about and use government and utility funding and incentive programs. To guarantee proper installation and maintenance of upgraded systems, this strategy supports contractor training and education. It also explores opportunities in geothermal expansion and campaigns to incentivize heat pump adoption. This strategy and supporting actions advance the CRRR's recommendation to incentivize the transition to environmentally sustainable ("green") homes.

Outcomes for Community Values

- Improved community resilience to extreme weather events while maintaining historic building characteristics.
- Improved local indoor air quality using cleaner energy sources.
- Lower home and business energy costs overtime.

68% of CEAP survey respondents indicated that financial assistance, such as an incentive or a rebate, could encourage them to incorporate clean energy into their home.

Figure 22. Historic homes in downtown Frederick.

Actions to Implement

B1.1 Encourage energy audits and increase outreach and education about energy efficiency financing opportunities.

Energy audits are a critical first step in identifying practical, cost-effective improvements that can reduce energy use by 5–30%,[xl] enhance indoor comfort, and lower utility bills. Audits identify how a building consumes energy and whether there are any existing inefficiencies with their HVAC systems, insulation, lighting, or appliances. This knowledge can empower homeowners and tenants to take action and make energy-savings decisions. However, awareness of and participation in audit programs remains low—particularly among LMI households, renters, and small businesses.

The County is already helping to close this gap by promoting available audit services and energy-efficiency incentives through targeted, inclusive outreach. Current strategies include multilingual materials, in-person and virtual workshops, tabling at community events, and partnerships with trusted local organizations. Moving forward, Frederick will place greater emphasis on reaching residents in older

homes, which often face high utility bills, outdated electrical systems, and poor insulation that make them difficult and costly to maintain. Strategies that prioritize those most in need help ensure that the benefits of energy upgrades and subsequent cost savings have the greatest impact.

Potential Partners

- City of Frederick Department of Housing and Human Services Weatherization Teams

Timeframe

Near-term

Investment

$

B1.2 Explore the potential for networked geothermal heating in new development.

Geothermal heat pumps can reduce building heating and cooling energy consumption and improve grid resilience; however, high upfront installation costs can be a barrier for widespread adoption. To address this, County staff should engage developers and utilities to evaluate their viability through a feasibility study. This should include community-scale systems for neighborhoods or multifamily housing, where leveraging economies of scale could help lower costs and encourage participation. In parallel, the County should also promote high-efficiency electric heat pumps as a more cost-effective alternative, especially given the recent technological improvements and utility incentives that help offset installation expenses.

> "Frederick County provided great opportunities for education and incentives to help bring our 1910 home to the 21st century with [a] geothermal heat pump & solar. "
>
> –Frederick Community Member, CEAP Survey

Potential Partners

- Building Developers
- Frederick County Building Industry Association

Timeframe

Mid-term

Investment

$$

B1.3 Launch a "solarize" style campaign for heat pumps and other renewable thermal technology.

A "solarize-style" campaign is a community-based initiative that simplifies and reduces the cost of installing solar panels by offering group purchasing, pre-vetted installers, and educational support to communities. This kind of campaign is typically launched with the goal of accelerating renewable energy adoption through targeted outreach to the community, bulk purchasing, and a streamlined installation process. For example, Switch Together, run by Solar United Neighbors and iChooser, partners with local governments, including the City and County, to offer discounted solar, EV charger, and battery storage installations for Frederick community members.

Frederick can also target investments for LMI households who are more vulnerable to high energy bills and more likely to have outdated and inefficient heating and cooling systems. Similar to the solarize campaign,

Frederick could help explore pilot and rebate programs in LMI communities for heat pumps and renewable thermal technology. By leveraging group buying power and trusted local partnerships, this action aims to make clean heating and cooling affordable and accessible for all.

Potential Partners

- iChooser
- Frederick County Division of Energy and Environment
- City of Frederick Sustainability Department

Timeframe

Mid-term

Investment

$

B1.4 Provide training and education for current and incoming contractors, so they are well equipped to install and maintain clean technologies.

Expanding training pathways for local contractors and strengthening partnerships will be critical to accelerating building electrification and decarbonization. Training and education opportunities for contractors — such as technical certifications and degrees, updated training on codes, and pathways to access college courses — will ensure they are well equipped to install and maintain clean energy equipment. Educating contractors on both existing and new state and local energy-efficiency regulations is also important to ensure best practices are followed in Frederick's building sector. Partnerships with local colleges, workforce development agencies, trade organizations, and the City and County's economic development teams can also provide critical support. This action directly aligns with the 2021 CRRR's recommendation to create and deploy workforce transition plans.

Potential Partners

- City Department of Economic Development
- Frederick County Workforce Services
- Frederick Community College Career & Technology Center

Timeframe

Mid-term

Investment

$$

B1.5 Encourage and financially support the installation of weatherization and energy-efficiency measures.

Frederick is expanding access to weatherization and retrofit services and should continue to build on this by strengthening local outreach, removing participation barriers, and providing supplemental financial support where needed. In 2020, approximately 12% of Frederick County households were considered energy burdened.[xli] Currently, programs geared toward alleviating this burden include: Maryland's EmPOWER Program, the federally funded Weatherization Assistance Program, the County's Power Saver Retrofits Program, and the City and County's Housing and Human Services Weatherization Teams. Frederick can further amplify the impact of these programs by launching outreach campaigns, increasing multilingual assistance, enhancing support for community-based enrollment events, and allocating local

match funding to expand program reach. Additionally, Frederick is working to mesh energy efficiency and weatherization with historic preservation policies.

Figure 23. Images from residential audit through the County's Power Saver Retrofits Program.

"I am super impressed with the heat pump water heater that replaced our traditional electric resistance water heater; our electric bill is significantly lower!"

-Frederick Community Member, CEAP Survey

Potential Partners

- Frederick County Division of Energy and Environment
- City and County Department of Housing and Human Services
- Maryland Department of Housing and Community Development
- Maryland Energy Administration & Utility Providers

Timeframe

Mid-term

Investment

$$

How Community Members Can Take Action

- Join local group-buying campaigns for renewable energy systems.
- Apply for financial assistance or rebates to install insulation, air sealing, or energy-efficient appliances.
- Schedule a home or business energy audit through local or state programs.

Figure 24. Students and families at a locally organized Energy Fair in 2023.

Power

The electric power sector is a source of "upstream" GHG emissions. When people use electricity in buildings and transportation, it does not emit GHG emissions at the point of use – the GHGs are emitted at power plants that use fossil fuels to generate electricity. Frederick relies on a diverse mix of electricity sources from around the region to power homes, businesses, vehicles, and public facilities, including traditional fossil fuels and an increasing share of clean electricity sources like wind and solar. As a result, increasing the share of clean electricity sources will support emission reductions in other sectors (particularly the building, data center, and transportation sectors) by reducing the upstream emissions associated with using electricity. However, this can be challenging, as Frederick has limited control over what electricity sources power the regional grid — that is determined by electric utilities and regional grid operators.

Nonetheless, Frederick can help advance this transition by supporting the deployment of clean electricity technologies and storage locally. While development of local, distributed clean electricity technologies will have a lower impact on overall GHG emission reduction compared to larger, utility-scale renewable energy deployment, these strategies will also enhance public health, reduce operational costs over time, increase grid resilience, enable more households to maintain power during outages, and allow for more participants in a cleaner, more reliable local energy system. **By implementing these strategies, Frederick can achieve a 98% reduction in its power sector emissions by 2050, compared to 2018 levels.**

Table 21. Strategies in the Power Sector.

Strategy	GHG Reduction Potential
P1: Accelerate development of distributed renewables and battery storage.	

Frederick's Mitigation Progress

Before the CEAP, Frederick's power sector GHG emission reduction efforts have been guided by plans and partnerships focused on leading by example in government operations, transitioning to renewable energy sources, and building resilient energy systems. These efforts align with broader goals to reduce emissions 50% by 2030 and 100% by 2050.

The County currently generates a portion of its operational electricity use from solar facilities located on County property. Additionally, the County is completing a Solar Blueprint Study to support expanding solar on county land and incentivizing solar development countywide. The County has also partnered with a solar cooperative run by the organization Solar United Neighbors to help the public access affordable solar for their roofs.

The County is piloting the development of a microgrid as a part of the Prospect Center Project that serves this facility when the main grid has an outage. The grid is powered by a photovoltaic solar array with battery backup to ensure the Center is resilient to challenges that might otherwise disrupt Frederick's broader electrical grid, such as high winds or heavy precipitation.

Maryland's statewide policies further support Frederick's local progress, including mandates for renewable electricity, solar access for LMI households, and the development of a Clean Power Standard. The plans and legislation listed below demonstrate the collective action taken in this sector and the ambitious goals to advance renewable energy in Frederick and Maryland.

- The County's 2010 Comprehensive Energy Plan: Set goals to reduce non-renewable energy use in County buildings, facilities, and fleet by 50% over a 15-year period.
- The County's 2023 Climate and Energy Action Plan for Internal Operations: Recommends converting County building electricity use to clean energy to reduce internal GHGs 50% by 2030.
- Frederick's CRRR: Advances the goal to reduce County and City-wide emissions 50% by 2030 and 100% by 2050; includes recommendations for accelerating solar and clean electricity adoption.

What are folks in Frederick saying about Power?

Reduce Energy Costs: The number one concern consistently raised during outreach events is the ongoing rise in energy costs, with significant interest in ways to combat these increasing prices. This was consistent with what both the County and City have been hearing previously and aligns with what has become a top concern for communities around Maryland and the nation.

Community Energy Capacity: Multiple community members expressed interest in solar panels and wind farms, showing a growing desire for alternative and cleaner energy production as a means to attract investment in Frederick. People hope that clean energy rebates and other incentives will be available to help them afford adopting cleaner energy sources.

- The City's Climate Action Plan for Government Operations: Commits to transitioning to 100% renewable energy for City operations, including purchasing renewable energy credits (RECs).
- The City, County, and Solar United Neighborhood's Switch Together Program: Uses group purchasing and reverse auctions to make residential solar more affordable and accessible.
- Maryland Renewable Portfolio Standard (RPS): Requires 50% of electricity sales from renewables by 2030, including 14.5% solar by 2028.
- Maryland Clean Power Standard: Created by Governor Moore through executive order on June 4, 2024 directing MEA to develop a framework, the Clean Power Standard aims for 100% clean electricity generation statewide by 2035. This includes Offshore Wind Development Reforms, Solar Market Enhancement, Nuclear Power Integration, Strategic Power Purchase Agreements, and Technology Innovation and Implementation. Some elements of this that rely on federal action may no longer be achievable.
- Maryland Clean Energy Center's Solar For All: Would have expanded access to solar energy for low- and moderate-income households, but funding has been rescinded by the current federal administration. Frederick County was participating in outreach efforts to support the program's rollout locally, including exploring community solar options and leveraging County-owned solar assets to benefit LMI residents.
- Maryland Solar Access Program: Offers a maximum total individual grant of $7,500 for low- and moderate-income households to install solar systems with approved contractors.

Challenges Posed by Federal Actions

Legislation passed by the current federal administration will significantly hinder local efforts to transition Frederick's electrical grid to clean energy. The federal "One Big Beautiful Bill Act" eliminated key clean energy tax incentives after a short phase-out period, particularly the Investment Tax Credit (ITC) for solar and wind energy projects, which provides a 30% tax credit, as well as the production tax credit (PTC) for commercial solar and wind production. The current federal administration has also rolled back significant funding for solar deployment in the state of Maryland as well as residential tax credits. The loss of these incentives will make the already challenging task of meeting growing local electricity demands while shifting to clean energy sources even more difficult.

Commercial property owners can still receive a tax credit if they begin construction on a solar project by July 4, 2026, or place the project in service by December 31, 2027. As of January 1, 2026, projects will be subject to additional, strict, and complex requirements restricting the use of equipment tied to "Prohibited Foreign Entities" (PFEs).

Despite the challenges these changes pose, community members and commercial property owners can still access state funding to support solar and other clean energy projects: the Maryland Energy Administration currently offers significant grant funding for investments in clean energy.

Equity Considerations

Historically, low-income and marginalized communities have faced higher energy costs, lived closer to polluting facilities, and had a harder time accessing affordable renewable energy sources. In Frederick,

these groups face higher energy burdens and are more vulnerable during power outages and other disruptions to the grid. This is often due to older, less energy-efficient housing units, limited access to financial resources to invest in backup power or weatherization improvements, and systemic underinvestment in infrastructure in these communities. By expanding access to renewable energy, these communities can gain greater control over their energy production and reduce utility costs. Instead of relying solely on electric utilities and being at the whim of fluctuating energy prices and service disruptions, households in Frederick can produce their own electricity, store power for later use, and make informed decisions about when and how to use that energy.

These strategies can also improve health outcomes for vulnerable populations as they reduce GHGs and other air pollutants. Reducing reliance on fossil fuels reduces air pollution, which is linked to asthma, heart disease, and other chronic health conditions. Finally, the transition to clean energy sources can also create local installation and maintenance jobs in Frederick.

Mitigation Strategy P1: Accelerate development of distributed renewables and battery storage.

This strategy will accelerate the adoption of distributed solar and battery storage by encouraging solar installations on developed sites, expanding access to solar energy to community members, and partnering with utilities to promote solar storage solutions. This strategy directly advances the CRRR's recommendation to accelerate solar deployment.

Outcomes for Community Values

- Improved grid resilience and energy independence through diversifying energy sources and improving grid backups.
- Improved local air quality and public health outcomes.
- Lower energy costs over time, especially if financial incentives are increased.
- Smart land use to maximize agricultural and natural spaces while increasing solar capacity.

Actions to Implement

P1.1 Encourage installation of solar on developed sites and planned growth areas, including commercial, multifamily residential, and mixed-use development, parking canopies, and bus stop and bike shelters.

The County's forthcoming Solar Blueprint Study will evaluate the potential for ground-mounted, rooftop, and parking canopy solar across a countywide inventory of sites. The CRRR highlights existing examples of rooftop solar successfully implemented in Frederick, such as those on the roof of Oakdale High School and homes in the North Pointe development. The County is investigating developing solar readiness requirements for newly constructed commercial and residential buildings. Frederick County will also explore opportunities for incentives to encourage the inclusion of solar in new development and redevelopment projects within developed and planned growth areas identified in the Livable Frederick Master Plan. Prioritizing these planned growth areas will help protect the county's agricultural areas. Frederick County's Division of Energy and Environment will also proactively reach out to owners of sites such as commercial buildings and places of worship to discuss potential solar installations and provide technical assistance to interested stakeholders.

This measure also includes exploring the potential for smaller scale but high visibility solar installations on infrastructure like bus stop shelters and bike shelters in the longer term. (Existing bus shelters in Frederick do not connect to a power source.)

Potential Partners

- Livable Frederick Planning and Design
- County Division of Planning and Permitting
- Solar developers
- Commercial, multifamily, and mixed-use site owners

Timeframe

Mid-term

Investment

$

Figure 25. Solar panels on parking canopy at the County's Montevue Campus.

P1.2 Promote private solar installations through the solar co-op program, streamlined permitting, and expanding access for low-to-moderate-income (LMI) community members.

This action supports LMI community members with electrical upgrades and rooftop repairs and promotes access to community solar for residents unable to have panels on their own homes. The City and County will also partner with the Department of Housing and Human Services and the Department of Housing and Community Development to take an integrated approach to removing barriers to residential rooftop solar. For example, since poorly maintained housing can be a barrier to solar energy installation, partners in housing agencies can offer programs to overcome these barriers or a joint program could be launched. Outreach and awareness campaigns will be essential to connect LMI households with available solar options.

Figure 26. Home with Rooftop Solar Panels.

Potential Partners

- City of Frederick Department of Housing and Human Services
- Frederick County Division of Housing
- Solar cooperatives
- Community Solar providers

Timeframe

Mid-term

- HOAs and Community-based organizations

Investment

$

How Community Members Can Take Action

- Explore the County's Solar Blueprint and incentive options to see if solar would be a good fit for your home or business.
- Commercial property owners: Begin constructing solar on your property by July 4, 2026 or place the project in service by the end of 2027 to receive the Federal 30% ITC before it is eliminated.
- Advocate for solar on public sites.
- Join or promote a solar co-op.
- Apply for state funding for residential and commercial clean energy projects from the Maryland Energy Administration.
- Build momentum by spreading the word on the benefits of solar energy.

P1.3 Promote agrivoltaics and support interested farmers in navigating solar opportunities.

Expanding renewable energy generation on a mass scale in Frederick County will require collaboration in order to balance the County's agricultural preservation goals. In addition to incentivizing solar projects in developed and planned growth areas, Frederick County should support interested farmers in navigating solar opportunities.

Agrivoltaics combine solar production and agriculture on the same land, providing a potential opportunity to balance those goals and achieve other potential benefits. While there are limited examples so far of agrivoltaics projects in the Mid-Atlantic region, existing research suggests agrivoltaics projects can produce positive impacts on crop yields, livestock health, and soil content, depending on how the projects are implemented.[xlii] Frederick County can support agrivoltaics by engaging with farmers and stakeholders to identify and address challenges, offer incentives, and track and share information about advances in solar technology and best practices that can make agrivoltaics more viable locally. Frederick County can also provide support to farmers interested in integrating solar on their land.

Potential Partners

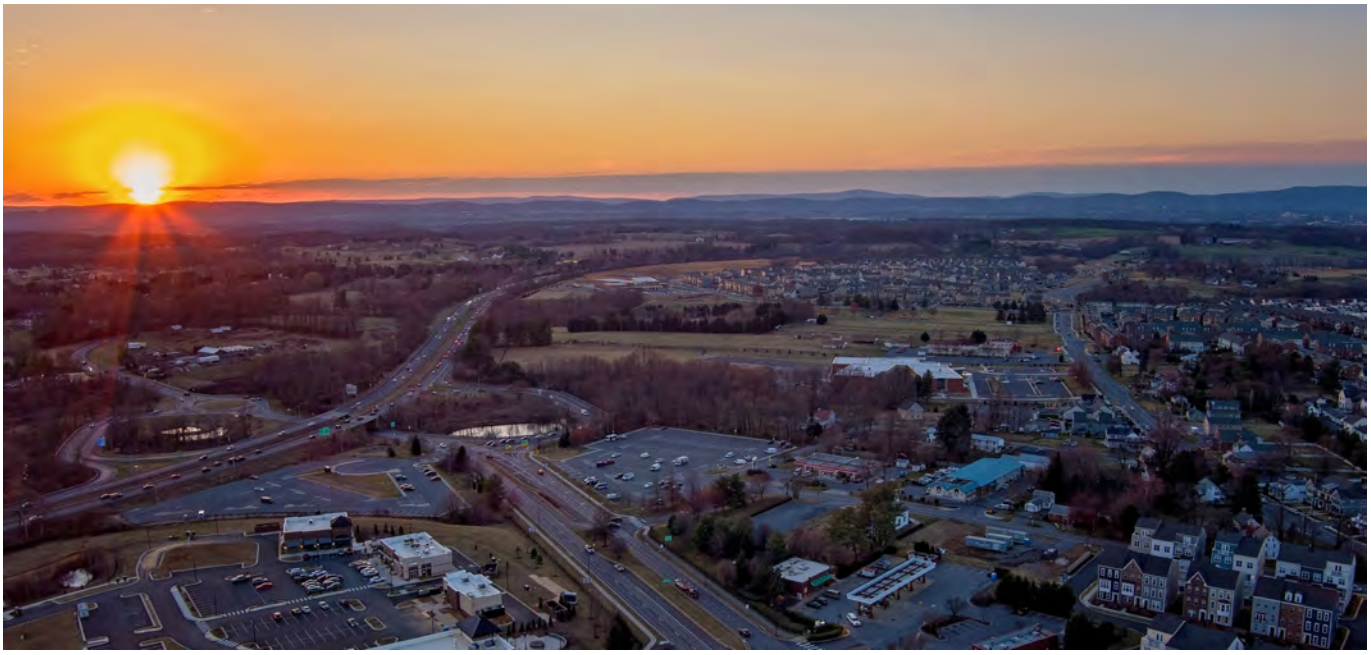
- Frederick County Office of Agriculture
- Farm Bureau
- Farmers and landowners
- Solar developers

Timeframe

Mid-term

Investment

$



Transportation

Transportation is embedded in our everyday routines and fundamentally influences how we connect with one another. It is essential for commuting to work, attending school, engaging in recreational activities, and doing household shopping. However, it is the largest source of GHG emissions both nationally and in Frederick. Impacts of the emissions generated by the transportation sector extend beyond their contribution to climate change. Fossil fuel combustion also adversely impacts public health, wildlife, and entire ecosystems.

Transitioning to a lower-carbon ground transportation system will require the adoption of EVs. Electric vehicles are more energy efficient than their gasoline and diesel counterparts and often have lower operational costs. Some U.S. households spend nearly 20% of their income on gasoline, so households with this burden could significantly benefit with an EV from savings at the pump.[xliii] Increased EV adoption will also reduce noise pollution and eliminate tailpipe emissions, improving local health outcomes and the quality of life for those living near highways.

Mitigating emissions from transportation will also require reducing vehicle miles traveled (VMT) by giving people living and working within Frederick the option to reduce how much they travel by car. Fostering a more walkable, bikeable, transit-friendly Frederick County and City and enabling community members and workers to drive less for daily needs goes beyond the benefits EVs can provide. Reducing VMT increases transportation affordability, provides health and safety benefits, and results in cleaner air and water. **The CEAP's strategies in the transportation sector have the potential to reduce emissions by 70% by 2050, relative to 2018 levels.**

Maryland is advancing transportation strategies to meet ambitious targets. For light-duty vehicles, Maryland's adoption of Advanced Clean Cars II (ACC II) aims for 100% zero-emission vehicle sales starting in 2035.[xliv] Whether or not this will be enforced, Frederick intends to use the ACC II as a goal. Additionally,

the following strategies align with an assumed reduction in total VMT of 7% by 2035 and 9% by 2050, which would result from land-use changes, travel demand management strategies, transit enhancement, and bike, pedestrian, and micromobility improvements. This assumed reduction is based on results from the work recently conducted by ICF for the National Capital Region Transportation Planning Board (TPB) of MWCOG. As part of this project, a study was conducted to assess types of transportation-related actions and the levels of implementation that might be needed to reduce GHG emissions to meet regional goals for 2030 and 2050.

Table 22. Strategies in the Transportation Sector.

Strategy	GHG Reduction Potential
T1: Reduce emissions from on-road light-duty vehicles through partnerships and expansion of charging and other clean fuel infrastructure.	
T2: Reduce vehicle miles traveled by expanding public transportation access, improving bike and pedestrian infrastructure, and supporting development patterns that integrate residential and commercial land use.	

Frederick's Mitigation Progress

Existing transportation planning initiatives in Frederick enhance sustainable mobility options, reduce vehicle dependency, and support the transition to a low-emission transportation network. All of Frederick's Transit services, including fixed route buses, commuter shuttles, and paratransit services are free to ride at this time.

The CRRR also includes recommendations to reduce emissions from transportation, several of which are already underway in Frederick. For example, the report recommends that Frederick "Transition light and medium duty vehicles (LDV and MDV) to all electric," including by creating a plan to transition local government fleets to electric, a process that is underway.

Frederick County has also moved to increase EV charging infrastructure by commissioning an EV Site Recommendation Report and a Charging Codes Permitting and Strategies Report to guide the County's investments. Public engagement for these efforts will begin in 2026.

Frederick's local initiatives align with Maryland's Statewide Transit and Transportation Plans to reduce vehicle dependency and emissions. MDOT is working on providing new EV incentives and maximizing federal funding opportunities to support the adoption of ZEVs. Local car dealerships are also crucial potential partners in this transition. Maryland currently offers both excise tax credits of $3,000 for zero-emission plug-in electric or fuel cell EVs as well as rebates of 50% of the cost of EV charging equipment and installation.

The state and local plans listed below lay the groundwork for the transportation strategies introduced in the CEAP.

- The County's Transit Development Plan: Enhances public transit services across Frederick County.

- The County's Bikeways and Trails Plan: Expands bicycle and pedestrian infrastructure.
- The City's Golden Mile Multimodal Access Enhancement Plan: Improves multi-modal access in the Golden Mile corridor.
- The County's Alternative Fuel Vehicle Fleet Transition Plan: Guides County operations' shift to electric and alternative fuel vehicles.
- The County's Community-wide Electric Vehicle Readiness Plan: Assesses EV infrastructure, barriers, and equity concerns.
- MDEP Advanced Clean Cars II: Requires increasing EV sales, aiming for 100% of new passenger car and light truck sales by 2035.
- MDOT Climate Implementation Plan: Includes the Zero Emissions Vehicle Infrastructure Plan to expand EV charging access.

Figure 27. Amtrak Train.

Challenges Posed by Federal Actions

The current federal administration has eliminated programs designed to encourage the purchasing of EVs. President Trump's "One Big Beautiful Bill Act" eliminated an up-to-$7,500 tax credit for new and leased EVs as of September 30, 2025. Federal tax credits have helped consumers offset the purchase price of EVs, which can have higher upfront costs than internal combustion engine vehicles, though EVs often save drivers money over the lifetime of the vehicle. The One Big Beautiful Bill Act also eliminates a federal tax incentive for EV home charging equipment as of June 2026.

The Trump Administration also froze significant federal grant funding for EV charging infrastructure established through the National Electrical Vehicle Infrastructure (NEVI) program and the Charging and Fueling Infrastructure grant program and eliminated other funding programs that support low-emission

transportation. As of August 2025, NEVI funds have been unfrozen, but the ongoing uncertainty around the availability of these funds poses significant challenges for local governments seeking to invest in charging infrastructure. Frederick County Government was a subrecipient of the U.S. Department of Transportation's Charging and Fueling Infrastructure (CFI) funds that would have installed over $2 million in DC fast chargers within Frederick County at public facilities.

Despite these challenges, residents, commercial and residential property owners, employers, and local governments can still access some funding from the Maryland Energy Administration for EVs and charging infrastructure. Commercial property owners also still have opportunities to partner with private sector EV charging companies, which can provide an additional revenue stream while expanding charging infrastructure in Frederick County. Frederick County Government's Permitting staff remain committed to helping the community through facilitating the permitting process for these facilities.

Equity Considerations

The transportation sector should prioritize fair access to mobility options in Frederick for all individuals, regardless of their socioeconomic status, race, age, ability, or background. This involves working toward creating transportation systems that are not only inclusive but also responsive to the diverse needs of the entire community. For instance, improving public transit, walking, and cycling infrastructure can help reduce reliance on personal vehicles, which are often less accessible to low-income and marginalized groups.

Equitable transportation strategies can help mitigate climate change and foster more resilient communities by promoting less carbon intensive modes of transportation and ensuring community members can equally access services. To make this possible, Frederick can expand public transit services, develop safe and connected bike lanes, improve the condition of sidewalks, and invest in EV infrastructure for all.

What are folks in Frederick saying about Transportation?

Investment Needed: Many Frederick community members commute longer distances than those in some surrounding areas, due to major job providers residing in Annapolis, Baltimore, and Washington, D.C., highlighting a need for increased investment in local roadways and connective transit infrastructure.

Multimodal Solutions: Although investment in roadways is heavily discussed, facilitating other forms of transportation are also of interest. Frederick has seen its bus system receive significant investments in recent years, and there is a desire for that to continue. Investments in other forms of transportation (like ebike and scooter rentals) could also help offset increased congestion resulting from the growing population in the area.

Safety First: Prioritizing bike safety—for example by building protected bike lanes and designated bike infrastructure—will encourage more people to take advantage of this mode of transportation

Grid-Readiness for EVs: In order for EVs to successfully lower Frederick's emissions, the region needs a decarbonized, resilient power grid to accommodate higher demand.

Mitigation Strategy T1: Reduce emissions from on-road vehicles.

On-road transportation is the largest emitting sector in Frederick County today, with light-duty vehicles making up over 60% of those emissions. This strategy aims to replace light-, medium- and heavy-duty[8] internal combustion engine vehicles (ICEVs) with ZEVs, primarily battery-electric vehicles (BEVs) to reduce GHG emissions and improve local air quality. With lower costs to fuel up and lower maintenance costs, ZEVs also typically cost less to own over the course of the vehicle's lifetime than ICEVs. This strategy aims to increase the number of ZEVs on the road by 2050, helping to advance Maryland's goal of reaching 100% of new light-duty sales being ZEVs by 2035.

Increasing access to EV charging infrastructure is a critical step to increasing public confidence in purchasing EVs. While on site charging typically works for single-family homes, Frederick must invest in public charging for those who cannot charge at home, such as condo or apartment dwellers and those without dedicated parking spaces. To address this, the 2021 CRRR recommends rapidly increasing community-wide EV charging capacity. This supports broader EV adoption and will provide reliable charging options for all community members. Additionally, charging for medium- and heavy-duty EVs will be crucial for adoption within and outside of Frederick to support intrastate shipping, public fleet conversion, and other targets set by the state.

Outcomes for Community Values

- Reduced costs for drivers over the life of the vehicle.
- Improved local air quality and public health outcomes.
- Reduced noise pollution and quieter neighborhoods.
- More opportunities for EV charging across the region for easy commuting.

Actions to Implement

T1.1 Review and streamline the permitting process for EV charger installation.

To accelerate the adoption of electric vehicles (EVs), it is crucial to rapidly deploy a comprehensive and scalable charging infrastructure. Each new charging site requires review by local permitting departments, and, sometimes Potomac Edison, if service upgrades are needed, which can lead to delays. The development of this CEAP included an evaluation of Frederick County's permitting process for EVs. That analysis found that Frederick County's permitting process is already more streamlined than many peer jurisdictions. However, there are opportunities for further updates to these procedures that could help facilitate the deployment of EV charging stations and tackle existing challenges, particularly by providing clearer, more centralized, and accessible information about the permitting process, such as through a permitting checklist or direct outreach to residents and HOAs. Frederick should further evaluate existing

[8] Light-duty vehicles include passenger vehicles such as cars, SUVs, and small pickup trucks that people drive every day. Medium-duty vehicles include larger vans, box trucks, delivery and work trucks, Heavy-duty vehicles include buses, tractor-trailers, garbage trucks, construction vehicles. Heavy-duty vehicles are often used for freight, transit, and industrial work.

permitting procedures to identify bottlenecks that may hinder EV charger deployment and explore opportunities to streamline approvals.

Potential Partners

- Maryland DOT
- Local car dealerships
- Workforce development organizations
- Division of Planning & Permitting
- Maryland Energy Administration
- Local businesses
- Electric utilities

Timeframe

Near-term

Investment

$

T1.2 Promote regional or bulk EV charger purchases.

Facilitating regional or bulk procurement of EV chargers can reduce costs, streamline installation, and promote interoperability. The County can coordinate with neighboring jurisdictions or regional planning entities to combine purchasing power and secure discounts on EV charger hardware and installation services. Standardizing equipment specifications can also simplify permitting, operations, and maintenance across public and private sites, which is particularly beneficial for small businesses and multifamily properties that may lack technical capacity.

Potential Partners

- Maryland DOT
- Local car dealerships
- Workforce development organizations
- Office of Procurement & Contracting

Timeframe

Mid-term

Investment

$$

T1.3 Install public Level 2 and DC fast EV charging at government facilities, in commercial parking lots, workplace parking lots, and/or at dedicated charging stations.

To build confidence in the transition to EVs, it is important for community members to have access to charging stations. Frederick County is exploring adopting EV charging-ready requirements for newly constructed multifamily residential and commercial buildings. Installing chargers at locations where people already spend time outside of single-family homes, such as government buildings, shopping centers, workplaces, and parks, can help normalize EV use and ensure convenient access to charging infrastructure.

Frederick can also lead by example by installing chargers on publicly owned properties. The City has installed 29 public chargers, including 21 L2 ports downtown, and the County's first public chargers have been installed at the Middletown Branch Library, with additional sites planned.

Potential Partners

- Maryland DOT
- Department of Parks and Recreation
- Frederick County Public Libraries
- Workforce development organizations
- Department of Permits & Inspections
- Division of Public Works

Timeframe

Mid-term

Investment

$$$

Figure 28. City of Frederick Mayor Michael O'Connor with residents and staff at an EV charging station in Downtown Frederick.

T1.4 Ensure dealers and dealerships are well equipped and trained to promote EVs.

Car dealers must be prepared to promote and sell EVs. Frederick can partner with local auto dealers to provide EV training courses and create programs to recognize dealers that prioritize EVs. Montgomery County, Maryland is advancing similar efforts by collaborating with local dealerships and workforce development organizations to launch EV-specific training programs. Montgomery County is also piloting an Electric Vehicle Purchasing Co-op to streamline access to EVs for the public.

Potential Partners

- Maryland DOT
- Local car dealerships
- Workforce development organizations
- Department of Permits & Inspections

Timeframe

Near-term

Investment

$$

T1.5 Assign roles for EV implementation based on the EV Public Engagement Plan.

This action requires coordination across multiple municipal departments and potentially with external partners. Frederick should identify and assign roles and responsibilities across agencies (e.g., Planning and Permitting, Fleet, Economic Development, etc.) to ensure accountability and momentum. This action aligns existing roles and efforts with the organizations that can implement strategy T1.

Potential Partners

- Maryland DOT
- Local car dealerships
- Workforce development organizations
- Department of Planning & Permitting
- Office of Economic Development

Timeframe

Near-term

Investment

$

How Community Members Can Take Action

- Understand where existing chargers are located (e.g., using apps like PlugShare or Google Maps).
- Explore electric utilities' time-of-use rates to reduce the cost of home charging.
- Apply for state incentives and grant funding for EVs or charging infrastructure from the Maryland Motor Vehicle Administration and Maryland Energy Administration.
- Advocate for public charging infrastructure.
- Support and/or apply for local policies and incentives.
- Educate and encourage others.

Mitigation Strategy T2: Reduce vehicle miles traveled.

This measure seeks to reduce VMT by improving active mobility options, expanding public transit services, providing e-bike incentives, and prioritizing housing developments that enhance Frederick's accessibility in the transportation sector.

43% of CEAP survey respondents support increased access to local public transit in Frederick.

Outcomes for Community Values

- Improved transit and multi-modal mobility options in Frederick with a focus on connectivity.
- Improved local air quality and public health outcomes.
- Safer environment for pedestrians and cyclists due to fewer cars on the road.

Actions to Implement

T2.1 Implement the proposed bike and pedestrian improvements.

The *Let's Move Frederick* plan for the City prioritizes developing streets that connect residential areas to commercial areas and transit. This action aims to expand the goals of this plan to the full County.

Potential Partners

- Maryland DOT
- City and County Department of Public Works and Transit
- Local landowners
- Workforce development organizations
- Department of Permits & Inspections
- Local landowners

Timeframe

Mid-term

Investment

$$$

T2.2 Implement the transit frequency and service expansions outlined in the Frederick County Transit Development Plan.

The County's Transit Development Plan outlines a variety of transit expansion opportunities to improve accessibility, convenience, and ridership in Frederick. Highlights of this plan include increasing the Transit fleet, reducing headway on current services throughout the work week, extending service hours on connector routes, expanding services offered on Saturdays and Sundays, and developing new Transit hubs. Frederick community members have also expressed support for coordinating the bus system with MARC station locations and service schedules, as well as connecting bus service to airports and Amtrak stations. This action prioritizes the implementation of the improvements outlined in this preexisting plan.

Potential Partners

- Maryland DOT

Timeframe

Long-term

- Workforce development organizations
- The City's Office of Public Affairs and County's Communications and Public Engagement Office
- City and County Transit Services
- Division of Planning and Permitting

Investment

$$$

T2.3 Provide e-bike incentives to county residents

To encourage efficient and active transportation options, Frederick could offer financial incentives to local community members who purchase electric bicycles.

Potential Partners

- Maryland DOT
- Bike shops
- Bike share programs
- Workforce development organizations
- Department of Development Review: Transportation Section

Timeframe

Mid-term

Investment

$$

T2.4 Support development of new housing within communities that are walkable, bikeable, transit-supportive, and mixed use.

To sustainably accommodate a growing population, this measure encourages the development of new housing in communities that are intentionally walkable, bikeable, transit-supportive, and designed for mixed-use. This approach to growth and development will help reduce car dependency, reduce transportation-related GHG emissions, and enhance the quality of life for Frederick's community members. It is imperative that transit-friendly design be part of the planning processes as development patterns will be instrumental in influencing the number of community-wide VMT.

Potential Partners

- Maryland DOT
- Workforce development organizations
- Livable Frederick Planning and Design
- Department of Development Review and Planning
- City and County Zoning Departments
- City and County Housing Departments
- Division of Public Works
- MWCOG TPB
- Community nonprofits

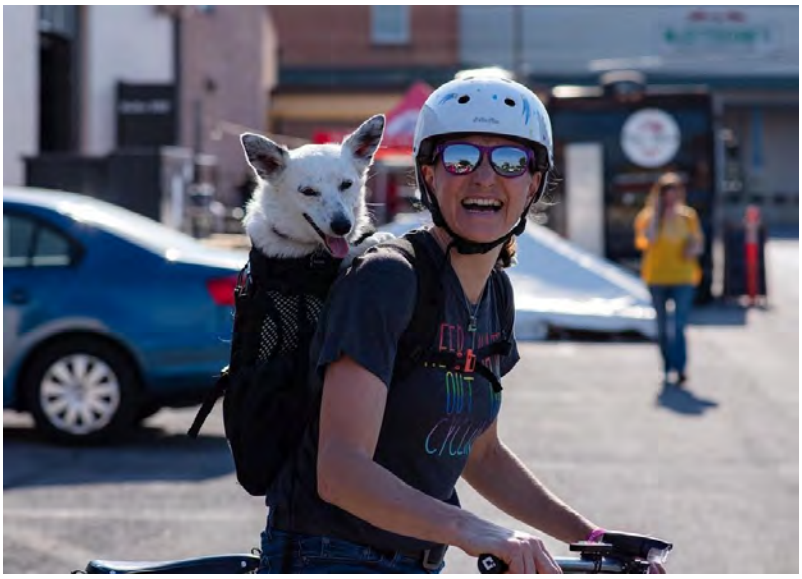
Timeframe

Long-term

Investment

$$$

Figure 29. Resident biking through Frederick with their



How Community Members Can Take Action

- When possible, choose active transportation instead of driving.
- Utilize and encourage others to use public transit.
- Carpool with family, friends, neighbors, and/or coworkers.
- Stay engaged in local planning processes.

Figure 30. Frederick family posing with the solar-powered transit bus at the City's Energy Fair.

Figure 31. Photo taken at the Frederick County Landfill.

Waste

Frederick's solid waste sector has a direct impact on public health, environmental sustainability, and economic development. Improvements to waste management in Frederick could contribute to the protection of water resources, reduce methane and other waste-related GHG emissions, and help strengthen the community's engagement with environmental initiatives The overarching targets guiding these strategies are to divert 45% of solid waste from landfills to recycling, 30% to composting, and 10% through waste reduction. **Collectively, the following strategies can reduce emissions in the waste sector by 22% by 2050, compared to 2018 levels.**

Additionally, wastewater treatment plays a role in local sustainability. The largest of ten County facilities is the Ballenger-McKinney Wastewater Treatment Plant, which has a capacity to process up to 15 million gallons per day and serves much of the central county. The City of Frederick also operates its own water treatment plant, treating over 2 billion gallons of wastewater annually and discharging into the Monocacy River. Together, these facilities work to help protect local waterways, support public health, and enable sustainable growth across the region.

Table 23. Strategies in the Waste Sector.

Strategy	GHG Reduction Potential
W1: Encourage waste diversion through composting of organic materials, recycling, and waste reduction.	

Frederick's Mitigation Progress

Since 2006, the County has exported most of its landfill waste to private out-of-state facilities for disposal. The County and City have made progress toward diverting solid waste from being landfilled, including improving organic waste composting services.

The County's Division of Solid Waste and Recycling offers curbside recycling to all single-family homes, and both municipalities have conducted public education campaigns to improve participation rates. Additionally, work is done to engage community members in general waste reduction best practices. Yard waste is prohibited from landfill disposal and is processed into compost at a County facility. Both the City and County sell backyard compost bins and provide educational materials to encourage home composting.

The City also offers a free curbside composting program for households receiving city trash collection, along with a community compost drop-off site located in the Golden Mile area to serve apartment dwellers and community members without access to curbside service. The City also subsidizes services from Compost Crew, making composting more accessible to community members outside the pilot area. Participants can receive finished compost, supporting local gardening and food production. The City of Frederick's residential pilot program was launched in 2022 and has since diverted over 1 million pounds of organic waste from landfills and had 1,600 households subscribed at the end of 2024.[xlv] The program also reduces waste transportation emissions and costs associated with transporting waste out of the county for disposal.

The County plans to add an anaerobic digester to its wastewater treatment plant between 2035 and 2040. All these initiatives by both City and County directly advance the CRRR recommendation to prevent the disposal of organic material.

Challenges Posed by Federal Actions

Actions of the current federal administration have created new barriers to reducing emissions from waste locally. For example, funding from the Inflation Reduction Act for waste management and recycling initiatives was frozen as of September 2025. Executive orders have called for reviewing and potentially eliminating federal policies on emissions monitoring, which could reduce accountability for waste-related emissions. Tariffs on goods from other nations are

What are folks in Frederick saying about Waste and Wastewater?

Continued Promotion: Many folks who engaged in CEAP planning wanted more promotion of the City and County's composting and recycling programs. Feedback indicated that there are likely individuals who would be interested in participating but are unaware of opportunities. Respondents were excited about education initiatives that started in schools and extended to social media promotion for a broader audience.

Enhanced Participation in Waste Reduction Programs: To grow the programs further, folks suggested color coded recycling bins, more compost drop-off stations throughout the county, more business collaborations, and increased opportunities to recycle more products like textiles, grocery bags, and clamshell containers.

The CEAP team successfully signed more community members up for the City's composting program at CEAP pop-ups, demonstrating an ability to increase participation and foster proper engagement moving forward.

also disrupting recycling markets that rely on empty sea containers from international trade to transport recyclables from the U.S. to other countries.

Equity Considerations

New waste strategies could improve equitable outcomes in Frederick by expanding food distribution networks, improving access to composting, and promoting place-based food systems. Such programs could also create waste infrastructure jobs, support urban agriculture, and improve soil health in community gardens. By diverting edible food from landfills and redistributing it through food recovery networks, Frederick can help address food insecurity among vulnerable populations, including those experiencing houselessness. Such efforts not only reduce waste but can also strengthen social safety nets and offer nourishment and dignity to those in need.

Frederick could also build a more inclusive circular economy by making waste diversion, recycling, and materials reuse accessible and affordable for all community members- especially those residing in multifamily housing.

Mitigation Strategy W1: Encourage waste diversion through waste reduction and composting of organic materials.

To reduce landfill waste and reduce GHG emissions, this strategy encourages waste diversion through both waste reduction and composting of organic materials. This strategy aims to further the CRRR's recommendation to prevent the disposal of organic materials.

Recycling is quite popular in Frederick. 93% of CEAP survey respondents indicated that they regularly recycle waste. Overall, 51% of CEAP survey respondents support reducing landfill waste.

Outcomes for Community Values

- Improved access to composting services across the region.
- Increased community awareness and access to waste diversion resources.
- Reduced costs for solid waste management as a result of community-wide waste reduction.

Actions to Implement

W1.1 Establish a countywide curbside composting program.

This action builds upon the City's existing free curbside composting program by launching a countywide curbside composting program. This initiative would make composting more accessible to all community members, help divert organic waste from landfills, reduce methane emissions, and create nutrient-rich compost that can be used to improve soil health. This initiative could also provide easily accessible compost collection bins or collection sites throughout residential neighborhoods, in frequently visited commercial and community spaces, and near multifamily housing.

While there are many benefits associated with a program like this, launching it would likely be a complex and phased initiative. Due to Frederick's geography— with the County spanning 660 square miles and the City spanning 24 square miles— route coverage poses a challenge due to the number of stops required over such a large area. Therefore, this recommendation represents a long-term ambition. Initial efforts may focus on piloting service in denser areas, expanding drop-off locations, and exploring scalable collection models that lay the foundation for wider deployment.

Potential Partners

- Division of Solid Waste & Recycling

Timeframe

Long-term

Investment

$$$

Figure 32. City-led compost education program at Centro Hispano de Frederick.

W1.2 Connect restaurants and other food vendors with resources to better handle food waste, such as apps that help sell surplus food or food recovery and redistribution programs.

This action helps reduce food waste and lower costs for restaurants and food vendors while simultaneously alleviating community food insecurity by redirecting edible food to communities in need. In addition, restaurants and food vendors will have greater access to composting sites to divert food being sent to landfills. Applications such as Leanpath, a tool designed for food service organizations to manage their food waste, can support this action by helping grocery stores, restaurants, and other food service entities track, measure, and divert food waste.

Potential Partners

- Frederick County Health Department
- Frederick Rescue Mission
- City of Frederick Food Bank (HHS)
- Frederick County Food Council

Timeframe

Mid-term

Investment

$

How Community Members Can Take Action

- Prevent individual food waste (plan meals, use leftovers, donate unopened, unexpired food to local food banks).
- Volunteer with organizations that collect and redistribute surplus food.
- Compost organic materials at home (such as food and yard waste).
- Participate in curbside compost collection or use composting drop offs.

- Reduce consumption of single-use and disposable items.
- Donate useable materials rather than disposing or recycling.
- Participate in available curbside recycling programs- including knowing what to and not to recycle.
- Utilize available drop-off programs for materials not recyclable curbside.
- Encourage local businesses to compost, recycle, and provide customer access to these initiatives.

Figure 33. Resident bringing recyclable plastic materials to the County drop-off site and Frederick County curbside recycling bins.

Agriculture

Agriculture is the largest commercial industry in Maryland, employing approximately 350,000 people across nearly 13,000 farms that span two million acres.[xlvi] Frederick County leads the state with the highest number of farms, producing dairy, turkey, cattle, pigs, hay, and commodity crops such as wheat, soy, and corn-making it an important contributor to the state's food system. Frederick's proximity to major urban centers and their markets also makes the county a strategic location for scaling climate-smart agricultural practices and advancing strategies that reduce emissions and protect soil and water resources.

The agricultural sector's reliance on predictable growing seasons makes it particularly vulnerable to the impacts of climate change, such as extreme weather events and increasing temperatures. Stronger and more frequent storms, heat waves, and record-breaking droughts are already impacting planting times, crop yields, livestock health, and the safety of agricultural workers. While this sector may offer lower immediate GHG reduction potential compared to sectors like energy or transportation, its emission reductions still play a long-term role in mitigating the impacts of climate change in Frederick. Investing in climate-smart agricultural practices such as implementing cover crops, improving manure management, and reducing tillage regimes will only reduce emissions but also foster healthier soils, conserve water, and ensure resilient crop yields into the future. Success in the agricultural sector is essential for Frederick's economy, its food security, and the livelihoods of its rural residents. **Integrating these mitigation strategies can lead to a 22% reduction in agricultural emissions by 2050.**

Table 24. Strategies in the Agriculture Sector.

Strategy	GHG Reductions Potential
A1: Reduce methane emissions from livestock through feed management practices.	
A2: Reduce emissions from agricultural soils through tillage, nutrient, and nitrogen management.	

Frederick's Mitigation Progress

Frederick continues to support agricultural communities and sustainability in the agricultural sector through local funding, technical assistance, and conservation-centered partnerships. Local initiatives are complemented by state-led programs administered by the Maryland Department of Agriculture (MDA), University of Maryland Extension, and USDA's Natural Resources Conservation Service. Collectively, these programs promote best management practices, nutrient stewardship, and economic development in the agricultural sector.

Maryland has actively supported anaerobic digestion projects across the state, including Maryland's first small-scale anaerobic digester at Long Green Farms in Cecil County, which converts manure into renewable energy and serves as a model for Frederick to strive toward in the realm of sustainable manure management.

The following programs, projects, and departments have laid the foundation for GHG reductions in the agricultural sector and will help bring about the successful implementation of CEAP strategies moving forward.

- The County's Agriculture Innovation Grant: Provides funding to local farms and agri-businesses for diversification and modernization; awarded over $1.5 million since 2021 and created more than 150 full-time and 190 part-time jobs.
- The County's Critical Farms Program: Helps full-time farmers finance farmland purchases; transferred 5,100 acres for continued agricultural use since 1994.
- The County's Office of Agriculture: Offers technical assistance, business development, marketing through Homegrown Frederick and Farming Frederick, and educational resources like the Land Preservation Informational Guide.
- Frederick County Soil Conservation District: Supports implementation of stream crossings and fencing to protect waterways from livestock contamination; operates under MDA guidance.
- MDA's Maryland Nutrient Management Program: Requires nutrient management plans for farmers grossing over $2,500 or managing large livestock operations; aims to reduce nitrogen and phosphorus

What are folks in Frederick saying about Agriculture?

Increased Investment: When speaking with a couple of local farmers, they expressed a desire to see further protection for their way of life and investment in local farms that continue to exist in an increasingly challenging industry.

Rethinking Pesticide Use: Many community members expressed dislike of pesticides and herbicides—like glyphosate—in agriculture and everyday lawn and garden management. Other Maryland counties have taken steps to reduce or restrict these chemicals.

Continued Education: A growing interest in agricultural education was evident among the youth and adults we interacted with. Outreach efforts highlighted the desire to see further investment in educating on sustainable farming practices whether for personal or commercial usage.

Engaging the community helped educate and inform community members about existing local agricultural programs. These include programs for climate-smart crops, low-carbon soil management, and other planting best practices.

runoff and mitigate nitrous oxide emissions. In 2024, 1.3 million acres of land were covered by submitted annual implementation reports.[xlvii]

- MDA's Cover Crop Program: Provides payment for planting cover crops during the off-season to prevent erosion, improve soil health, and reduce nutrient runoff.

Challenges Posed by Federal Actions

Under the current federal administration, the USDA removed climate-related scoring criteria from dozens of programs, including conservation grants and disaster aid, and banned the words "climate change" from its materials. The administration froze funding for international climate-supportive agriculture programs, including a $3.1 billion initiative to reduce farm emissions across 55 U.S. states and territories. Farms in Frederick County have been impacted by these funding cuts.

Equity Considerations

The strategies in this sector prioritize mitigating inputs such as fertilizers, herbicides, and pesticides. In doing so, farm workers, who often face social disadvantages including lower incomes, job insecurity, lower educational attainment, and stress,[xlviii] will be less exposed to chemicals and have improved health outcomes. Farm workers can also be especially vulnerable to negative climate disruptions like heat waves, droughts, and severe weather.

These strategies can also advance public health outcomes on a community-wide scale, improving conditions for those who are the most at-risk. The following strategies can improve air and water quality, and reduce the risk of respiratory and waterborne illnesses due to reductions in nutrient runoff. The following strategies may also result in new job opportunities in sustainable agriculture, nutrient monitoring, and on-farm technology innovation. If they are grounded in equity, these new jobs can contribute to a more inclusive agricultural economy in Frederick.

Mitigation Strategy A1: Reduce methane emissions from livestock through feed management practices.

This strategy lowers GHG emissions by changing what livestock eat. By adjusting feed inputs, such as incorporating additives like fats, oils, or seaweed, farmers can reduce the amount of methane produced during digestion which, in turn, reduces the methane emissions resulting from livestock operations.

Outcomes for Community Values

- Improved air and water quality.
- Increased sharing of knowledge among community members, municipal and state agencies, and other stakeholders.
- Increased access to new agricultural technologies for community members.

Actions to Implement

A1.1 Include 3-NOP and Monensin in livestock feed to reduce methane emissions.

An additional action to reduce methane emissions resulting from livestock is to include specific feed additives such as 3-NOP (3-nitrooxypropanol) and Monensin. These compounds work by inhibiting the microbes in the rumen that produce methane during digestion, resulting in improved feed conversion efficiency in livestock and reduced enteric methane emissions.

Potential Partners

- Frederick County Office of Agriculture
- MDA
- University of Maryland Extension
- USDA NRCS Frederick Service Center

Timeframe

Mid-term

Investment

$

A1.2 Explore opportunities for increasing adoption of anaerobic digestors for onsite manure management.

Agricultural waste, like manure, is broken down by microbes in an oxygen-free, or anaerobic, environment. This, in turn, produces biogas, a mix of methane and carbon dioxide. Biogas can be used directly for heat and electricity or further refined into renewable natural gas, which meets pipeline-quality standards and can be used like conventional natural gas.

This action focuses on implementing anaerobic digestion primarily for onsite production and use, not commercial or industrial-scale anaerobic digestion on agricultural land. While anaerobic digestors offer a way to reduce agricultural emissions, their high upfront and operational costs must also be considered. Industrial-scale anaerobic digestion can also lead to increased truck traffic, particularly on rural roads will likely increase due to transporting feedstocks and waste. This action calls for Frederick to explore ways to

increase adoption of anaerobic digesters (e.g. conducting a feasibility study) while keeping these costs and challenges in mind.

Partners

- Frederick County Office of Agriculture
- MDA
- University of Maryland Extension
- USDA NRCS Frederick Service Center

Timeframe

Long-term

Investment

$

How Community Members Can Take Action

- Buy from farms that implement methane-reducing feed strategies.
- Educate yourself and others on the benefits of adopting climate-smart feed practices.
- Advocate for incentive programs related to this strategy.

Mitigation Strategy A2: Reduce emissions from agricultural soils through tillage, nutrient, and nitrogen management.

Practices such as reduced tillage and improved nutrient and nitrogen management target the main sources of GHGs emitted during the in-crop production lifecycle. Such practices can reduce nitrous oxide emissions from fertilizer use and carbon dioxide emissions released by fuel combustion from agricultural equipment. Together, these practices not only mitigate GHG emissions but also improve soil health, water retention, and crop productivity. This strategy aims to advance the recommendation in the 2021 CRRR to provide outreach and coordination to expand conservation practices on agricultural land.

Outcomes for Community Values

- Improved soil health.
- Improved water quality and habitat for riverbed and other aquatic ecosystems.
- Increased long-term agricultural productivity and resilience.
- Reduced use of pesticides and herbicides.

Actions to Implement

A2.1 Encourage tillage management, such as reduced or no-till practices if replacing conventional tillage practices.

Limiting soil disturbance by shifting from conventional to reduced or no-till systems reduces soil erosion, improves water retention, and increases the organic matter content and the fertility of soils. Reduced and no-till practices are already a key part of many farmers' operations. In fact, the state of Maryland is recognized as a national leader in no-till and cover crop adoption. However, there is still room to expand adoption in Frederick and provide additional education and support to agricultural communities.

Potential Partners

- Frederick County Office of Agriculture
- MDA
- University of Maryland Extension
- USDA NRCS Frederick Service Center

Timeframe

Mid-term

Investment

$

A2.2 Encourage nutrient management strategies such as enhanced efficiency fertilizers, nitrification inhibitors, controlled-release fertilizers, variable rate technology, and split N applications.

To reduce GHG emissions and on-farm nutrient inputs, this action encourages the adoption of various alternative nutrient management strategies. These include the use of enhanced efficiency fertilizers, nitrification inhibitors, and controlled-release fertilizers, all of which help minimize nitrogen losses and reduce nitrous oxide emissions. These practices minimize excess nitrogen in the soil, which lowers the risk of leaching and runoff. Farmers are also leveraging technologies such as drones to apply cover crop seed

and nutrients to soil with greater precision to support conservation agriculture goals and improve farm efficiency.

Potential Partners

- Frederick County Office of Agriculture
- MDA
- University of Maryland Extension
- USDA NRCS Frederick Service Center

Timeframe

Mid-term

Investment

$

A2.3 Decrease nitrogen from cropland or livestock production activities entering waterways.

This action focuses on protecting water quality by reducing nitrogen runoff and leaching from agricultural sources, although this action could affect other land like lawns in addition to agricultural land for full implementation. Nitrogen from sources such as fertilizers and manure can enter rivers, lakes, and groundwater, leading to harmful algal blooms, dead zones, and drinking water contamination.

Farmers in Frederick are already subject to several requirements to help protect waterways. To protect the health of local farm streams, farmers must have stream setbacks and livestock exclusion measures in place. Farmers who till their soil are required to incorporate manure and other organic nutrient sources into fields within 48 hours of application and follow specific timing requirements for all nutrient applications. To further protect waterways, all farm operations, regardless of size, are banned from spreading manure on fields in winter. In addition, fields with high soil phosphorus levels must be managed using Maryland's Phosphorus Management Tool.

By implementing additional best management practices, farmers and other land managers can reduce nitrogen losses and safeguard both environmental and public health.

Potential Partners

- Frederick County Office of Agriculture
- MDA
- University of Maryland Extension
- USDA NRCS Frederick Service Center

Timeframe

Mid-term

Investment

$$

How Community Members Can Take Action

- Plant native vegetation and/or buffer strips along waterways.
- Abide by the Maryland lawn fertilizer law for home lawns and agricultural lands or explore non-fertilizer options for lawn management.
- Support Frederick farmers by shopping locally and promoting policies that protect sustainable farmland.

Figure 34. Recently restored streambank buffer along agricultural land in Frederick.

Natural and Working Lands and Forestry

Natural and working lands and forests are vital to sequestering Frederick's GHG emissions while also serving as a cornerstone for ecosystems, economies, and positive health outcomes in the region. Forests not only capture carbon, but also sustain diverse ecosystems of plants, animals, fungi, and bacteria. Preserving contiguous forest areas also supports wildlife corridors and encourages the movement of species that are adapting to climate change and being displaced due to increasing development. Abundant tree canopies enhance air and water quality, provide cooling, and reduce the impact of heat islands. Additionally, this sector sustains jobs for Frederick's community members in wood products industries and offers recreational opportunities for residents, all of which contribute to community well-being.

The County has 33% total forest cover and 43% total tree canopy.[xlix] Despite losing approximately 420 acres of forested land annually, there are numerous opportunities to protect and expand forested areas. The City of Frederick has about 20% tree canopy, remaining steady since 2016. As the City annexes farmland without forest cover, those spaces are developed and include forest conservation easements, street trees, and park spaces for increasing canopy.

While the strategies in the NWL sector may deliver lower immediate GHG reductions compared to other sectors, they play a long-term role in climate mitigation. The following strategies focus on carbon sequestration, the process of capturing and storing carbon dioxide in biomass, which accumulates over time. These strategies not only help offset emissions from other sectors but also provide co-benefits such as improved air and water quality, enhanced biodiversity, and increased resilience to climate impacts. Sustained investment in protecting and conserving natural resources is essential for achieving long-term, landscape-scale impacts in Frederick.

Based on a 2018 baseline, these strategies are projected to increase Frederick's carbon sequestration potential by 38% by 2050. This represents nearly 100,000 additional metric tons of CO_2e captured compared to the BAU scenario.

Table 25. Strategies in the Natural and Working Lands and Forestry Sector.

Strategy	GHG Reduction Potential
NWL1: Conserve and expand urban tree canopy.	
NWL2: Conserve and manage natural resources.	

Frederick's Mitigation Progress

Frederick is advancing carbon sequestration in the NWL sector through a combination of state and local programs that, at their core, promote natural resource conservation. The City and County are implementing reforestation and green infrastructure projects to expand tree canopy, protect waterways, and support climate adaptation and resilience. These efforts are supported by the Maryland Department of Natural Resources, USDA Forest Service, and Chesapeake Bay Trust. Together, the programs, ordinances, and projects listed below establish a strong framework for advancing NWL strategies and ensure the CEAP's goals can be effectively realized:

- The County's Green Infrastructure Plan: Developed under the Livable Frederick Master Plan to reduce habitat fragmentation and support wildlife corridors.
- The County's Forest Resources Ordinance: Adopted in 1992 to meet the State Forest Conservation Act of 1991; requires developers to mitigate forest loss through preservation, replanting, or off-site conservation.
- The County's Creek ReLeaf Program: Reforested over 575 acres as of 2024 by establishing permanent conservation easements and providing native tree installation and maintenance; funded in part by Maryland's Chesapeake & Atlantic Coastal Bays Trust Fund.
- The City's' Low Impact Landscaping Ordinance: Adopted in October 2024 to allow and encourage community members to replace traditional turf grass with native plants and water-conserving landscapes; low-impact landscapes require fewer fertilizers and pesticides, reduce irrigation needs, and provide habitat for pollinators and birds.
- The City's Tree Frederick Program: Subsidizes the cost of native trees for residents to enhance urban green space.

What are folks in Frederick saying about Natural and Working Lands and Forestry?

Tree Positive: Community members voiced support for initiatives that promote tree planting, native species and natural land preservation. Community members appreciate the benefits these programs bring to local ecosystems and biodiversity, particularly in maintaining the natural resources, reducing heat, and boosting the beauty of the Frederick region.

Partnerships for Greener Spaces: Community members in Frederick are looking around in their neighborhoods for opportunities to plant more and manage better. Several folks mentioned wanting to engage school districts, business parks, HOAs, and other land management entities to try out more grass alternatives, native plant, and greener management.

- Mobilize Frederick's Cooler Neighborhoods Project: Aims to plant 240 trees and train 18 part-time staff from priority census tracts in urban forestry between 2025 and 2026.
- MDE's MS4 Permits: Frederick is implementing stormwater best management practices to meet Phase I and II permit requirements and improve watershed health.
- MDNR's Rural Legacy Program: Preserves large, contiguous tracts of land that include both working farms and ecologically significant landscapes.
- USDA and Maryland Department of Natural Resources' Working Lands for Wildlife Program: Provides technical and financial assistance to landowners for conservation practices that benefit wildlife and working landscapes.

Equity Considerations

In Frederick, the NWL and Forestry sector has the potential to promote environmental justice, improve public health outcomes, increase carbon sequestration, and expand economic opportunities. Trees can improve air quality by directly removing pollutants from the air.[I] They also reduce urban heat by providing shade and can improve the quality of life for community members due to increased access and interaction with nature.[Ii] These are all benefits that are especially valuable for vulnerable populations such as children, the elderly, those with respiratory conditions, and lower-income communities, where tree canopy is often sparser.

Similarly, promoting low-impact landscaping can reduce the need for fertilizers and irrigation, thus mitigating environmental impacts and lowering maintenance costs. Low-impact landscaping can be implemented in public parks, schools, and housing developments to make green spaces more environmentally friendly and accessible to all in Frederick. When paired with community education and incentives, they can also empower community members to adopt similar practices at home, regardless of income level. Expanding access to green spaces in underserved neighborhoods, improving air and water quality, and involving the public (especially those historically excluded) in planning and stewardship efforts are all key considerations for Frederick within the NWL and Forestry sector. Frederick County incorporates equity considerations for these communities into the process of identifying and prioritizing potential projects during watershed planning.

Mitigation Strategy NWL1: Conserve and expand urban tree canopy.

Expanding the urban tree canopy can help reduce urban heat, improve air and water quality, manage stormwater, and improve Frederick's natural beauty. By planting and conserving trees in neighborhoods, parks, and along streets, Frederick can simultaneously improve the carbon sequestration capacity of its tree canopy, support biodiversity, and create more livable and enjoyable spaces for all community members. This strategy provides a tangible step to support the recommendation in the 2021 Climate Response and Resilience Report to increase the County forest canopy by 10% over current levels.

Outcomes for Community Values

- Reduced heat island effect and improved stormwater management.
- Improved air quality and increased carbon sequestration.
- Maintained aesthetic and comfortable green spaces.

Actions to Implement

NWL1.1 Create a 5-year tree maintenance plan that ensures the upkeep of trees planted through existing volunteer programs.

To ensure the long-term success of Frederick's urban greening efforts, the City will launch a 5-year tree maintenance plan focused on caring for trees planted through existing volunteer programs. While planting new trees is important, consistently maintaining existing trees is essential for their long-term survival and growth. This plan will help protect the community's investment in its urban canopy through consistent watering, mulching, pruning, and monitoring for pests, ensuring that newly planted trees thrive and continue to deliver environmental and public health benefits.

Potential Partners

- Mobilize Frederick
- Maryland's Five Million Trees Program
- Stream-Link Education
- Friends of Maryland State Parks
- Frederick County Division of Energy & Environment
- Catoctin Land Trust
- Monocacy and Catoctin Watershed Alliance
- Western Maryland Resource Conservation & Development

Timeframe

Mid-term

Investment

$$

How Community Members Can Take Action

- Plant trees on private property.
- Participate in local tree programs such as Tree Frederick and Creek ReLeaf.
- Apply for state funding for tree planting projects such as MDOT's Urban Tree Grant Program.
- Protect existing trees.
- Support local ordinances that protect mature trees and require tree planting in new developments.

Mitigation Strategy NWL2: Conserve and manage natural resources.

With its diversity of forests, farmland, waterways, and parklands, Frederick has a unique opportunity to lead in protecting natural ecosystems that provide clean air, water, and wildlife habitat. By investing in conservation, responsible land use, and community-based stewardship, Frederick can ensure that its natural resources continue to benefit both current community members and future generations. These strategies aim to further advance recommendations in the 2021 CRRR to restore and sustain natural systems on public and private land.

66% of CEAP survey respondents support increasing access to parks, trees, and green spaces.

Outcomes for Community Values

- Enhanced ecosystem services such as pollination, nutrient cycling, and water purification.
- Reduced fertilizer dependency and limiting hazards from potential runoff.
- Habitat creation and connectivity with improved riparian buffers and forested spaces.
- Improved public health, property value, and quality of life.

Actions to Implement

NWL2.1 Promote landscaping on existing turf grass that requires minimal resource application of fertilizers and irrigation (e.g. xeriscaping).

This action encourages the Frederick public and property owners to transition from traditional lawns to more sustainable landscaping practices, such as xeriscaping or low-impact native plantings. These approaches reduce the need for fertilizers and irrigation systems, helping conserve water, improve soil health, promote healthier lawns and pollination gardens, and reduce nutrient runoff into local waterways. These landscapes will not only help improve water quality in City and County streams but also contribute to overall watershed health.

Potential Partners

- Wild Ones Greater Frederick Maryland Chapter
- City and County Communications Teams
- Frederick County Master Gardeners
- Monocacy and Catoctin Watershed Alliance
- HOAS

Timeframe

Mid-term

Investment

$

NWL2.2 Promote planting and maintenance of native grassland and wildflower species on larger-scale existing turf areas.

Replacing traditional turf grass with native grasses and wildflowers creates and connects habitat for pollinators and wildlife, reduces the need for mowing, fertilizers, and irrigation, and strengthens the community's resilience to climate change.

Potential Partners

- Frederick County Master Gardeners
- HOAs

Timeframe

Mid-term

Investment

$

NWL2.3 Promote planting riparian buffers and stream restorations.

Planting riparian areas will help provide habitat and reduce temperatures in waterways, which better supports macroinvertebrates and fish that depend on them. In addition, stream restoration projects can help reconnect floodplains where appropriate, which will allow water to slow, spread, and recharge groundwater as floodplain lands are intended. These actions will help improve water quality and habitat in City and County waterways, as well as those downstream.

Potential Partners

- Frederick County Master Gardeners
- HOAs
- Maryland's Five Million Trees Program

Timeframe

Mid-term

Investment

$

How Community Members Can Take Action

- Support local native plant nurseries.
- Advocate for native landscaping in public spaces.
- Participate in community planting days.
- Convert lawns to native gardens where goals match the need.

Figure 35. Birdhouse in Frederick.

Data Centers

Maryland and Northern Virginia have become the world's leading hub for data centers, driven by state-level tax incentives, access to land and electric power, an extensive underground fiber optic network, and proximity to federal agencies. Data centers can bring significant economic benefits, including tax revenue and jobs, and are key to the world's technology and digital economy.

Without regulations, however, data centers have the potential to disrupt resource availability in the area due to the significant water and energy usage required to keep these sites running. The development of more powerful microchips in recent years has led to higher power demand in a smaller footprint, resulting in some hyperscale data center facilities using hundreds of megawatts of electricity – enough to power hundreds of thousands of homes. Increasing strain on the capacity for electric transmission and distribution have already led to price increases, according to the Office of the People's Counsel. the state's consumer watchdog.

Frederick County is partnering with MWCOG and other jurisdictions in the region to develop detailed recommendations for mitigating the impacts of data centers on emissions as part of the Climate Pollution Reduction Grants Program and MWCOG's forthcoming CCAP. The recommendations developed through this partnership will need to be modeled to assess their relative impacts on emissions reductions from data centers. At the time of this CEAP's publishing, this regional work is still in progress, so detailed modeling of the impacts of different measures for reducing data center emissions is not included in this CEAP but will be developed and publicly shared moving forward.

What are folks in Frederick saying about Data Centers?

High Energy Costs: Folks across Frederick are feeling the sting of higher energy rates and are concerned about the increased load brought on by data centers.

Natural Resource Strains: Community members cited hearing negative experiences from other regions in the US where data centers have limited water availability and worsened air pollution from onsite generation. Folks in Frederick want more transparency around data center growth and a sound understanding that the government will protect resident's quality of life and access to basic needs like water, clean air, and affordable energy.

Currently, data centers are projected to be the largest source of GHG emissions in Frederick County. Under the BAU scenario outlined in this CEAP, the County's GHG emissions are projected to increase 38% by 2050 compared to 2018 levels, and this projected growth is primarily driven by increased electricity use in data centers. As of 2018, data centers made up just 3% of Frederick County's estimated 3.6 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) emissions. By 2050, emissions from data centers are conservatively projected to grow to 2.0 million metric tons of CO_2 equivalent, making up around 40% of Frederick County's emissions in 2050 if no mitigating actions are taken.

At this time, the reductions in data center emissions that can be modeled to reach Frederick's climate targets are due to cleaner electricity sources powering the grid. The analysis assumes a cleaner grid based on proposed state executive orders and regional regulations that would require a transition to cleaner electricity. It will be crucial for the state to provide the leadership and policies required to achieve a cleaner electricity grid. Currently, the state is struggling to meet current clean energy targets, with many utilities paying fees for noncompliance rather than meeting the state's clean energy goals.

While Frederick will need state leadership to achieve these reductions, local and regional work is also underway to regulate data center growth and identify and model measures to reduce emissions from data centers throughout the Metropolitan Washington region. The goal of this strategy is to provide an overview of key categories of actions that the County could pursue going forward to take advantage of revenue and job growth advantages while addressing concerns regarding how to balance challenges from rising electricity demand and other resource stressors.

Regional Progress

Frederick County regulates the data center industry more than any other use permitted in the County. Meanwhile, state and regional actors are also discussing the issue of managing projected data center grid impacts alongside stakeholders including utilities and the data center industry.

At the local level, Frederick County established a Critical Data Infrastructure ordinance 22-05, effective May 14, 2022. This legislation established definitions for a Critical Data Infrastructure Electric Substation and CDI Facility; created design requirements, performance standards, and use classifications; and allowed for CDI facilities within Light and General Industrial Districts.

Executive Order No. 04-2023, effective June 12, 2023, temporarily discontinued accepting, considering, and processing certain individual zoning map amendments seeking rezoning to Limited Industrial or General Industrial. This action was designed to allow for the creation of a community-driven Data Center Workgroup and for its recommendations.

The Frederick Data Center Workgroup convened from 2023-2024 to examine existing laws and other issues related to data centers. The group published a report in March 2024 with recommendations for managing more sustainable data center growth. Key recommendations for future data center development relevant to this report from the Workgroup include:

- Recommendation to establish an overall upper limit to data center development in the County. Recommendation to require periodic and reliable monitoring of performance metrics such as noise, electricity consumption, greenhouse gas emissions, air quality, water usage, and stormwater management.
- Revision of the Critical Digital Infrastructure (CDI) ordinance to require data centers to submit an operational sustainability plan that adheres to at least one industry-accepted sustainability framework and review the ordinance on a regular basis.

On October 4, 2024, County Executive Jessica Fitzwater requested in a letter that the Frederick Delegation to the Maryland Legislature work at the state level to address issues "that are beyond the County's authority or ability to regulate and might be appropriate subjects for state legislation," including the following:

- Regulate energy use through the creation of a high energy use surcharge to encourage energy-efficient building standards and cooling technologies.
- Requirement to disclose the use of power purchase agreements.
- Requirement to purchase renewable energy to the extent possible, including onsite solar.

- Develop an incentive for the use of alternative fuels such as hydrotreated vegetable oil (HVO) or Green Hydrogen for backup power needs.
- Develop incentives for data center operations that exceed state BEPS requirements.
- Require specific sustainability measures for data centers, such as implementing an operational sustainability plan, which names a program officer charged with its administration, and a sustainability program that adheres to at least one industry-accepted sustainability framework.

In May 2025, the Frederick County Council approved bill number 25-05 to create a CDI siting ordinance with stricter design requirements for data centers that included the CEAP-relevant topics of lighting and backup generators.

County Executive Jessica Fitzwater introduced legislation, Council Bill 25-09, to significantly limit where data centers could be developed within the county through the creation of a Critical Digital Infrastructure Overlay Zone, primarily near the former Eastalco aluminum plant north of Adamstown where current infrastructure exists. The bill also retains zoning decisions within the overlay with the County Council and preserves five acres of farmland for every acre of land converted to a new data center development. Without these changes, any industrially zoned land in Frederick County could be subject to data center development, or roughly 4,966 acres. The Frederick County Council voted to approve Bill 25-09 on September 2, 2025.

The County Executive has introduced a map to establish the Critical Digital Infrastructure Overlay Zone, consisting of approximately 0.6% of County's land mass. The Frederick County Council is currently considering the map, with a final vote on the overlay expected by the end of 2025.

In 2025, legislation directing the state to conduct a comprehensive data center study, l SB116/HB270, passed the Maryland legislature but was vetoed by the Governor; a statewide analysis of the environmental impact of data centers on the state's greenhouse gas emissions and energy needs will be important to understanding the data center impact on the grid and on Maryland's GHG reduction goals as the industry grows.

At the regional level, MWCOG is currently developing a Comprehensive Climate Action Plan (CCAP) as part of EPA's Climate Pollution Reduction Grants program, which is expected to be published in December 2025. The report will include solutions for more sustainable data center development in the region, and the role local governments can play in implementing those solutions. MWCOG is conducting engagement with regional and state stakeholders to inform the report's recommendations. At the state level, both Maryland and Virginia are also developing CCAPs that will include additional information on both data centers and the role of the power sector in meeting potential electricity demand while balancing clean energy targets.

This CEAP for Frederick did not model specific strategies for data centers to implement to increase efficiency and manage their impact on the electric grid. Frederick County is participating in MWCOG's CCAP process as it relates to developing recommendations for reducing the GHG emissions from this sector. As stated previously, the draft CCAP contains recommendations for reducing data center emissions that are echoed in this report with the caveat that the reductions have not yet been modeled.

The CEAP only models the GHG impacts from estimated electricity use at data centers. As such, the main emission mitigation strategy noted in this report is implemented by the power sector, resulting from Maryland state policies to reduce emissions from electricity generation, that will reduce the carbon intensity of the electricity used by the modeled data centers. In the CEAP's Climate Trends chapter, Table 15 describes some of the current and potential regional policies that could reduce GHG electricity emissions resulting from data centers.

Action Opportunities

Frederick City and County have been participating in the MWCOG data center work group, as part of the region's CCAP, to develop a suit of strategies to reduce energy demand from data centers. These are described below at a high level, with the full detailed report to be released by MWCOG at the end of the year.

IT Equipment Efficiency

Servers and IT equipment can drive 60-70% of data center power demand. Encouraging data centers to identify savings opportunities through IT equipment upgrades is a relatively straightforward method to help reduce energy demand. This may include efforts to boost IT utilization, adopt ENERGY STAR IT equipment upon set up, considering technology recycling, and keeping up best practice in operations for improved efficiency.

Reducing the IT power requirements results in a multiplier effect through savings on infrastructure power: every unit of IT power saved reduces infrastructure power to energize and cool the IT equipment. Data center owners and operators can take advantage of not only higher efficiency IT equipment, but also data center management strategies such as utilization, consolidation, and virtualization to prevent excessive IT energy consumption.

Building-level (Mechanical and Electrical)

Servers and computer chips generate heat, resulting in significant cooling needs for the building and equipment. With current technology, cooling systems often drive 30-40% of data center energy demand. At the building level, data center cooling systems can be either air-cooled or water-cooled, although emerging technologies offer more efficient and hybrid options. Evaporative cooling systems use water evaporation to cool air, and while very energy efficient, these systems can consume significant amounts of water. Considerations for cooling systems include cost and complexity to implement, load availability, space configurations, future energy needs, and energy efficiency.

Frederick should encourage and promote best practices for cooling & air management, power infrastructure, and other onsite efficiency efforts. These practices include solutions like hot aisle/cool aisle arrangements, using recycled wastewater, and using Data Center Infrastructure Management software, among many other efficiency options. These solutions reduce energy and water consumption to mitigate negative local impacts while also broadly reducing the costs of data center operations.

Onsite Energy

Emissions from data centers come from the use of fossil fuels to generate electricity. That electricity is either grid-supplied or generated onsite through backup power (typically diesel generators). In theory,

reducing these emissions is simple: sourcing carbon-free power would eliminate GHG emissions from data center operations. However, developing such resources at the pace and scale required presents a significant challenge, largely due to the high reliability requirements for data centers. Meeting load with nuclear or other clean energy technologies incurs significant costs, alongside grid infrastructure investments.

However, onsite power can and should be diversified away from high-emission sources like diesel and toward renewable sources like solar or lower-emission sources like natural gas. Frederick can incentivize or require provision for onsite solar usage, natural gas generators in place of diesel ones, combined heat and power systems to recycle waste heat from the facility, and other lower-emission energy solutions during the permitting process. This will also need to be supported by utilities' participation in demand response programs for data center facilities and feasibility studies to explore district energy systems for more reuse of waste heat.

Data Tracking and Reporting

Transparency in energy usage for data centers is critical to projecting and preparing for load growth and resource availability. However, local governments do not have the authority to require data center developers and operators to disclose their energy usage. Frederick aims to, with the support of other regional actors, encourage data center operators to implement metering/monitoring systems to track water and energy consumption and benchmark their performance, specifically power usage effectiveness (PUE) and water usage effectiveness (WUE). Furthermore, certification programs like ENERGY STAR and comprehensive energy assessments can be powerful tools to monitor and report on these metrics. The County needs access to these metrics to better assess what resource impacts they might experience as data centers grow and create risk mitigation plans to avoid any negative impacts on the community, like limited potable water availability or increases in energy rates.

Engagement and Advocacy

The County will continue with its current plan to develop a CDI overlay zone and continue to align local regulatory policies with neighboring jurisdictions across Maryland and Virginia. County policy should incentivize reporting of PUE where able and set maximum PUE design targets for new data center builds and retrofit/operating targets for existing data centers.

Coordination will be key as the County develops local policies and advocates for rulemaking across the region. At the state level, the County will track Maryland's legislative agendas and coordinate with regional actors across the state to support select bills, especially around data reporting and tracking of energy and water use. Additionally, the County will continue to participate in broader data center regulatory efforts through MWCOG: for example, participating in PJM or Federal Energy Regulatory Commission (FERC) stakeholder discussions; and exploring partnership opportunities with the Data Center Coalition for anonymized and aggregated data collection.

Finally, the County will continue clear public communication to both share updates on data center development and regulations while taking in public comment and feedback about any potential impacts on the ground.

Implementation Partners

While the County has options to influence data center development, data center owners and operators, such as Amazon, Microsoft, and Google—who collectively own over half of hyperscale data centers—and state and federal policymakers will be critical partners for implementing the actions in this strategy. Other partners may include regulatory agencies like:

- FERC,
- Maryland Public Service Commission, and
- MDE,

and implementation partners like:

- EPA's ENERGY STAR program,
- US DOE and their partner laboratories like Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory,
- Data Center Coalition, and
- Electric, water, and gas utilities.

Resilience Strategies

The impacts of climate change are currently affecting and will continue to threaten Frederick's infrastructure and built environment, Fredericks' communities' health and well-being, and the region's ability to respond to emergencies. Frederick aims to protect communities from the negative consequences of climate change by achieving the following resilience goals:

Table 26. Frederick Resilience Goals.

Infrastructure and the Built Environment 	• A sustainable, multi-modal transportation system that ensures safe, efficient, reliable, and affordable mobility for all community members. • Reliable and efficient water, sewer, and stormwater infrastructure that supports sustainable growth, protects natural resources, ensures clean water, and minimizes environmental and human health impacts. • A resilient and reliable energy supply that meets the demands of homes, business, and emergency services.
Health and Well-Being 	• Accessible parks, recreation, and cultural landmarks that enrich the community. • A healthy environment with fresh air, safe water, and reliable medical services to promote community well-being. • A diverse and vibrant economy that creates employment opportunities, reduces financial insecurity, and ensures long-term community prosperity.
Emergency Management 	• Proactive and reliable emergency services to support the community during crises.

These resilience goals are founded on the goals articulated in the City of Frederick Comprehensive Plan, in Livable Frederick (Frederick County's comprehensive plan), and in the CRRR. Building on this vision and drawing on engagement with the Advisory Group, stakeholders, and community, the CEAP team developed specific resilience strategies that can help accomplish each goal. For more information about the development of these goals and following strategies, see Appendix B: Methodologies. To achieve these goals, Frederick will pursue the resilience strategies listed in the following sections. These strategies aim to address Frederick's climate risks (see below), and vulnerabilities identified in the Climate Risk and Vulnerability assessment in this report.

Extreme Heat  Flooding  Winter Storms  Drought 

Challenges Posed by Federal Actions

The administration has stated that it plans to eliminate the Federal Emergency Management Agency (FEMA). This agency helps communities to plan for and recover from crises like natural disasters. Frederick County Government had FEMA grants that were frozen but ultimately allowed to continue. Another grant that was in pre-award status has an uncertain status. The future of FEMA grants is unknown. Frederick County continues to work through its Hazard Mitigation and Climate Adaptation Plan, coordinated by Emergency Management, to identify infrastructure in the community that would be impacted by emergencies including climate-driven flooding, and to create solutions in these areas.

Some communities in Frederick County are disproportionately affected by environmental pollution and climate impacts like flooding and heat. Many of these communities have greater poverty and poorer health outcomes than surrounding areas. These problems are often historical, dating back to discriminatory housing policies from generations ago. The Trump administration has eliminated environmental justice (EJ) initiatives for these communities and retracted federal funds for grants designed to help eliminate risks for these communities. A $1 Million EPA Government to Government Grant that had been awarded to Frederick County Government was rescinded. This grant would have installed air monitors in EJ communities, provided energy-efficiency measures for housing stock affected by increasing heat, and worked with nonprofits to reduce pollution. Frederick County remains committed to these programs and is seeking funding alternatives.

Infrastructure and Built Environment

Climate change is currently affecting and will continue to affect Frederick's infrastructure and built environment, impacting sectors such as transportation and water. The following strategies aim to maintain and improve the sustainability, safety, and reliability of Frederick's infrastructure, protecting the built environment from climate hazards and enhancing the regions' ability to withstand the negative impacts of climate change.

Maintaining and improving Frederick's built infrastructure is key to protecting our communities. Since 1950, Frederick has reported each year on average approximately $3.5 million in damage to the built environment due to natural hazards, from flooding, to drought, to winter storms. For example, on July 8, 2019, Frederick County experienced 6.3 inches of rainfall over the course of just a few hours, resulting in the overflowing of Carroll Creek and the subsequent closure of 20 different roadways throughout the county. During this flash flood event, 11 cars were stranded in flood waters in the county. As such catastrophes become more frequent due to climate change, it is crucial that Frederick builds resilient infrastructure systems to prevent future losses and better withstand disruptions.

Climate change is contributing to disruptions to local water quality, and it is important that Frederick has the appropriate infrastructure in place to safeguard drinking and irrigation water supplies. As summer temperatures warm due to climate change, the likelihood of harmful algae blooms (HABs) is increasing. For example, in September 2023, the Frederick County Health Department issued an advisory against swimming in Cunningham Falls State Park. Drinking water in Frederick County comes from a number of sources, including four main surface water sources, Fishing Creek Reservoir, Linganore Creek, Monocacy River, and the Potomac River. It is crucial that the City and County protect these drinking water sources against climate-driven disruptions like HABs and drought.

Table 27. Strategies in the Infrastructure and Built Environment Sector.

Strategy	Primary Benefits
IBE1: Harden transportation infrastructure to withstand future climate impacts.	
IBE2: Enhance resilience in water supply to meet drinking water and agricultural needs.	
IBE3: Accelerate the use of nature-based solutions and resilient infrastructure.	

Frederick's Resilience Progress

The City and County have already undertaken several projects that aim to increase the resilience of Frederick's built environment and infrastructure.

Water: The City and County have been making steady progress toward protecting Frederick's waterways and preventing flooding. The City has partnered with the U.S. Army Corps of Engineers to evaluate seven flood zones in downtown Frederick to design and construct projects to decrease flood risk in the area. The County is taking action to decrease the risk of stormwater flooding in the region, in accordance with the Municipal Separate Storm Sewer System (MS4) permit. This permit, issued by the state of Maryland, requires the County to restore 1,027 acres of impervious surfaces and reduce the amount of pollution that makes its way into the Chesapeake Bay. To better understand the region's flooding risk, the County performed a stormwater flooding exposure assessment in 2022 as part of their Hazard Mitigation and Climate Action Plan. An analysis of this data showed that 7.2% of all buildings in the County are exposed to stormwater flooding. In 2023, the County applied for funding through FEMA's Hazard Mitigation Assistance Pre-Disaster Mitigation grant program to decommission a dam and restore the adjoining stream in Point of Rocks Community Park. Failure of the dam due to extreme precipitation would lead to flooding along Maryland Route 28 and in the nearby MARC station parking lot, and decommissioning the dam is decreasing the vulnerability of the surrounding community and infrastructure to flood hazards.

Green Infrastructure: Over the past several years, the City and County have taken several steps to implement green infrastructure in the region. For example, as of 2024, the County's Creek ReLeaf reforestation program, has reforested more than 575 acres of land. The County is currently developing a Green Infrastructure Plan, intended to support the process of establishing a network of green patches and corridors to reduce habitat fragmentation, promote wildlife migration, sustain working lands, offer more options for recreation, and mitigate the causes and effects of climate change. The City maintains and manages more than 7,000 acres of forested land to protect the headwaters of Fishing and Tuscarora

Creek watersheds and the City's water supply. In addition, the City's Low-impact Landscaping Ordinance encourages the installation of nature-based solutions on private property.

Energy: The County and the state of Maryland have made significant progress toward building the region's energy resilience. The County is piloting the development of a microgrid as a part of the Prospect Center Project to rehabilitate a 25.95-acre parcel of land and 200,000-square-foot building. In the process, the County is constructing a local electrical grid that only serves this facility. The grid is powered by a photovoltaic solar array and is intended to provide an energy source for the Prospect Center that is resilient to challenges that might otherwise disrupt Frederick's broader electrical grid, such as high winds or heavy snow. Additionally, the MDE developed Building Energy Performance Standards, following the 2022 CSNA. BEPs are regulations that apply to facilities that are 35,000 square feet or larger and require these buildings to report their energy usage to the state yearly, starting in September 2025, with the goal of reducing emissions to net-zero by 2040. "Benchmarking" programs like this one have resilience benefits in addition to mitigation benefits. More energy-efficient buildings put less strain on the grid, especially during extreme heat events when lots of people are running air conditioning systems, allowing Frederick's electrical system to better withstand climate-related hazards.

What are folks in Frederick saying about Infrastructure and the Built Environment?

Grid stress: Community members are feeling the heat, especially in traditionally cooler months like May and September. More air conditioning use during heat waves can put strain on Frederick's electrical grid and drive-up energy bills. Ensuring that the public has access to adequate cooling and improving Frederick's grid will go hand in hand.

Flooding and pollution: Community members are concerned about increasing flood risks around the county. Recent flooding-driven sewage overflows can lead to contamination of waterways and stormwater management is a priority.

Social infrastructure: Resources like community centers and schools can experience structural damage during flooding events, and this raises concerns especially for people with children and elderly community members.

Equity Considerations

Some aspects of equity that are relevant to improving the resilience of Frederick's built infrastructure are affordability, accessibility, and efficacy. Resilience measures—like home floodproofing or energy-efficiency retrofits—can be expensive up front, even if they provide cost-saving benefits in the future, making them unattainable for low-income households without outside support. Additionally, as Frederick hardens and diversifies its transportation infrastructure to adapt to climate hazards, it is important that these transformations result in a transportation system that is accessible to the entire public, regardless of factors like income or rurality. Finally, as the City and County pursue flood mitigation measures, planners should take a holistic view of the project and its surroundings to ensure that new infrastructure or land-use changes do not unintentionally exacerbate flood risks in a nearby community.

Resilience Strategy IBE1: Harden transportation infrastructure to withstand future climate impacts.

This strategy aims to build the resilience of Frederick's transportation system so that the public can travel safely and efficiently, even when our community faces climate-related hazards. This strategy supports the recommendation in the 2021 CRRR to build new and retrofit existing infrastructure to withstand anticipated threats.

Outcomes for Community Values

- A sustainable, multi-modal transportation system that ensures safe, efficient, reliable, and affordable mobility for all community members.
- Reliable and efficient water, sewer, and stormwater infrastructure that supports sustainable growth, protects natural resources, ensures clean water, and minimizes environmental and human health impacts.

Actions to Implement

IBE1.1 Identify and test new pavement technologies and mixtures more resistant to flooding and extreme heat impacts.

Pavements can sustain severe damage due to climate hazards like flooding and extreme heat. When temperatures climb, pavements crack and buckle, and flash flooding events can wash out street segments. Emerging pavement technologies, however, are seeking to remedy these issues by using heat-resistant materials and construction techniques. Additionally, asphalt streets contribute to the urban heat island effect by absorbing and re-emitting heat, increasing the surrounding air temperature. Some cities around the world are implementing "cool pavements," pavements that reflect more heat than they absorb and, in this way, reduce the urban heat island effect.

76% of CEAP survey respondents support the installation of cool pavements in Frederick.

Primary Benefit

A sustainable transportation system

Hazards

Potential Partners Maryland Department of Transportation

Timeframes

Long-term

Investment

$$$

IBE1.2 Adopt more aggressive codes to limit impervious surfaces and require the use of pervious pavements, especially in publicly funded projects.

Impervious surfaces are surfaces like concrete and asphalt that do not let rainwater filter below ground. This contrasts pervious surfaces like soil, gravel, sand, or even some kinds of cobblestone and brick paving that allow rainwater to seep below the surface and feed the water table below. A high concentration of impervious surfaces can contribute to higher flood risks. If rainwater cannot filter below ground where it falls, it runs off the pavement and collects at the bottom of hills, in storm drains, or in creeks, sometimes exceeding the capacity of the basin and leading to flooding. This stormwater runoff also carries pollutants like gasoline, fertilizer, pesticides, road salt, and other substances commonly found on streets and sidewalks that are harmful to waterways. Limiting impervious surfaces in Frederick will not only reduce our exposure to flooding hazards, but it will also protect the water quality in our creeks and in the Potomac River.

50% of CEAP survey respondents support improving water quality in Frederick.

Primary Benefit

Reliable and efficient water, sewer, and stormwater infrastructure

Hazards

Potential Partners Frederick County Division of Planning and Permitting

Frederick City Planning Department

Timeframes

Mid-term

Investment

$

How Community Members Can Take Action

- Use permeable pavements around your home, such as in driveways.
- Avoid traveling when flash flood warnings are issued.
- Never drive through flood waters.

Resilience Strategy IBE2: Enhance resilience in water supply to meet drinking water and agricultural needs.

This strategy aims to safeguard access to water for drinking and irrigation purposes, even as Frederick faces climate-related challenges. Given Frederick's projected population growth over the next several decades, the importance of agriculture in the region, and the demand that data centers place on local water supplies, it is important that the City and County are able to meet demand for drinking and irrigation water and withstand potential disruptions to water supplies due to climate change, such as drought or HABs. This strategy also aligns with the 2021 CRRR recommendation to install advanced treatment capacities for removal of natural toxins from drinking water.

Outcomes for Community Values

- Reliable and efficient water, sewer, and stormwater infrastructure that supports sustainable growth, protects natural resources, ensures clean water, and minimizes environmental and human health impacts.
- A diverse and vibrant economy that creates employment opportunities, reduces financial insecurity, and ensures long-term community prosperity.

Actions to Implement

IBE2.1 Address agricultural water shortages by assessing demand and building capacity to increase the use of reclaimed water sources for irrigation.

"Reclaimed water" refers to the process of filtering, disinfecting, and reusing wastewater for non-drinking purposes, like irrigation. Using water more than once (first in homes and then on farms) before returning it to surface or groundwater sources helps to meet demand for a variety of water uses and supports resilience against hazards like drought and HABs.

Primary Benefits

Reliable water infrastructure and a diverse economy

Hazards

Potential Partners

MDE Water Supply Program

University of Maryland Extension

Timeframes

Long-term

Investment

$$$

IBE2.2 Encourage land management practices to increase soil and organic matter for water storage through education and incentives.

Adopting sustainable agriculture practices like user cover crops, growing deep root plants, and using natural compost can increase the organic matter in soil, thus enhancing soil's ability to store water, reducing need for irrigation, and building resilience to drought.

Primary Benefits

Reliable and efficient water infrastructure, and a healthy environment.

Hazards

Potential Partners

University of Maryland Extension Program

Timeframes

Long-term

Investment

$

IBE2.3 During severe droughts and periods of extreme heat, ensure underserved communities have access to safe and affordable water supply.

Access to clean drinking water is crucial to maintain community health and well-being through extreme events like droughts and heatwaves. These events disproportionately impact marginalized communities, like people experiencing homelessness, and it is important that the City and County ensure that safe drinking water is accessible to community members who need it the most, especially during climate emergencies.

Primary Benefit

Reliable and efficient water, sewer, and stormwater infrastructure

Hazards

Potential Partners

City and County HHS

City and County Safety Teams

MDE Water Supply Program

University of Maryland Extension

Timeframes

Mid-term

Investment

$

How Community Members Can Take Action

- Install a rain barrel in your yard to collect rainwater for at-home gardening.
- Reduce the use of lawn fertilizers and pesticides.
- Maintain septic tanks properly.
- Avoid toiletries with microplastics to prevent contaminating local water supplies.
- Participate in local stream and river clean-up events.

Resilience Strategy IBE3: Accelerate the use of resilient infrastructure and nature-based solutions.

This strategy aims to build the resilience of Frederick's infrastructure systems by implementing resilient design and construction techniques in addition to nature-based solutions.

Resilient design and construction methods allow buildings and facilities to withstand climate hazards, from flooding to extreme heat. This might look like floodproofing the first floor of a building or installing solar panels, so an apartment complex still has access to energy, even if there are disruptions to the grid due to a storm.

Nature-based solutions can address challenges ranging from stormwater management to extreme heat mitigation. Frederick County's 2023 Climate Change Working Group published a whitepaper in 2023 that defines green infrastructure as "natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife" (Russell, 2023). Small-scale examples include bioswales that allow for water to filter below ground and feed the water table, or street trees that mitigate the urban heat island effect. Larger-scale examples include networked forest patches that allow birds to migrate across the landscape, or vegetated buffers along streams that filter pollution from stormwater runoff before it enters a creek or river.

Outcomes for Community Values

- A resilient and reliable energy supply that meets the demands of homes, business, and emergency services.
- Improved air and water quality to promote community well-being.
- Reliable and efficient water, sewer, and stormwater infrastructure that supports sustainable growth, protects natural resources, ensures clean water, and minimizes environmental and human health impacts.
- Increased greenery close to built infrastructure for reduced heat, reduced flooding, and better comfort indoors and outdoors.

Actions to Implement

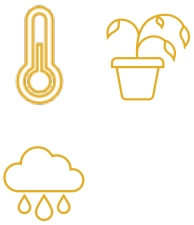
IBE3.1 Promote existing programs and develop new programs and incentives that encourage nature-based solutions and resilient infrastructure for new developments.

It can be difficult to retrofit existing buildings with redundant and floodproof energy systems or to install a bioswale in a parking lot that has already been paved. But new developments like apartment complexes and business centers are prime opportunities for implementing nature-based solutions and resilient infrastructure. Ensuring that new developments in Frederick implement climate-friendly measures will ensure resilient energy systems and a healthy environment for our communities. An example of a program that incentivizes nature-based solutions and resilient infrastructure outside of Frederick is Washington D.C.'s FloodSmart Homes program, run by the D.C. Department of Energy and Environment. The program covers a free home resilience assessment report and the free installation of floodproofing and resilience upgrades.

Primary Benefits

A healthy environment and a resilient energy supply

Hazards



Potential Partners

Frederick County Division of Energy and Environment

Timeframes

Mid-term

Investment

$$

IBE3.2 Conduct awareness campaigns that provide education and training on incorporating resilient infrastructure and nature-based solutions.

Frederick community members have lots of opportunities to implement nature-based solutions and resilient building techniques, even in their own homes, from building rain gardens to installing water-efficient washing machines. But some community members might not be aware of the actions they can take right now, as well as the incentive programs available to them.

Primary Benefits

A healthy environment and a resilient energy supply

Hazards

Potential Partners Frederick County Division of Energy and Environment

Timeframes

Mid-term

Investment

$

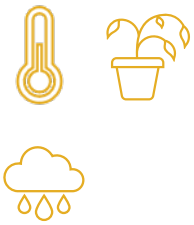
IBE3.3 Use equity indicators to prioritize nature-based solutions and resilient infrastructure in areas with disadvantaged communities.

Communities in Frederick do not experience climate hazards equally. Some areas, especially among historically marginalized communities, are more vulnerable to the negative consequences of climate hazards, from power outages to flooding to heat-related health complications. Prioritizing these areas for resilient infrastructure improvements and the implementation of nature-based solutions will ensure that the communities who are most impacted by climate change are receiving solutions. Our planning partners, like MWCOG, have developed statistical indicators to identify disadvantaged communities in the region. Frederick can leverage these indicators to identify communities to prioritize for the implementation of nature-based solutions and resilient infrastructure.

Primary Benefits

A healthy environment and a resilient energy supply

Hazards



Potential Partners

MWCOG

Frederick County Division of Energy and Environment

Timeframes

Mid-term

Investment

$

IBE3.4 Update building codes to reflect specific resilience improvements and enforce updated building performance standards.

It is important that buildings are built using the most effective design standards to withstand climate hazards like flooding, hurricanes, and heat waves. Resilience efforts can overlap with mitigation efforts in the realm of energy efficiency. More energy-efficient buildings put less strain on the grid, especially during extreme heat events when lots of people are running air conditioning systems, allowing Frederick's electrical system to better withstand climate-related hazards.

Primary Benefits

A resilient energy supply and reliable water infrastructure

Hazards

Potential Partners

Frederick County Council

City of Frederick Department of Public Works, Building/Permits Department

Timeframes

Mid-term

Investment

$

How Community Members Can Take Action

- Apply for financial assistance or rebates to install insulation, air sealing, or energy-efficient appliances.
- Learn more about installing small-scale nature-based solutions around your home, like green roofs, rain gardens, bioswales, or riparian buffers.
- Buy a tree for your yard through Tree Frederick.
- Be involved in community science and use free platforms such as iNaturalist, and eBird, to help scientists collect data to track trends in species and habitat.

Health and Well-being

As climate change progresses, the health effects of extreme weather are becoming increasingly clear, from heat stroke to vector-borne illnesses, from mental health challenges to food insecurity. To successfully prepare for these impacts, Frederick will need to ensure the resilience of the regions' health care systems, natural resources, and food systems. Frederick's thriving agricultural sector is especially vulnerable to the impacts of climate change. However, climate-friendly innovations in food production and distribution offer valuable opportunities to maintain community health and well-being, both by protecting employment and income for Frederick communities, and by protecting sources of food and nutrition. Through the following strategies, Frederick aims to maintain and bolster the health of community members by ensuring the accessibility, safety, reliability, and diversity of natural and cultural resources, health care systems, and local economies.

Table 28. Strategies in the Health and Well-being Sector.

Strategy	Primary Benefits
HW1: Increase shade and urban green spaces to reduce heat risk.	
HW2: Protect the health and safety of outdoor workers.	
HW3: Ensure the public has adequate and equitable access to cooling facilities and services during extreme heat events.	
HW4: Enhance food system resilience to climate-inducted disruptions.	

Frederick's Resilience Progress

The City and County have already undertaken several projects that aim to increase the resilience of Frederick's health systems and our communities' overall well-being.

Heat & Air Quality Monitoring: In 2020, the City of Frederick published an air temperature study which investigated the urban heat island effect. The study found that temperatures in the city were significantly higher than temperatures recorded at nearby rural sites within the county. Frederick County's Department of Energy and Environment (DEEP) collects data about air quality in the region through the Air Quality Monitoring Network. The goal is to better understand the variations in air quality within Frederick and to make this information publicly accessible, so the public can make informed decisions about spending time outside. The Frederick County Division of Energy and Environment collects air quality data from 12 sensors around the county and issues daily Air Quality Indicators (AQI), from green (meaning good) to maroon (meaning hazardous).

Figure 36. Installation of PurpleAir monitor at Casa Rico Restaurant in Frederick.

The County has also launched a community air quality monitoring program in partnership with Hood College. The City program aims to deploy 15 air quality monitors that display real-time data on the PurpleAir Quality Map.

Urban Forestry: Tree Frederick is a program that supports tree planting in the City of Frederick. The program provides a 50/50 cost share for native trees to be planted on residential properties in the City. In 2024 the City saw a 27% increase in tree sales through Tree Frederick since 2023. In 2009, Frederick conducted a study of its urban tree canopy in partnership with the USDA Forest Service and the University of Vermont. The study found that the city has 14% tree canopy cover. The City's 2010 Urban Forestry Master Plan highlights the issues facing Frederick's urban tree canopy, as well as management goals and a plan for implementation.

Food Systems: The Maryland Food System Resiliency Council (FSRC) is a formally appointed body operating under the Maryland Dept. of Emergency Management that meets regularly to spearhead a multiagency, collaborative initiative: engaging experts in food resiliency across Maryland in better addressing food insecurity and food resilience issues across the state. The FSRC harnesses the

collaborative efforts of Maryland State agencies and food system experts to address the issues impeding production, distribution, and access to nutrition across Maryland.

Frederick County Master Gardeners is a volunteer organization trained through the University of Maryland Extension that educates the public about safe and effective practices for healthy gardening. The organization offers workshops and conducts outreach programs to provide assistance in starting and maintaining food gardens, raise awareness about water pollution and protecting pollinators, and engage young people and students. Community gardening is a key aspect of building a local food system that can withstand disruptions due to climate change like drought, heat, and extreme precipitation.

Figure 37. Frederick Food Security Network Volunteers at Lucas Village Community Garden.

Equity Considerations

Health and well-being challenges do not appear uniformly across communities. Nationally, health risks associated with a changing climate—such as heat stress, or respiratory illness from exposure to poor air quality—disproportionately affect socially marginalized populations, like low-income households, people of color, people with disabilities and chronic illnesses, and people experiencing homelessness. In Maryland, the risk of hospitalization for a heart attack increases 27% among Black communities on extreme heat days, as compared to only 9% among white communities, according to the Maryland Department of Health. Additionally, Frederick's 2025 Community Health Report found that nearly 40% of community members in Frederick find it difficult to pay for their basic needs, putting them at higher risk for negative physical and mental health outcomes and exacerbating the health consequences of climate change. This is especially true in the context of nutrition, given that 22,210 community members, or 8% of Frederick County's population, experience food insecurity. The report also found that pests and mold, both of which are directly linked to health outcomes and climate change, are among the most common problems community members have within their households.

Frederick's climate resilience strategies offer a meaningful opportunity for the City and County to rectify these inequities and remedy historical health and climate injustices. For example, tree planting projects can target communities that disproportionately experience health impacts associated with extreme heat, or food resilience initiatives can focus on neighborhoods that already face food insecurity. In this way, Frederick can build community resilience to climate change in a way that is equitable and accessible.

What are folks in Frederick saying about Health and Wellbeing?

Protecting Green Spaces: Community members in Frederick highly value Frederick's greenery, for both its aesthetic value and health benefits. Climate change and its impacts are affecting Frederick's biodiversity, from invasive species to changing habitat conditions. Protecting the region's flora and fauna is key to safeguarding Frederick's greenspaces and ensuring these natural resources continue to thrive for generations to come.

Resilience Hubs: Resource availability and accessibility in heat waves, floods, food crises, and other disaster events is a high priority for folks in Frederick. Combining critical services for the region could be key to connecting existing community services and spaces with resilience resources to great resilience "hubs." These may be information hubs, physical cooling/heating spaces, or other manifestations of this idea.

Resilience Strategy HW1: Increase shade and urban green spaces to reduce heat risk

This strategy aims to increase the amount of tree canopy cover in Frederick. Higher tree canopy cover reduces air temperatures, limiting exposure to extreme heat. Extended exposure to extreme heat can have negative health consequences, contributing to heat stress and compounding the effects of chronic conditions. As climate change progresses and as extreme heat events become more frequent and severe, it is important that Frederick plants trees to reduce exposure to hot temperatures and limit the associated negative health consequences. This strategy supports the 2021 CRRR recommendation to improve community public health resilience to extreme heat events.

Outcomes for Community Values

- A healthy environment with fresh air, safe water, nutritious food, and reliable medical services to promote community well-being.
- Accessible parks, recreation, and cultural landmarks that enrich the community.
- A sustainable, multi-modal transportation system that ensures safe, efficient, reliable, and affordable mobility for all community members.

Actions to Implement

HW1.1 Increase tree canopy, shade structures, and natural areas around schools, buildings, sidewalks, parking lots, and other areas with high pedestrian traffic.

Pedestrians, bicyclists, transit users, and other people who rely on multi-modal forms of transportation are often more exposed to extreme heat because, unlike car drivers, they are not always sitting in air conditioning as they travel. By targeting areas with high pedestrian traffic for tree planting, Frederick can reduce the exposure of these groups to extreme heat.

Primary Benefits

A healthy environment and a sustainable transportation system

Hazards

Potential Partners

Tree Frederick

Mobilize Frederick

Frederick County Division of Transit Services

Frederick City and County Parks Departments

Frederick City Urban Forestry Department

Timeframes

Mid-term

Investment

$$$

52% of CEAP survey respondents prioritized reducing the urban heat island in Frederick.

HW1.2 Build on existing heat mapping and data collection work by conducting a gap analysis of current heat and tree canopy datasets to both identify further research needs and to prioritize sites for tree planting and urban green spaces.

Trees lower air temperature by reflecting sunlight, providing shade, and emitting tiny droplets of water that evaporate and function like sweat, cooling the air around them like sweat cools skin as it evaporates. Prioritizing hotter areas of the city and county will direct the cooling benefits of trees to communities that need these benefits the most. The Climate Risk and Vulnerability chapter of this CEAP partly completes this action, in that it offers a heat risk assessment of Frederick. The City and County can use the results of this study to prioritize areas for tree planting and urban green space development.

Ongoing actions: In 2020, Frederick conducted an Urban Heat Island Effect Study of the region. Future studies should draw on already available data, in addition to collecting new data to fill in gaps. Data could come from Maryland Office of Preparedness and Response's Heat Report Archive, NASA climate data, Meteoblue's Urban Heat Maps, Google's Project Sunroof, or NOAA's climate data.

Primary Benefit

A healthy environment

Hazards

Potential Partners

Tree Frederick

Mobilize Frederick

Frederick County Division of Energy and Environment

Hood College

Timeframes

Near-term

Investment

$

How Community Members Can Take Action

- Buy a tree for your yard through Tree Frederick.
- Sign up for emergency alerts to get notified about extreme heat events through AlertFC or CoFAlert.
- Participate in community air quality monitoring programs.

Figure 38. Residents at the Tree Frederick annual pickup event.

Resilience Strategy HW2: Protect the health and safety of outdoor workers.

This strategy aims to keep outdoor workers safe during extreme weather events, especially heat waves, storms, and floods. Because of the nature of their work, outdoor workers (like agricultural workers and construction workers) are more exposed to climate hazards than people who work in indoor environments.

Outcomes for Community Values

- A healthy environment with fresh air, safe water, nutritious food, and reliable medical services to promote community well-being.
- A diverse and vibrant economy that creates employment opportunities, reduces financial insecurity, and ensures long-term community prosperity.

HW2.1 Pass legislation protecting indoor and outdoor worker rights, including implementation of weather monitoring, emergency response procedures, and heat training.

Currently, there is no national legislation regarding worker safety when it comes to extreme temperatures. The Occupational Safety and Health Administration (OHSA) has only released recommendations for protecting indoor and outdoor workers' safety under extreme heat conditions. Protecting the health and safety of workers from climate hazards means protecting local economies from disruptions due to climate hazards.

Ongoing actions: Maryland's heat stress standard, COMAR 09.12.32, went into effect September 30, 2024. The City of Frederick's Risk, Safety, and Compliance Department has established protocols in line with this standard to protect indoor and outdoor worker rights during extreme weather events.

Primary Benefits

A healthy environment and a diverse and vibrant economic environment

Hazards

Potential Partners

Frederick County Public Health Department

Maryland Occupational Safety and Health

City of Frederick's Risk, Safety, and Compliance Department

Timeframes

Mid-term

Investment

$

How Community Members Can Take Action

- Learn about workplace best practices for protecting workers from extreme heat, such as shifting work hours to cooler times of day, taking frequent breaks in air conditioning, and drinking plenty of water.
- Learn the warning signs of heat stress and check in on vulnerable colleagues during heat waves.

Resilience Strategy HW3: Ensure community members have adequate and equitable access to cooling facilities and services during extreme heat events.

This strategy aims to increase the accessibility of cooling options during extreme heat events. Because prolonged exposure to extreme heat can have negative health consequences, it is important that the public can access cooling infrastructure like cooling centers, air conditioning, parks, pools, splash parks, and emergency shelters in order to protect our communities' overall well-being. This strategy supports the 2021 CRRR recommendation to improve community public health resilience to extreme heat events.

Outcomes for Community Values

- A healthy environment with fresh air, safe water, nutritious food, and reliable medical services to promote community well-being.
- Accessible parks, recreation, and cultural landmarks that enrich the community.
- A sustainable, multi-modal transportation system that ensures safe, efficient, reliable, and affordable mobility for all community members.

Actions to Implement

HW3.1 Identify opportunities to increase mobility and access to parks, open spaces, cooling centers, and emergency shelters.

Some cooling infrastructure already exists in Frederick, but it is important that everyone can access it. Building Frederick's multi-modal transit opportunities will ensure that the public can access cooling infrastructure when they need it. For example, assess or map pedestrian and transit access to cooling centers, within half a mile of each location.

Primary Benefits

Accessible parks and a sustainable transportation system

Hazards

Potential Partners

Frederick County Division of Transit Services

Frederick County Division of Emergency Management

City Office of Emergency Management

City of Frederick Department of Public Works

Frederick County Public Libraries.

Timeframes

Mid-term

Investment

$$

Ongoing actions: Cooling services in Frederick City and County are available at: Frederick Housing and Human Services (100 South Market Street); Salvation Army's Day Shelter (25 East Second Street); Frederick Rescue Mission (419 West South Street); Seton Center (226 East Lincoln Avenue, Emmitsburg); Beyond Shelter (27 Degrange Street); Frederick County Public Libraries (multiple locations).

HW3.2 Create new opportunities for cooling activities in the summer, such as community sprinklers, fountains, splash pads, and increasing public access to community pools and waterways.

In addition to ensuring access to existing cooling infrastructure, creating new cooling opportunities can help support our communities' health and well-being through heatwaves. Other cities like New York make information about where to access cooling facilities accessible to the public using digital maps and websites through the Cool It! NYC program.

Primary Benefits

Accessible parks and a healthy environment

Hazards

Potential Partners

Frederick County Public Health Department

Frederick County Parks and Recreation

City of Frederick Housing and Human Services

Mobilize Frederick

City of Frederick Parks Department

Timeframes

Mid-term

Investment

$$

How Community Members Can Take Action

- Learn the warning signs of heat stress and check in on neighbors without air conditioning during heat waves.
- Learn about and tell your neighbors about public places in your community that offer air conditioning in the summer, like libraries and rec centers.

Resilience Strategy HW4: Enhance food system resilience to climate-related disruptions.

This strategy aims to build the resilience of Frederick's food systems to climate change-driven hazards. As climate change progresses, agriculture both in and outside of Frederick faces risks from drought, heat, and extreme precipitation. These changing climate conditions could change the type of crops that are viable in Frederick and could threaten food supplies from outside of the region. Building a resilient food system that can withstand disruptions due to climate change is essential to protect community health and well-being. Actions under this strategy advance the recommendation in the 2021 CRRR to minimize the impact of extended droughts.

50% of CEAP survey respondents prioritized access to local, sustainable food sources.

Outcomes for Community Values

- A healthy environment with fresh air, safe water, nutritious food, and reliable medical services to promote community well-being.

Actions to Implement

HW4.1 Expand food banks and distribution networks in vulnerable communities.

Communities that already experience food insecurity are more prone to experiencing the negative effects of climate-driven disruptions to local and regional food systems. For example, a community that already struggles to access affordable food will be more sensitive to rising food costs due to climate hazards. Food banks offer an opportunity to support these communities through climate-related food system disruptions. Prioritizing fresh produce over highly processed, shelf-stable foods and ensuring that food banks have reliable access to energy sources to properly store perishable foods is crucial to the success of this action.

The Frederick Food Bank Program, operated by the Department of Housing and Human Services (HHS), provides a three- to five-day supply of food to individuals and families facing economic hardships. The City currently operates in two locations. The Food Bank serves between 600 to 800 households each month. These include very low-income to moderate-income families who are experiencing financial challenges and need regular food assistance.

Primary Benefits

A healthy environment

Hazards

Potential Partners

Frederick Rescue Missions

Frederick Food Pantry

Frederick County Food Council

Local farmers and community gardens

Timeframes

Mid-term

Investment

$$$

HW4.2 Conduct a food waste assessment to identify the types and quantities of food that are thrown away and create an educational program that raises awareness among communities and businesses about proper buying, storing, and disposal methods to reduce food waste.

Minimizing food waste can help ensure the ability of local food systems to withstand disruptions due to climate change. Conducting a food waste assessment will allow Frederick to target specific points in the food system to reduce waste, and creating an educational program to raise awareness will ensure that households and restaurants are implementing best practices to minimize waste.

Primary Benefits

A healthy environment

Hazards

Potential Partners

Frederick County Food Council

Frederick County Health Department

Local restaurants, grocery stores, and other businesses

City of Frederick Sustainability Committee and composting program

Timeframes

Mid-term

Investment

$$

How Community Members Can Take Action

- Reduce individual food waste (plan meals, use leftovers, donate unopened, unexpired food to local food banks).
- Volunteer with organizations that collect and redistribute surplus food.
- Volunteer with community gardens and local farms to support local food systems.

Figure 39. Community garden plot at Willow Brook Park.

Emergency Management and Response

The City and County are highly diligent when it comes to emergency response planning, offering real-time alerts and maintaining detailed hazard mitigation plans. The City and County should continue to integrate climate change projections in these plans, as emergencies arising due to extreme weather events increase in frequency and severity. Between 1991 and 2021, Frederick County experienced 237 precipitation-driven flooding events, 12 droughts, 44 extreme heat events, and 265 winter storms. It is important that communities know where to go for support before, during, and after emergencies, and are well equipped with the knowledge and resources to protect themselves and their neighbors. To adequately prepare for emergencies and best protect communities from these and other hazards, Frederick aims to implement the following strategies.

Table 29. Strategies in the Emergency Management and Response Sector.

Strategy	Primary Benefit
EMR1: Promote partnerships with local organizations to connect people with resilience and emergency management resources.	
EMR2: Establish climate risk education and public outreach programs to increase preparedness for climate events.	

Frederick's Resilience Progress

The City and County have already taken several steps to enhance community resilience through improved emergency management and response.

Emergency Alerts: The City and County use a mass notification system, AlertFC, to issue emergency notifications to the public. The system contacts the public in a variety of ways including text, email, phone

call and push notifications to mobile devices. The public may opt-in to the system to sign up for general emergency or optional specific information such as severe weather or the City's CoFAlert.

Public Communication & Outreach: Frederick County's Green Compass program connects the public with programs, incentives, and credits to build resilience to climate change. The County's Green Partners program organizes volunteers, businesses, nonprofits, and government agencies who are interested in increasing the sustainability and resilience of Frederick. Partners connect people to programs and resources, staff events like tree plantings and watershed monitoring, and meet monthly to discuss policies to advance Frederick's sustainability and resilience. Frederick County and City of Frederick Emergency Management also recognizes September as Preparedness Month, an opportunity to raise awareness about taking action to keep Frederick safe by preparing for emergencies. Additionally, the City's Department of Health and Human Services Safety Team releases weekly situational reports with details about the community resources available during extreme heat events.

Insurance: The City participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), a voluntary incentive program that encourages sustainable floodplain management to protect communities from flood hazards. By participating in CRS, the City of Frederick is eligible for discounted flood insurance premiums. Participation in the program not only incentivizes purchasing flood insurance but also implementing sustainable floodplain management practices to support Frederick's resilience to flood hazards.

Equity Considerations

As Frederick seeks to implement these strategies, it is important that equitable access remains a priority, and that ongoing efforts continue to be targeted to the communities who need them the most. For example, educational materials and emergency alerts should continue to be published in multiple languages and accessible to people with disabilities. It is also important that Frederick develops climate education programming that is accessible to communities across cultures. Not every community in Frederick County experiences the effects of climate change in the same way, and Frederick remains committed to providing services to our whole community.

What are folks in Frederick saying about Emergency Management and Response?

Public Awareness: Community members know that understanding how to protect yourself and your home before and during a climate emergency is key to building resilience. But many people indicated they didn't have a safety plan or knew about local emergency resources. It is important that members of our community are aware of these tools, like the AlertFC system, and that the public is well informed about the health risks of climate hazards, like exposure to water contamination during flood events and the risks associated with prolonged exposure to extreme heat.

Resilience Strategy EMR1: Promote partnerships with local organizations to connect people to climate resilience resources.

The City and County offer resources to prepare and recover from disruptions related to climate change hazards. These resources include places to access air conditioning and medical care during heatwaves, shelters during flood events, basic materials to build an emergency "go bag," and information about how to implement resilience measures in the home. Community-based organizations and institutions like faith groups, libraries, schools, community centers, and shelters can leverage existing networks to build effective and accessible resilience hubs.

Outcomes for Community Values

- Proactive and reliable emergency services to support the community during crises.
- A healthy environment with fresh air, safe water, nutritious food, and reliable medical services to promote community well-being.

Actions to Implement

EMR1.1 Leverage existing tools and datasets to identify the most climate-vulnerable communities and continue leveraging relationships with community organizations and leaders to build on previous work connecting community members with resilience resources.

Not all communities experience climate hazards in the same way or to the same extent, and resources (including everything from funding to information to materials) are most effective when they are accessible to the community members who need them most. Identifying the most climate-vulnerable communities will allow Frederick to strategically connect people to resources throughout the region to achieve the best outcomes for overall resilience and emergency preparedness. Successfully connecting people to resources requires coordination with the communities that the resources are meant to serve, and it will be crucial for the City and County to develop and maintain strong partnerships with community-based organizations to execute this action successfully.

Primary Benefits

Proactive and reliable emergency services and a healthy environment.

Hazards

Potential Partners

Mobilize Frederick

Frederick County Green Partners

Centro Hispano de Frederick

Asian American Center of Frederick

East Frederick Rising

Multi-Faith Alliance for Climate Stewards

Timeframes

Mid-term

Investment

$

How Community Members Can Take Action

- Volunteer with local resilience organizations.
- Learn more about what to do during climate emergencies through online resources from City and County Emergency Management.
- Facilitate conversations about climate change and natural hazards in your home and workplace.

Resilience Strategy EMR2: Establish climate risk education and public outreach programs to increase resilience to and preparedness for climate events.

Raising awareness about current and future resilience opportunities (like programs and incentives) is crucial to maximize participation and enhance our communities' ability to withstand disruptions due to climate hazards.

Outcomes for Community Values

- Proactive and reliable emergency services to support the community during crises.
- Increased public awareness of emergency services and resources to more effectively support the community, especially vulnerable individuals like those who are lower-income, elderly, or non-English speaking.

Actions to Implement

EMR2.1 Conduct community engagement and workshops to increase awareness on climate change risks and develop shareable information materials.

Ensuring that Frederick community members are informed about climate change risks and hazards is a critical step toward building community resilience. Many agencies and trusted messengers will help to make information accessible.

Primary Benefits

Proactive and reliable emergency services.

Hazards

Potential Partners

Frederick County Division of Emergency Management

City's Office of Emergency Management

Frederick County Green Compass

Frederick County Public Schools

Hood College

Maryland School for the Deaf

Public libraries

Senior centers

Timeframes

Mid-term

Investment

$

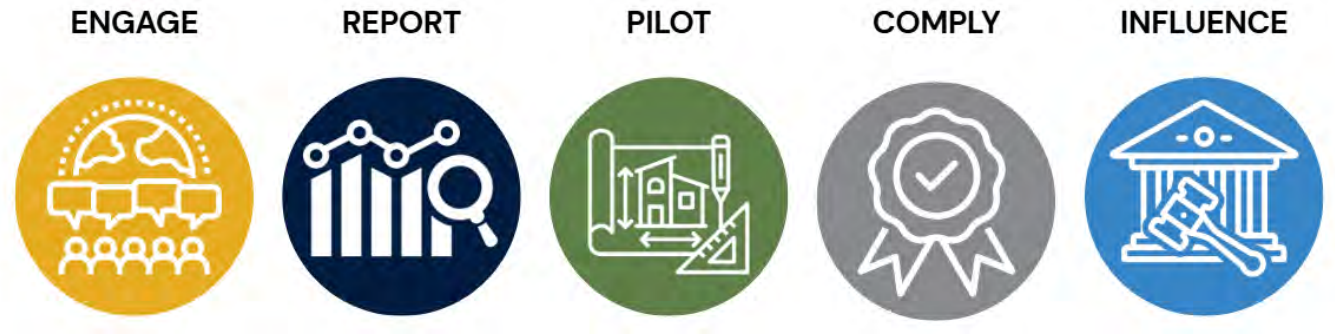
How Community Members Can Take Action

- Put together a "go bag" with essential items like medication, shelf-stable foods, first-aid, and batteries to prepare for emergencies that require evacuation.
- Sign up for emergency alerts through CoFAlert or AlertFC.

Figure 40. Community Members with Department of Stormwater Management.

Next Steps

Frederick has lots of opportunities to take critical action on climate mitigation and resilience, to prevent climate change and protect the region from its worst impacts. While the CEAP gives many actions and strategies to achieve these goals, the City and County will focus on five guiding actions as they take next steps.



1: Keep Engaging with the Community and Experts on Climate

As the City and County move beyond the outreach efforts conducted during this phase of the CEAP process, engaging community members and experts on climate will continue to drive progress on climate action across Frederick.

Maintain and Grow Existing Connections

The CEAP team gained significant traction with the community over the past few months, which can support the implementation of the strategies proposed here. To maintain this momentum, the City and County will find ways to continue these community conversations. This could involve scheduling follow-up meetings with community members who have expressed interest in being involved in the CEAP development process; establishing targeted conversations at local homeowners' associations; or attending at community events such as farmers' markets, local fairs, and festivals.

The City and County also developed a strong group of experts that advised on the CEAP development process. These individuals and groups will remain an important partner in the climate action ecosphere in Frederick. Continued outreach and follow-up on specific actions and implementation activities will continue past the publication of the CEAP.

Local businesses, HOAs, and community-based organizations have also been identified throughout this plan as potential implementing partners to help these strategies achieve their full potential. The City and the County will continue to cultivate these relationships with new and existing partners who are interested in making their communities cleaner, healthier, accessible, and ready to take action. These partnerships will be particularly impactful for:

- Community outreach and education efforts.
- Waste reduction efforts like recycling and composting.
- Reducing barriers to home upgrades for owners and renters, like permeable pavements, onsite renewable energy, composting, and more.

- Expanding green spaces with native plants and tree coverage around homes, businesses, and community gathering spaces.
- Deploying energy-efficiency and renewable energy options to diversify the energy landscape as demand continues to grow.

Beyond engaging for implementation, the CEAP team hopes that the CEAP can be a starting point for those who engaged with them during the plan development to keep talking about shared solutions and goals with friends and neighbors to make climate a household conversation.

Expand Virtual Outreach

Another pathway to invest in while the team transitions from a whole outreach period to focusing on CEAP development is to invest time and effort in utilizing virtual communication methods. While the CEAP team reduces its in-person outreach, there is an opportunity to redirect that time and effort into emails, social media, and virtual meetings with community members. Virtual communication allows for a lower investment rate than in-person events, while continuing to communicate with those interested in next steps and their ability to shape the CEAP. Keeping the community informed about the current phase, next steps, and what the project team is currently working on helps eliminate negative perceptions surrounding the timeline of the CEAP development process.

Evaluate Feedback for Implementation

The project team will continue to evaluate its successes and learning points during the development of the CEAP, which enables the project team to identify what works best for the Frederick region to enhance its communication abilities. After receiving almost 600 survey results, there is significant interest in what happens next and how that pathway is determined. Utilizing this genuine interest, the project team can work with the community to gain insights into what has worked well previously, as well as what is needed moving forward.

By continuing outreach efforts, we aim to maintain an engagement process that is meaningful, inclusive, and reflective of the community's aspirations and challenges. Together, we can ensure that our initiatives not only resonate with the public but also lead to impactful outcomes for Frederick County and the City of Frederick.

2: Study and Report on Climate Trends for Transparency

Heat Mapping

Conduct an updated heat mapping analysis that builds on the 2020 Urban Heat Island Effect Study. This analysis can be used to identify locations with high heat risk and help prioritize sites for tree planning and urban green spaces. The Climate Risk and Vulnerability chapter of this CEAP partly completes this action, in that it offers a heat risk assessment of Frederick. The City and County can use the results of this study to prioritize areas for tree planting and urban green space development.

Climate Dashboard

The City and County plan to set up a public reporting dashboard for transparency and education on trends like GHG emissions, air quality, and heat vulnerability. This dashboard should be operational by the end of 2025 and will include regular updates to climate inputs to demonstrate measurable progress toward their climate and energy goals.

3: Pilot and Site for Climate Solutions

EV Charging Stations

To effectively transition to EVs, it is essential to have the appropriate charging infrastructure in place to support a variety of EV types and travel patterns in Frederick County. The CEAP team conducted a siting analysis that led to a total of 26 candidate sites for standing up charging infrastructure. Key next steps for the County include:

- For sites not served by Potomac Edison, coordinate with local utilities to examine grid capacity.
- For sites not owned by the County, engage property owners to install publicly accessible EV charging stations.
- Identify optimal placement of charging stations within sites by carefully considering additional factors to balance cost, convenience, and accessibility.

Solar Installations

Frederick County has completed a Solar Blueprint Study that evaluates the potential for ground-mounted, rooftop, and parking canopy solar throughout the county, including through an inventory of potential sites countywide. Frederick will proactively reach out to building and site owners such as commercial buildings and places of worship to discuss potential solar installations and provide technical assistance to interested stakeholders. Frederick will also explore and develop incentives to encourage inclusion of solar in new development and redevelopment projects within already developed areas and planned growth areas identified in the Livable Frederick Master Plan to help protect the county's agricultural areas, and provide education to landowners, homeowners, and communities.

Geothermal and Networked Geothermal

Geothermal energy systems are already in use across the state, lowering energy bills and increasing indoor comfort in hot and cold temperatures. Under Maryland's WARMTH Act, utility providers are required to start piloting networked geothermal systems across jurisdictions to understand more about this renewable energy source and its potential benefits across the state. Geothermal heat pumps can reduce building heating and cooling energy consumption and improve grid resilience. Frederick County intends to explore expanding geothermal heating in new development in alignment with this statewide push, and this would require a community-wide study. County staff should engage developers and utilities to evaluate viability, including community-scale (networked) systems for neighborhoods or multifamily housing, potentially leveraging economies of scale to boost local adoption.

Economic Feasibility Analysis

For new projects and or expansions put forward in the CEAP, economic feasibility assessments would help guide implementation choices in the short and long term to achieve the most impact for community investments. These dollars and cents analysis can also help attract private investors for public private partnerships or assist with securing grants for sustainable project support.

4: Maintain Code Compliance for City and County

City Code Compliance and Maryland's Building Performance Standards (MBPS)

Based on an analysis of how the City compares neighboring jurisdictions and other state municipalities and the stakeholder input (including from City of Frederick Sustainability Committee and Frederick County Building Industry Association), there are currently no code-related improvements needed to further promote energy-efficiency and GHG emission reductions. The key updates in the Frederick City Code will include the adoption of the 2021 MBPS that will reference the 2021 I Codes. Priorities for considerations associated with future code changes include costs of implementation, building and housing accessibility, occupant experience, consideration of historic buildings, and electrification impacts.

New County Mechanical Code Program

Frederick County is looking to establish a mechanical program to regulate the safety of mechanical equipment and systems in buildings in alignment with the International Residential Code and the International Mechanical Code. The mechanical program will mimic Frederick County's plumbing and electrical codes programs and leverage the County's complimentary combination permitting and inspection staffing resources to build upon the County's existing permitting and inspection infrastructure (people, systems, and processes) for buildings, plumbing, electrical, and life safety systems. The proposed mechanical program for Frederick County carefully considers its existing staffing conditions and the assessment of peer jurisdictions.

5: Engage with Legislative Processes to Advocate for Frederick

As the City of Frederick and Frederick County plans for continued alignment with state and federal standards, it is suggested that local stakeholders, government officials, and designated staff engage with the legislature and appropriate state agencies to provide community and industry feedback. Frederick is uniquely positioned as the fastest growing jurisdiction in Maryland, and the needs of the region need to be represented on critical issues like housing availability and affordability, data center expansion, changing building codes, and rebates and other support for climate and energy solutions.

Appendix A: Engagement Summary

This appendix includes the planning, methodology, and results of public and technical engagement for the CEAP development.

Engaging Community Members

Summary of Public Engagement

The City of Frederick and Frederick County conducted a public engagement program from March to June 2025 as part of the Community-wide Climate Energy Action Plan (CEAP). The program was designed to educate community members, gather input, and build community trust.

Nearly 520 community members participated in and were engaged during 18 in-person outreach events. These included nine formal interactive informational sessions and nine less formal pop-up events to share information, promote participation in the survey, and gather additional climate adaptability and sustainability-related feedback. This initiative also included digital engagement through promotional emails, a new webpage, social media posts, and an online survey that received over 650 responses from across Frederick.

Community members expressed broad support for local climate action. Respondents stated concerns about energy affordability, population growth, loss of farmland, and the need for alternatives to vehicle travel and increased composting programs. Findings from this engagement informed the final CEAP and will continue to guide collaboration between the City, County and its communities as this plan comes to life across the region.

The City of Frederick and Frederick County also held a public comment period to solicit feedback on the draft CEAP from August 11-August 31, 2025. The City and County received a total of 41 responses through an online feedback portal and direct email submissions.

Goals and Objectives of Public Engagement

In the fall of 2024, the CEAP team produced a Public Engagement Plan for the CEAP that included:

- Engagement program goals and objectives,
- A high-level demographic analysis,
- Identification of key audiences/stakeholders,
- Key messages,
- Communication and outreach tools and methods to successfully reach and engage the many diverse populations of the City and County, and
- Metrics for evaluating the success of the engagement program.

The goals and objectives in Table 30 from the plan guided engagement over the 4-month period.

Table 30. Goals and Objectives for the CEAP Engagement Plan.

Goal	Objective
Conduct meaningful public engagement and community-wide outreach with a focus on engaging the following populations to inform the CEAP more holistically: Overburdened - minority, low-income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards. Underserved - people who experience discrimination of any kind and encounter barriers (e.g., racial, ethnic, gender, sexual orientation, economic, cultural, and/or linguistic) to accessing public health and health care goods and services. Climate skeptical - a person who denies or dismisses scientific evidence that climate change caused by human activity is occurring.	Execute 17 community events over the contract length, split into two rounds focused on reaching overburdened, underserved, skeptical, and atypical respondents.
Authentically and equitably seek feedback and needs from the community to enhance community buy-in and provide realistic, logical, attainable, actionable items in the CEAP.	Design a feedback process that is simple for those interacting during the feedback process. Implement equitable engagement strategies and outreach methods that educate and incentivize community feedback on the final CEAP.
Educate the public about climate change, sustainability, GHG emissions, and local governments role in their daily lives.	Use non-technical language for all materials and community interactions during the feedback process; tailor messaging and materials appropriate to different audiences (e.g., those that may not own a home or vehicle).
Engage key community-based organizations (CBOs) and community members to help reach an array of community members.	Develop effective and mutually beneficial working partnerships with the Asian American Center of Frederick, Habitat for Humanity of Frederick County, Maryland,

Goal	Objective
	and Mobilize Frederick to strengthen the City and County's ability to serve overburdened communities. *
Develop lasting community relationships that allow community engagement to continue beyond the CEAP's development.	Create avenues for continued community building during the feedback process, while informing the community of the desire to stay engaged beyond 2025.

*See note below on CBO engagement

To equitably engage overburdened and underserved communities in Frederick, the CEAP team designed both formal and informal in-person meetings and events throughout the County to reach various demographics. This included two in-language events with materials translated to Spanish and Spanish-speaking staff; a pop-up event at H-Mart; translating and offering the survey in Spanish; and offering many ways to engage online including information and interaction via City and County websites, emails, and social media accounts.

The City and County planned on using Environmental Protection Agency (EPA) grant funds to compensate three CBOs to conduct engagement on their behalf, realizing that these organizations have well established connections and relationships with the many diverse communities throughout the City and County. Those organizations included the Asian American Center of Frederick (AACF), Habitat for Humanity of Frederick County, Maryland (HHFCM), and Mobilize Frederick.

Shortly after the Trump administration took office in late January 2025, the status of the grant became uncertain, and the City and County were not sure if they would have secure funds to compensate the CBOs for their engagement efforts. Rather than risk this and potentially damage established relationships and goodwill between the City/County and these organizations, the City/County decided to rework the scope of the consultant team to have them support existing and design and implement new engagement activities and events. Despite this sudden change in plans, the City and County exceeded expectations by conducting 18 engagement events without CBO facilitation.

Public Engagement Activities and Outcomes

The City and County hosted or attended 18 in-person events during the 4-month CEAP engagement period from March to June. Formal information sessions were promoted through various City/County communication channels (website, email blasts, newsletters, social media, flyer distribution) and the pop-ups were meant to spread geographic reach and augment the information sessions by informally engaging community members at local shopping centers in areas where formal sessions did not take place.

Information Sessions

A total of nine sessions were held throughout the County to share information about the CEAP and gather feedback via interactive Mentimeter activities—3 in the City of Frederick and five in other

Frederick County jurisdictions. Eighty people attended these sessions in total and provided valuable input on the future of climate adaptability and sustainability across Frederick County and in the City of Frederick and, as detailed in Table 31.

Table 31. In-Person Public Engagement Sessions for the CEAP.

Session Location	Date	Number of Attendees
Climate Summit – City of Frederick	March 1, 2025	7
Woodsboro Bank Session	April 12, 2025	1
Años Dorados Earth Day - Centro Hispano, City of Frederick **Conducted in Spanish**	April 23, 2025	25
Brunswick Library Session	May 10, 2025	20
Evangelical Reformed United Church of Christ – City of Frederick	May 14, 2025	6
Emmitsburg Library Session	May 17, 2025	1
Thurmont Library Session	May 21, 2025	4
Middletown Library Session	May 23, 2025	10
Urbana Library Session	May 29, 2025	7

During these sessions, attendees participated in online polling and activities using Mentimeter. Respondents were asked several questions and provided answers that were then summarized into word clouds and ranked by priority. Responses are available in the Feedback section.

Pop-Ups

The primary purpose of the five pop-ups was to create a dynamic, engaging experience that would allow the Frederick team to connect with community members from across the region. The consulting team established temporary physical spaces, allowing for authentic interactions with non-traditional respondents, in a manner that traditional large open houses, teaching workshops, or other extensively planned outreach formats do not permit. These temporary set-ups are designed to generate curiosity, drawing in passersby and encouraging them to explore new offerings or initiatives they are unfamiliar with in their local area. Furthermore, these pop-ups offered an opportunity for immediate, real-time feedback, helping to understand their audience's needs and preferences in real-time.

Nine pop-up events were attended or planned by the team to increase engagement and expand the reach to target populations and a wider geography (see Table 32). The CEAP team interacted with over 435 people during these events, and shared information and materials with basic climate adaptability, sustainability, and CEAP concepts, promoted the survey, and shared the dates and locations of information sessions in case people were interested in attending to learn more.

Table 32. Public Engagement Pop-Ups for the CEAP.

Pop-Up Location	Date	Number of Interactions
One Waverley Night at Waverley Elementary School – City of Frederick **Spanish materials and speakers available**	March 26, 2025	185
H-Mart – City of Frederick **Asian supermarket**	April 17, 2025	30
Ace Hardware - Brunswick	May 9, 2025	9
Dollar General – Walkersville	May 14, 2025	13
Bike to Work Day	May 15, 2025	60
Common Market – City of Frederick	May 15, 2025	28
Asbury Health Fair – City of Frederick	May 17, 2025	40
Warehouse Cinema – City of Frederick	May 20, 2025	20
Sustainable Frederick Sustainability Social Hour - City of Frederick	June 5, 2025	40

Overall, events, such as the Centro Hispano Años Dorados Earth Day session and Waverley Elementary School pop-up event, successfully reached Spanish-speaking community members in Frederick County. Rural locations, such as Emmitsburg and Woodsboro, experienced lower turnout compared to more urban areas. Urban and commercial locations, including the Warehouse Cinema and Common Market, attracted more diverse participants and engagement.

Figure 42. Participants at the Urbana Library Information Session.

Figure 41. Participants at the Waverley Elementary School pop-up.

Survey

The CEAP survey was designed to gather public input on climate action priorities, barriers, and needs. The survey was a great call to action for public engagement and a quick and easy way for the people to provide feedback. This input was used to shape the development of the CEAP.

The survey was open from March 25 to June 15, 2025, and received a total of 662 responses. It was promoted at public meetings, local pop-up events, and on City/County websites, email communications, and social media platforms. The full survey results are available for review here.

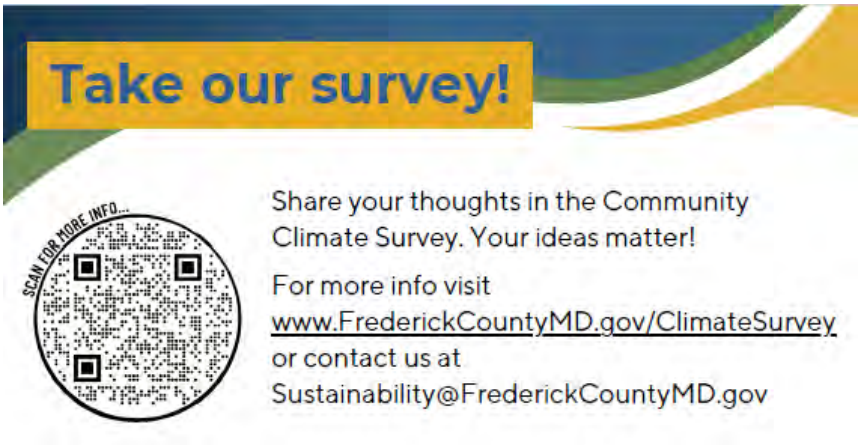


Figure 43. Example of Outreach.

Communications

The team used the existing County and City websites, distribution lists, email marketing tools, and social media platforms to share information and solicit participation and feedback during the development of the CEAP. A design theme was created for all CEAP print and digital materials, and they were cohesively branded to incorporate both County and City elements and styles.

The Frederick County CEAP webpage: www.FrederickCountyMD.gov/ClimateAction housed a link to the survey and shared the full schedule of information sessions. This page received over 2,000 views between February and July 2025.

Both the County and City sent CEAP information and calls to action for participation and feedback to their respective distribution lists. During in-person events, 33 additional email addresses were collected and added to the City and County distribution lists.

Social media was also used to promote the survey and information sessions.

Flyers were distributed to 18 places, including businesses and community centers, for display around the City and County to promote the survey and information sessions.

Feedback Received

Overall, participants were willing to engage, learn more, and provide feedback that could help improve climate adaptability and sustainability in the City of Frederick and Frederick County. The overwhelming majority of feedback was collected via the survey and highlights of those responses are summarized below. For more details regarding feedback received, please see the Public Survey Report attached to this summary.

Survey Feedback Highlights

General feedback collected via the survey indicated that the top 3 priorities for climate action in Frederick are:

- reducing urban heat (52% of respondents),
- reducing landfill waste (51%), and
- improving air and water quality (50%).

Survey participants also wanted to see the following top ranked resources in their community:

- more parks, trees, and green spaces (66% of respondents),
- more access to local or sustainable food sources (50%), and
- more recycling or composting programs (46%).

The most requested programs for Frederick to implement included:

- tree canopies, cool pavement, or other efforts to reduce heat for walking or biking (76%),
- increased local public transit service (43%), and
- education and resources about transit options (24%).

Energy Upgrades

Overwhelmingly, cost was cited as the main barrier to 1. improving home energy efficiency (74% of respondents), and 2. incorporating clean energy or low- or zero-carbon fuels in households (65% of respondents). As such, 68% of respondents indicated that financial assistance in the form of an incentive or rebate could encourage them to incorporate clean energy into their home.

Electric Vehicles

Survey responses suggest that many Frederick residents are somewhat skeptical of the environmental benefits and economic feasibility of EVs. Only about 20% of respondents prioritized expanding access to EVs and charging stations. In comparison, about 43% were in favor of Frederick implementing increased local transit services.

The survey received 11 comments related to EVs, mostly in response to the "Which of the following programs would you like to see Frederick implement?" question, with a few in the general additional comment box. Comment themes included:

- Support for EV incentives or infrastructure: A few of the commenters noted support for efforts to increase support or adoption for EVs, including preparing new homes and businesses to be EV and solar-ready and incentivizing EV vehicle maintenance and infrastructure support.

- Concerns about environmental impacts or power generation for EVs: Some commenters noted concerns that the power generation, or other requirements to support EVs may have a negative impact on the environment, even if EVs themselves are less directly impactful than gas powered vehicles.
- Opposition to EVs or public spending on them, for reliability, cost, or other reasons: A few commenters were directly opposed to the support or adoption of EVs, believing they were not reliable, too costly, not as environmentally friendly as advertised, or that it was inappropriate for government to subsidize them.

Composting and Recycling

Frederick respondents indicated high rates of waste-reduction actions in their own homes:

- 93% of respondents indicated that they regularly recycle items.
- 84% of respondents indicated that they regularly donate items instead of discarding them.
- 51% of respondents indicated that they compost.
- Between 49-63% of respondents indicated that they participate in other waste reduction actions, including avoiding single-use plastics, buying used goods, buying local food or products, repairing or reusing goods, and buying greener products with less packaging.
- 34% of respondents indicated that they do not face any barriers to taking action to reduce waste.

The survey received 76 comments related to recycling and composting, most of these in response to the "What waste reduction actions do you practice regularly?" question, with a few in the general additional comments box. Comment themes included:

- Requesting more frequent pickups: Several commenters noted that their recycling is only collected every other week; some of these commenters say this can cause storage issues or lead them to discard recyclables in the trash.
- Limitations on recyclable items: Some commenters also noted limitations on what can be recycled in Frederick, wishing there were easier ways to recycle food containers, electronics/appliances, textiles, and other items. Many also noted a need for outreach to better understand what can and cannot be recycled.
- Concerns about recycling effectiveness: Several commenters expressed concerns about the overall effectiveness of recycling, as well as the recycling process in Frederick, some are under the impression that many items end up in the landfill.
- Expanded composting options or services: Most compost-related comments were positive; some appreciated the current compost offerings, others would like to see expanded service—beyond City of Frederick—or more information about it, a few noted that storing or transporting compost materials posed a challenge and was a barrier to doing so more often.

Open Ended Comments

About 170 respondents left an additional comment as part of their survey response. The top comment themes from these responses included:

General support or positive feedback (15% of comments): These comments include general appreciation for Frederick preparing a CEAP, taking climate action, and seeking public input through the survey.

General opposition or negative feedback (13%): These include several respondents expressing a belief that climate change is not real, an opinion that public funds should not be spent on it, or skepticism about the value or effectiveness of a climate-oriented plan. Note that even for those who indicated that climate was not a priority for the region, they indicated in other sections of the survey that they were interested in the services and strategies being proposed by the plan. Many were mostly concerned about cost-of-living impacts, tax increases, and competing funding priorities.

Support for improved and protected green spaces and natural habitats (11%): These commenters wish to see the CEAP prioritize the preservation or increase of green space, native plants, and other natural habitats as a key feature of the CEAP.

Concern about costs as a barrier to taking action (11%): These comments broadly spoke to the current economic situation and how high costs of energy bills, food, housing, and other daily necessities are a barrier to taking more progressive actions.

Suggestions for regulatory and code changes (10%): These comments spanned a wide range of code suggestions but focused on 1. removing rules-based barriers to solutions and 2. Adding more guard rails around sources of pollutants. For example, a few community members noted how codes that intend to do good for preserving Frederick's historical buildings actually prevent energy upgrades. Others cited limitations for home improvements from HOAs. On the other hand, some community members voiced support for restricting or banning pesticides and herbicides—like glyphosate—and expanding air quality efforts like idling restrictions.

Other comment topics included:

- Suggestions for targeted improvements and praise for the existing recycling program. (9%)
- Support and suggestions for improvements to public transit and other car-free transportation options. (8%)
- Calls to limit the development of new housing and data centers to lessen future environmental impacts and maintain Frederick's historic character. (6%)
- Requests for other resources or learning opportunities related to the CEAP. (5%)
- Calls to keep the CEAP actions simple, objective, and targeted for achievable outcomes given conflicting priorities related to current political and economic challenges. (4%)

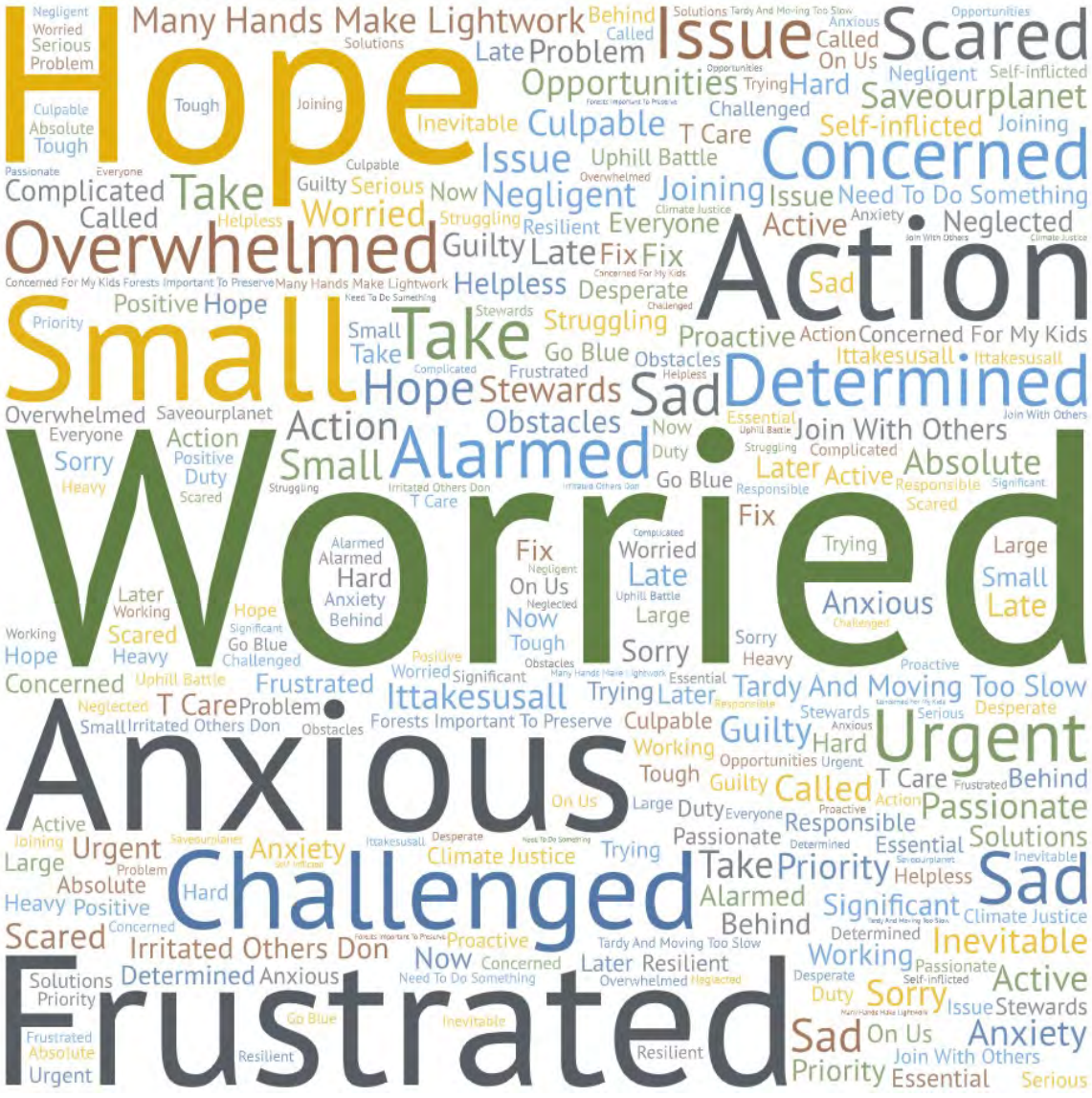
In-Person Session Highlights

The nine In-Person Engagement events included interactive activities and conversations to capture participants' feelings about climate action and priorities for climate action in the region. The following section summarizes the responses and aggregates the rankings that were captured during these sessions. In total, 42 responses were captured in Mentimeter (digital live polling tool) were

analyzed by the CEAP team and integrated throughout the report along with comments from the other attendees who may not have participated in the polling (81 participants attended total).

When asked, "How do you feel about climate change and the role we play in addressing it?" Participants were primarily feeling worried and anxious, but still hopeful, while acknowledging that everyone has a role to take action, even if it is small. See word cloud of responses in Figure 43.

Figure 44. Word Cloud of CEAP Session Responses to "How do you feel about climate change and the role we play in addressing it?"



When the CEAP team asked participants, "What is your top priority for climate action in Frederick?" The most responses supported the following themes:

- Making public transit and EV charging more accessible. (14 responses)
- Transitioning to cleaner and more efficient energy systems. (13 responses)

- Planting more trees and native plants. (11 responses)

Participants also noted that they think increased public awareness and access to solutions is a priority for the CEAP and that they value starting conversations to educate about climate issues in Frederick (10 responses). Participants also indicated that they want Frederick to continue their efforts to reduce climate hazards like heat and stormwater runoff (8 responses) while sticking to their GHG reduction commitments (5 responses).

Participants were then asked to rank the following action categories in order of 1 (most important) to 10 (least important) to answer the question *Which of the following programs would you like to see Frederick implement?*

Figure 45 demonstrates the order of importance ascertained from the rankings across all sessions. Rankings of 1 gave the category a score of 10, and scores decreased by 1 point as the ranking decreased until ranking of 10 which gave the category a score of 1. From there, scores were added up across all rankings and categories to give the following distribution. Individual counts of rankings can be seen in Figure 46.

Figure 45. Prioritization Rankings Across CEAP Session Response.

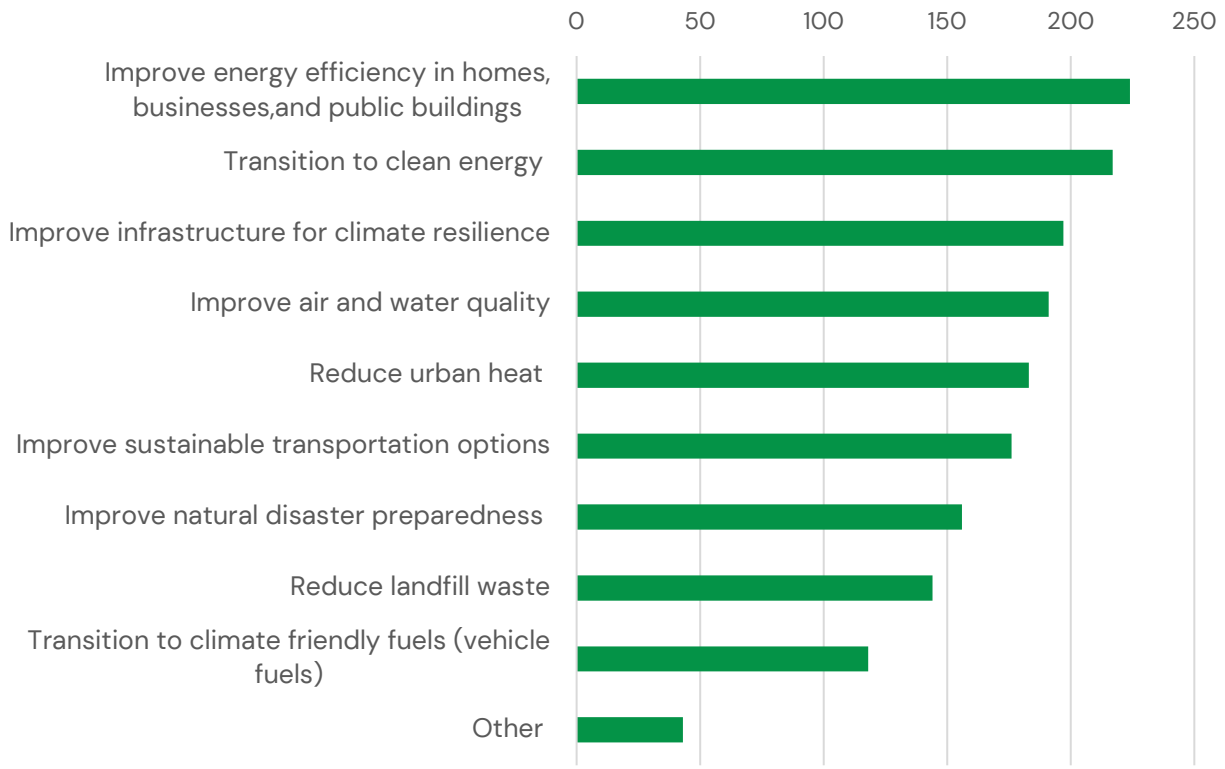
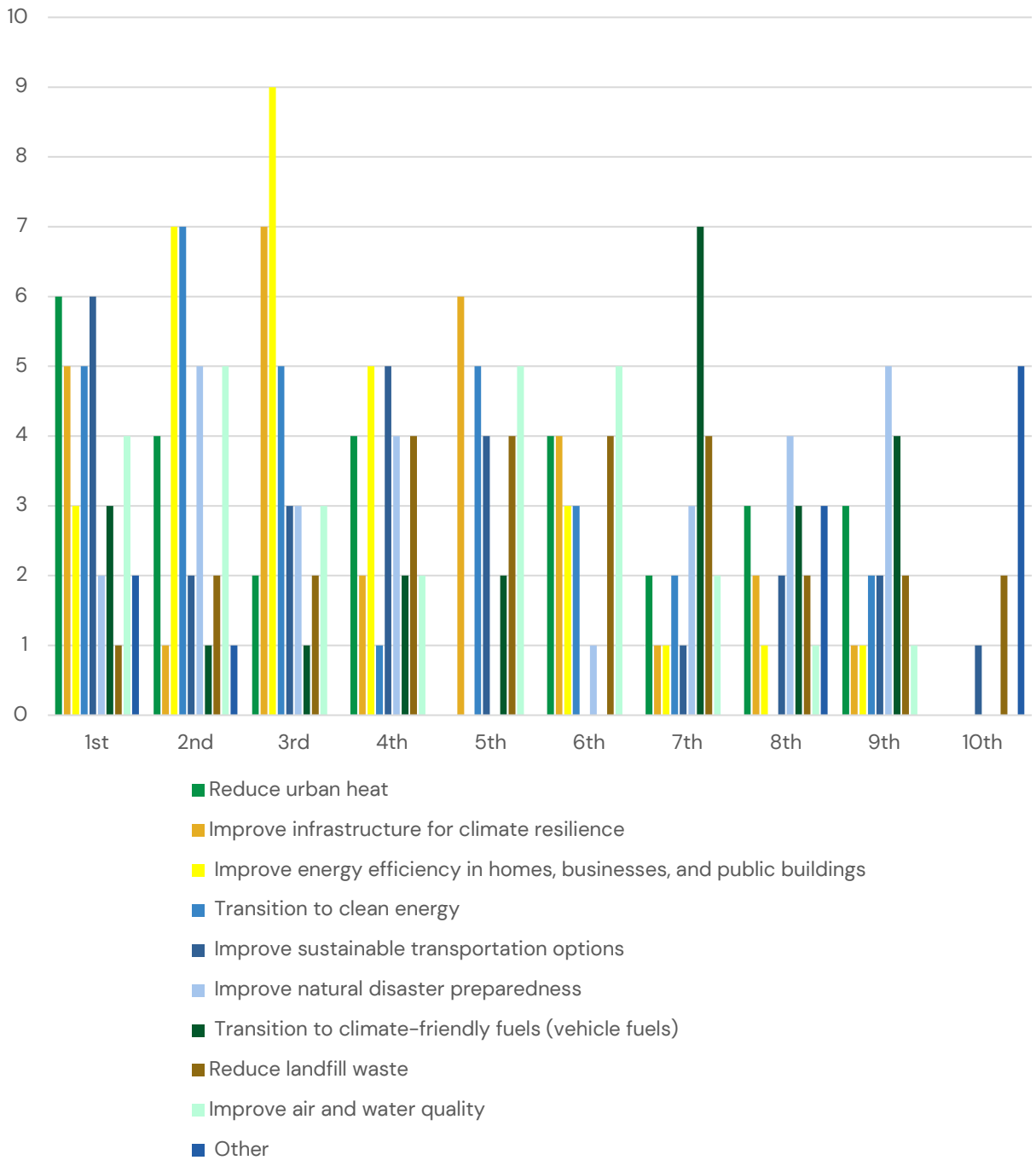


Figure 46. Frequency of Rankings for Climate Solutions (1st highest priority- 10th lowest priority).



These findings broadly support the findings from the survey and other engagement opportunities. The highest priority actions for community members relate to energy efficiency and clean energy in the built environment while other categories like reducing waste and EV preparedness fall lower on the priority list. This may be because respondents in the in-person sessions were generally aware of the County and City's efforts in waste and transportation, so those actions are seen as already ongoing and thus not a planning priority for the purpose of this plan.

The CEAP team asked participants What ideas for programs do you have that aren't on the list? Participants focused primarily on infrastructure solutions—like building bike lanes, electrifying buses, expanding composting services, and building microgrids—but also noted some policy ideas. These included the following:

- Using students as ambassadors for climate action.
- Creating data dashboards and other resources for homeowners looking into sustainable solutions.
- Cultivating opportunities for better climate education and outreach.
- Leveraging climate solutions to improve outcomes for food security.
- Activating other local and government actors for funding support.
- Incentives like rebates for clean energy production, micromobility, tree planting, rain gardens, and more.

Finally, during pop-up engagement, most commentary on the CEAP was captured in the survey results above. However, in passing conversations, the number one takeaway from all pop-ups was the need for economic support and relief for the public. This includes anything from new energy sources, grants, fiscal programs and job resources for newly unemployed community members who have been impacted by federal layoffs or funding cuts.

Public Comment Period

The City of Frederick and Frederick County held a public comment period to solicit feedback on the draft CEAP from August 11-August 31, 2025. Public comment was initially slated to close on August 22, but the City and County opted to extend the period in response to feedback received and requests for more time to review the plan. In total, 26 comments and 19 emails were submitted through the public comment portal.

Public input revealed divergent viewpoints on climate action—from outright rejection to strong support. Across perspectives, several common themes emerged: a call for transparency and accountability (especially around data centers); fiscal responsibility; attention to equity; the need for visible, tangible steps moving forward; and simpler Plan language with clearer, more accessible actions for residents to implement.

General Perspectives

- **Supportive** voices described the CEAP as thoughtful, comprehensive, and timely, emphasizing the importance and necessity of local leadership addressing climate change and building community resilience.
- **Mixed perspectives** were the most common, in which residents voiced agreement with the overall goals but also raised concerns or suggestions for plan improvement.
- **Skeptical** voices questioned whether Frederick County's actions are needed or can meaningfully affect global climate trends, with some describing the plan as unrealistic. Concerns were also raised about costs, taxes, and potential burdens on businesses or residents. Some expressed frustration that the plan overreaches or conflicts with practical realities.

- **Technical feedback** included clarifications, editorial suggestions, and requests for greater transparency in the plan's structure and communication.

Summary of Key Themes

1. **Data Centers**
    - Data centers were mentioned extensively in public comments, with concerns centered on diesel backup generators, air quality, and transparency of reporting.
    - Residents questioned whether data center growth is consistent with the County's climate and energy goals, and several requested independent, third-party monitoring of emissions.
    - Others urged the County to ensure stricter land-use policies and clearer accountability measures before expanding or approving additional facilities.
2. **Transportation and Electric Vehicles**
    - Supporters highlighted EV adoption as an important step toward reducing emissions.
    - Others raised skepticism about EV feasibility, citing vehicle cost, charging infrastructure, and energy grid reliability as major barriers.
    - Some commenters expressed concerns that EV requirements could disproportionately affect small businesses or residents with limited resources.
3. **Solar Energy and Land Use**
    - Many residents supported rooftop and parking lot solar as preferable to large ground-mounted systems.
    - Concerns were noted about the expense of residential solar, tree removal, and roof replacement requirements.
    - Suggestions included requiring or incentivizing solar on new housing developments and prioritizing solar installations on public buildings.
4. **Resilience, Watershed, and Stormwater Management**
    - Suggestions included stronger emphasis on flood protection, drought planning, watershed health, and drought-resistant agriculture.
    - Several residents encouraged aligning the CEAP with state resilience standards and emergency management planning.
5. **Costs, Taxes, and Economic Impacts**
    - Economic concerns were a consistent theme, with commenters worried about increased taxes or financial burdens.
    - Others countered that climate action is an investment that can save money in the long term, create jobs, and strengthen resilience.
6. **Equity, Accessibility, and Engagement**
    - Several comments emphasized that climate benefits (trees, green space, solar access) must reach low-income and underserved communities, not just wealthier neighborhoods.
    - Deeper partnerships with Frederick County Public Schools and Frederick Community College were suggested to build climate literacy and community participation.

- Feedback also called for a readable and accessible final document, with plain-language summaries, visuals, and multilingual options.

Summary of Major Edits Made to Address the Comments Received

The City of Frederick and Frederick County worked to incorporate as many of the public comments received as possible into the final CEAP, particularly in areas of broad consensus across a number of commentors. The most significant edits made fell within the following thematic categories:

- A greater acknowledgment of the impacts of the current federal administration: In response to a number of public comments provided, the final plan more directly addresses the challenges posed by the Trump administration's actions to roll back funding and programs for clean energy, energy efficiency, EVs, resilience, and sustainability, as well as what actions can still be taken to advance local climate work.
- Data centers: The final plan acknowledges the challenges posed by data centers and the regional work being done to address those challenges earlier and more directly in response to public comments calling for more action and transparency in this area.
- Executive summary: The final plan includes a significantly more detailed executive summary to ensure that readers can understand the plan highlights at a glance: the findings of the GHG modeling and CRVA conducted during the plan's development; a more detailed summary of the recommended strategies and their potential impacts; and a greater acknowledgment of key issues Frederick currently faces in implementing the plan, including the impact of the current federal administration and data centers.
- Sector-specific additions: Where consensus emerged across a number of commenters about the strategies recommended for specific sectors and those recommendations were feasible within broad budgetary and capacity constraints, the City of Frederick and Frederick County synthesized and updated the recommendations in response. For example, the final plan includes several additions to the Natural and Working Lands section in response to commonality across comments received.

Advisory Groups and Technical Expertise

As part of developing the CRVA and resilience strategies, the City and County facilitated two meetings of the Risk & Resilience Advisory Group. The purpose of the first meeting, held virtually in January 2025, was to hear first-hand from stakeholders about their experiences of climate hazards in Frederick and to get an idea of the types of climate action they would support or that they think the City and County should implement. Following an informational presentation from the CEAP team about the CRVA research process, the Advisory Group used Mural to reflect on their experiences with climate hazards in Frederick and brainstorm ideas for climate action. The purpose of the second meeting, held hybrid in April 2025, was to solicit feedback from the same group of stakeholders regarding the draft list of resilience strategies and actions for the CEAP. The Advisory Group considered the costs, benefits, feasibility, and resilience impact of each strategy, based on their on-the-ground understanding of localized conditions. The Advisory Group responded to the draft list using Mural, and the CEAP team used this feedback to prioritize strategies and actions.

To develop the mitigation strategies and actions, the City and County facilitated two meetings with internal and external stakeholders, including Comprehensive Planning, Public Works Department, Department of Economic Development, Department of Permits and Inspections, Transit Services of Frederick County, Mobilize Frederick, Division of Energy and Environment, Office of Agriculture, Division of Water and Sewer Utilities, Department of Stormwater, Parks Division, and Solid Waste & Recycling. At these meetings, attendees used Mural to discuss feasibility, implementation barriers and considerations, and inclusion of several potential strategies and actions across the six modeled sectors. Attendees also had the opportunity to suggest additional actions. Worksheets with the same framework as the Mural board were sent to additional members from the above offices and external stakeholders, such as major employers within the County, to seek comments and feedback from anyone unable to attend the live meetings. The mitigation strategies and actions that were ultimately included in the CEAP were selected based on the feedback from these meetings and worksheets, prioritizing those that had higher levels of agreement across stakeholders, lower implementation barriers, and higher level of authority to implement by the local governments

Continuing Climate-Related Engagement

The CEAP team worked diligently to incorporate as many of the creative solutions, thoughtful suggestions, and key priorities that community members shared over four months into the CEAP. However, this effort is just the start. As the City and County move beyond the outreach efforts conducted during this phase of the CEAP process, engaging community members and experts on climate will continue to drive progress on climate action across Frederick.

Maintain Existing Connections

The CEAP team gained significant traction with the community over the past few months, which can support the implementation of the strategies proposed in the report. To maintain this momentum, the City and County will find ways to continue these community conversations. This could involve scheduling follow-up meetings with community members who have expressed interest in being involved in the CEAP development process; establishing targeted conversations at local homeowners' associations; or attending community events such as farmers' markets, local fairs, and festivals to continue to share climate and sustainability information and program offerings. The City and County also developed a group of experts that advised on the CEAP development process, and these individuals will remain important partners in the climate action ecosphere in Frederick.

Expand Virtual Outreach

Another pathway to invest in while the team transitions from the CEAP focused engagement period to what comes after the CEAP is finalized and published is to invest time and effort in utilizing virtual communication methods. While the CEAP team reduces its in-person outreach, there is an opportunity to redirect that time and effort into emails, social media, and virtual meetings with community members. Virtual communication is more economical than in-person events, while still allowing for open communication and engagement. Keeping the community informed about the current phase, next steps, and what climate/sustainability programs and obviatives are active and available to the public will show progress is being made because of the CEAP.

Evaluate Feedback for Implementation

The CEAP team will continue to evaluate its successes and learning points, which enables the project team to identify what works best for the Frederick region to enhance its communication abilities. After receiving over 650 survey results, there is significant interest in what happens next and how that pathway is determined. Utilizing this genuine interest, the CEAP team has the opportunity to work with the community to gain insights into what has worked well previously, as well as what is needed moving forward.

Appendix B: Methodologies

At the foundation of the CEAP is a data-driven, engagement-lead assessment. This plan includes some original analysis as well as literature reviews of previous plans and assessments that have already been completed for the region.

Climate Risks and Vulnerability Analysis

Approach to Assessing Climate Risks and Vulnerability

The project team combined the findings from literature review, input from community engagement, and results from the extreme heat vulnerability analysis, to develop a comprehensive picture of key climate risks affecting the communities in Frederick. The individual components of this analysis are described below.

Building on Existing Climate Studies to Identify Hazards & Risks

The team reviewed the resources in Table 33 to inform the structure and direction of the assessment and determine significant climate risks and community values. As a result, the team selected four **primary climate hazards of concern – extreme heat, flooding, drought, and winter storms**, as well as a set of key **community resources** to understand and organize the risks from these climate hazards. Community resources include both infrastructural assets as well as aspects that impact people's health and well-being (Table 34). The team then identified a preliminary list of risks for each hazard and incorporated input from the County and City staff and members of the CEAP Risk and Resilience Advisory Group to refine the key risks.

Table 33. List of reviewed Frederick County and City resources for the CVRA.

Jurisdiction	Title	Purpose
County	2023 Frederick County Climate and Energy Action Plan for Internal Government Operations	Reviewed to identify primary hazards
City	2021 City of Frederick Climate Action Plan	Reviewed to identify primary hazards
City & County	2021 Frederick County and City Climate Response and Resilience Draft Report	Reviewed to identify primary hazards and to identify community resources
City	2020 City of Frederick Comprehensive Plan	Reviewed to identify community resources
County	2019 Livable Frederick Master Plan	Reviewed to identify community resources

Table 34. Frederick community resources at risk from climate change impacts.

Infrastructure and Built Environment	Health and Well-Being
• Transportation • Water, Sewer, and Stormwater • Energy • Houses, Buildings and Facilities	• Human Health & Safety • Economy and Livelihoods • Natural and Cultural Resources • Emergency Management and Response

The Future Trends sections within each of the primary climate hazards relies on climate projections to better understand the future potential of each climate hazard. The climate projections provided are derived from the Coupled Model Intercomparison Project Phase 5 (CMIP 5), which simulates future climate conditions based on a set of possible emissions scenarios. The projections particularly included in the Extreme Heat and Heavy Precipitation & Inland Flooding sections are based on a low-emission scenario (where humans dramatically reduce and then stabilize global greenhouse gas emissions, referred to as RCP4.5) and a high emissions scenario (where emissions continue to increase through the end of the 21st century, referred to as RCP8.5).

Community and Expert Engagement

During the first Risk and Resilience Advisory Group meeting, participants shared personal experiences with the four main climate hazards, as well as reflections on current climate resilience work ongoing in Frederick to supplement the CEAP team's literature review. The CEAP team developed an online, interactive flood location mapping tool to solicit feedback from community members on known locations of past flooding and associated impacts on communities. During the second Risk and Resilience Advisory Group meeting, participants provided feedback on a draft list of resilience strategies and actions. The CEAP team used this feedback to finalize the strategies and actions as they appear in this document.[9]

Vulnerability Analysis for Extreme Heat

To supplement the review on extreme heat risk, the project team carried out an indicator-based spatial analysis to evaluate vulnerability to extreme heat within Frederick. The analysis identified areas that are more vulnerable to extreme heat based on a set of indicators that either raise or reduce vulnerability. Indicators were scored, weighted, and combined into a **Heat Vulnerability Index (HVI),** with a vulnerability score assigned to each census block group within the county. Preliminary findings from this analysis were also presented during the first meeting of the Risk and Resilience Advisory Group to ensure that quantitative findings matched with participants lived experiences of heat in Frederick.

The HVI considers three dimensions of vulnerability – exposure, sensitivity, and adaptive capacity.

[9] Inputs received through the interactive flood location mapping tool will be included in the final CRVA chapter of the final CEAP Report.

- **Exposure:** Indicates the extent to which communities may encounter and experience extreme heat. Higher exposure could lead to more negative impacts on human health and well-being, as well as cascading socioeconomic impacts, such as lowered productivity or missed workdays. Land surface temperature was used as the key indicator to understand heat exposure, especially due to its relation to the urban heat island effect.
- **Sensitivity:** Indicates the susceptibility of communities to negative impacts in the event of extreme heat exposure. Certain population groups are known to be more prone to experiencing adverse health impacts from extreme heat exposure, including the elderly, young, those with preexisting health conditions, and those who are socially or economically disadvantaged.
- **Adaptive Capacity:** The ability for communities to withstand, adjust to, or respond to extreme heat exposure and its impacts. For example, resources such as shade trees, the availability and access to cooling facilities can help vulnerable people withstand heatwaves and reduce exposure to extreme heat.

Table 35. Indicators and data sources used in Frederick County HVI.

Exposure Indicator	Source
Average land surface temperature	U.S. Census Bureau
Sensitivity Indicators	**Source**
Proportion of children under 5 years of age	U.S. Census Bureau
Proportion of people 65 years of age or older	U.S. Census Bureau
Proportion of people in poverty	U.S. Census Bureau
Proportion of minority (non-white) population	U.S. Census Bureau
Proportion of people with disabilities	U.S. Census Bureau
Proportion of people without health insurance	U.S. Census Bureau
Proportion of people without access to a car	U.S. Census Bureau
Proportion of Asset Limited, Income Constrained, Employed (ALICE) households	Frederick County GIS database
Adaptive Capacity Indicators	Source
Distance to cooling facilities[10]	Frederick County GIS database
Precent tree canopy cover	Chesapeake Bay Program Land Use Data

BAU Analysis

The CEAP team developed BAU emissions projections to estimate how emissions could change through 2050 if no new climate policies or programs are implemented beyond those already in place. These projections used 2018 as the base inventory year and incorporated historical data from

[10] Cooling facilities include libraries, shaded park facilities, and community recreation centers.

2019 to 2023 where available. Emissions forecasts were based on a combination of historical trends, existing forecasts, literature review findings, and input from County staff. Sector-specific methods and assumptions are summarized in Table 36.

Table 36. BAU Methods and Assumptions by Sector.

Sector	Key Assumptions
Residential Buildings	Projected energy consumption from existing buildings were based on trends from EIA AEO, a data set that describes potential long-term energy trends in the United States. Projected energy consumption from new construction was assumed to grow with projected household growth and EUIs were held constant at current building codes (2021 IECC). It was assumed that new buildings would not use fuel oil or propane.
Commercial Buildings	Projected energy consumption from existing buildings was based on trends from AEO Table 2. Projected energy consumption from new construction was assumed to grow with projected household growth and EUIs were held constant at current building codes (ASHRAE 90.1-2022). It was assumed that new buildings would not use fuel oil or propane.
Data Centers	Projections were developed separately due to the high energy demands anticipated from several approved facilities. The square footage from existing and planned data centers (except the 2 GW campus) was multiplied by an energy use intensity (EUI) of 525 kWh per square foot, derived from data published by Dominion Energy for Loudoun County, VA, in its 2023 Integrated Resource Plan (IRP) and other presentations. For the 2 GW campus, which is expected to be fully operational by 2025, the available capacity was assumed to increase linearly to 2 GW through 2035 starting in 2026. A capacity factor of 60% was applied to the available capacity each year to estimate the annual electricity consumption in kWh from that capacity. This means that on average, the data center campus was assumed to use power at 60% of its full capacity. The 60% capacity factor was derived based on a report from Lawrence Berkeley National Lab (LBNL), which showed server utilization for hyperscale and AI training data centers in the 50-80% utilization range. The actual capacity factor of the data center campus will depend heavily on what the servers are actually used for. The electricity consumption was then multiplied by Maryland's electricity emission factor to estimate projected emissions.

Sector	Key Assumptions
	This methodology is consistent with the MWCOG CCAP data center projection methodology at the time of modeling.
On-Road Transportation	Projections were based on MOVES4, which incorporates IRA tax credits and federal fuel efficiency standards.
Off-Road Transportation	Projections for non-road vehicles were based on MOVES4. Projections for aviation were based on the MWCOG methodology through 2030, then aligned with EIA AEO Table 2 forecasts. Projections for commuter rail were based on the MWCOG methodology through 2030, then aligned with forecasted freight indicators from EIA AEO Table 7.
HFCs	Projections incorporated GHG reductions associated with the federal AIM Act, assuming the following schedule for refrigerant global warming potential (GWP) reductions in new equipment purchases: 40% by 2025, 70% by 2029, 80% by 2030, and 85% by 2050. A 20-year equipment lifespan was assumed.
Fugitive Natural Gas	Projected emissions were based on natural gas consumption from buildings and CNG consumption in the transportation sector. A leakage rate of 0.88% was assumed, consistent with EPA guidance.
Waste	Projected emissions from landfills were based on population growth. Projected emissions from septic and sewer systems were based on MWCOG's methodology through 2030. For years beyond 2030, emissions were assumed to grow with population and the population share using septic and sewer systems were assumed to remain constant.
Agriculture	Projections were based on historical state-level trends in livestock population and fertilizer use.
Natural & Working Lands	Projections were based on historical land cover trends using Chesapeake Bay Program Land Cover Data.
Electricity	Projections were based on the eGRID 2022 emission factor for the RFCE subregion and forecasted emissions intensity trends for the PJME region from EIA AEO Table 54.

Developing Strategy for the CEAP

The CEAP includes mitigation and resilience strategies that fall under sectors organized by GHG emissions sector and resilience goal sector (Table 37).

Table 37. Strategy Sectors for Mitigation and Resilience.

GHG Emissions Sector	Resilience Goal Sector
Transportation	Infrastructure and Built Environment (IBE)
Buildings	Health and Well-Being (HW)
Power	Emergency Management and Resilience (EMR)
Waste	
Agriculture	
Data Centers*	

Within each strategy, there are actions with pinpoint more granular ways in which Frederick and community members can advance the strategies. Definitions for strategies and actions are included below:

- **Strategy:** Broad method for decarbonization that may include multiple implementation actions.
- **Action:** Individual implementation steps that support the Strategy. Many build off or expand upon existing initiatives.

All strategies put forward in the CEAP are representative of existing strategies in climate plans from Frederick, neighboring counties, the MWCOG region, and the state of Maryland (see Table). These strategies and actions pulled from these plans were tailored through a multi-party iterative process to address the following factors:

1. The biggest sectors and opportunities for GHG emissions reductions (mitigation strategies).
2. The hazards and resilience goals identified through the CRVA and a literature review of existing resilience plans for Frederick.
3. Public and working groups input on priorities, needs, and limitations for strategy implementation.
4. The County and City's Sustainability Offices review for alignment with existing programming, funding opportunities, and potential implementing partners.

After tailoring the strategies and actions for the final list of strategies, the following elements were determined by the CEAP team:

- **GHG emissions reduction potential** (<500,000 MT CO_2e, 500,000- 1 million MT CO_2e, >1 million MT CO_2e): Estimates came from GHG reduction potential by sector calculated for the CEAP. These projections were done by sector rather than individual strategy as many strategies are contingent on full implementation for sector reductions.

- **Hazards Addressed/Co-Benefits:** These inputs were established in the Climate Risk and Vulnerability Assessment by the consultant team and verified by the Advisory Group and the City and County Sustainability offices.
- **Investment level** ($, $$, $$$): Estimates come from the consulting team and the City and County Sustainability Offices' based on previous project costs and currently budgeted items. Each strategy includes an estimated investment level, reflecting both capital and operations and maintenance costs. While these estimates are preliminary, they provide a useful indication of the financial resources required and help guide funding and budgeting decisions.
- **Timeline for Implementation** (near, medium, and long-term): Estimates come from the consulting team and the City and County Sustainability Offices' based on previous project timelines and currently planned regional actions.
- **Contributors/Implementing Partners**: Partners listed were selected from the review of previous climate and energy plans in existence for the region, suggestions from the working group and public engagement, and knowledge of government agency responsibilities and ongoing programming. Partners listed in this section are not formally committed at this stage but are well-positioned to support implementation based on their expertise, resources, and alignment with the plan's objectives.

***Data Center Strategy:** The specific actions under the Data Center strategy are under development in collaboration with other regional actors like MWCOG. MWCOG is currently working with government and industry entities across Northern Virginia and Maryland to solidify a joint action plan under the MWCOG Comprehensive Climate Action Plan (CCAP), to be published in December 2025. The action categories described in the CEAP data center strategy are representative of the action plan that will be published in the CCAP which was vetted by local stakeholders and energy experts. Frederick County will continue to pursue legislative and policy action aligned with these efforts for a stronger regional coalition for best practices in data center development.

Table 38. Existing sources used to develop the CEAP's strategies and actions.

Strategy	Action	Source
Mitigation Strategies		
B1: Accelerate Deep Building Energy Efficiency and Electrification.	B1.1 Encourage energy audits and increase outreach and education about energy-efficiency financing opportunities.	CRRR City of Frederick Climate Action Plan (Government Operations)
	B1.2 Explore the potential for networked geothermal heating in new development.	Maryland PCAP
	B1.3 Launch a "solarize" style campaign for heat pumps and other renewable thermal technology.	CRRR CEAP Advisory Group

Strategy	Action	Source
	B1.4 Provide training and education for current and incoming contractors, so they are well equipped to install and maintain clean technologies.	City of Frederick 2020 Comprehensive Plan
	B1.5 Encourage and financially support the installation of weatherization and energy-efficiency measures.	CRRR
P1: Accelerate Development of Distributed Renewables and Battery Storage.	P1.1 Encourage installation of solar on developed sites and planned growth areas, including commercial, multifamily residential, and mixed-use development, parking canopies, and bus stop and bike shelters.	CRRR
	P1.2 Promote private solar installations through the solar co-op program, streamlined permitting, and expanding access for low-to-moderate-income (LMI) community members.	CRRR
	P1.3 Promote agrivoltaics and support interested farmers in navigating solar opportunities	CEAP Advisory Group
T1: Reduce Emissions from On-Road Light-Duty Vehicles.	T1.1 Review and streamline the permitting process for EV charger installation.	MWCOG PCAP Maryland PCAP
	T1.2 Promote regional or bulk EV charger purchases.	MWCOG PCAP Maryland PCAP
	T1.3 Install public Level 2 and DC fast EV charging at government facilities, in commercial parking lots, workplace parking lots, and/or at dedicated charging stations.	MWCOG PCAP Maryland PCAP
	T1.4 Ensure dealers and dealerships are well equipped and trained to promote EVs.	CEAP Advisory Group
	T1.5 Assign roles for EV implementation based on the EV Public Engagement Plan.	CEAP Advisory Group
T2: Reduce Vehicle Miles Traveled.	T2.1 Implement the proposed bike and pedestrian improvements.	Let's Move Frederick - Bicycle and Pedestrian Plan

Strategy	Action	Source
	T2.2 Implement the transit frequency and service expansions outlined in the Frederick County Transit Development Plan.	Let's Move Frederick - Bicycle and Pedestrian Plan
	T2.3 Provide e-bike incentives to county residents	Let's Move Frederick - Bicycle and Pedestrian Plan
	T2.4 Support population growth with new housing developed in communities that are walkable, bikeable, transit-supportive, and mixed-use.	Let's Move Frederick - Bicycle and Pedestrian Plan
W1: Encourage Waste Diversion.	W1.1 Establish a countywide curbside composting program.	City of Frederick 2020 Comprehensive Plan
	W1.2 Connect restaurants and other food vendors with resources to better handle food waste, such as apps that help sell surplus food or food recovery and redistribution programs.	CRRR
A1: Reduce Methane Emissions from Livestock.	A1.1 Include 3-NOP and Monensin in livestock feed to reduce methane emissions.	CEAP Advisory Group
	A1.2 Explore opportunities for increasing adoption of anaerobic digestors for manure management.	City of Frederick Climate Action Plan (Government Operations)
A2: Reduce Emissions from Agricultural Soils.	A2.1 Encourage tillage management such as reduced or no-till practices if replacing conventional tillage practices.	Maryland PCAP
	A2.2 Encourage nutrient management strategies such as enhanced efficiency fertilizers, nitrification inhibitors, controlled-release fertilizers, variable rate technology, and split N application.	Maryland PCAP
	A2.3 Decrease nitrogen from cropland or livestock production activities entering waterways.	Maryland PCAP
NWL1: Conserve and Expand Urban Tree Canopy.	NWL1.1 Create a 5-year tree maintenance plan that ensures the upkeep of trees planted through existing volunteer programs.	City of Frederick 2020 Comprehensive Plan MWCOG PCAP

Strategy	Action	Source
		Maryland PCAP
NWL2: Conserve and Manage Natural Resources.	NWL2.1 Promote landscaping on existing turf grass that requires minimal resource application of fertilizers and irrigation, (e.g. zero-scaping).	CRRR
	NWL2.2 Promote planting and maintenance of native grassland species on existing turf areas.	Maryland PCAP
Resilience Strategies		
IBE1: Reinforce Transportation Infrastructure.	IBE1.1 Identify and test new pavement technologies and mixtures more resistant to flooding and extreme heat impacts.	CRRR
	IBE1.2 Adopt more aggressive codes to limit impervious surfaces and require the use of pervious pavements, especially in publicly funded projects.	CRRR
IBE2: Enhance Resilience in Water Supply.	IBE2.1 Address agricultural water shortages by assessing demand and building capacity to increase the use of reclaimed water sources for irrigation.	CEAP Advisory Group CRRR HMCAP
	IBE2.2 Encourage land management practices to increase soil and organic matter for water storage through education and incentives.	CEAP Advisory Group CRRR HMCAP
	IBE2.3 During severe droughts and periods of extreme heat, ensure underserved communities have access to safe and affordable water supply.	CEAP Advisory Group CRRR
IBE3: Accelerate Green & Resilient Infrastructure.	IBE3.1 Promote existing programs and develop new programs and incentives that encourage nature-based solutions and resilient infrastructure for new developments.	Frederick County CEAP (Government Operations) Howard County Climate Action & Resiliency Plan
	IBE3.2 Conduct awareness campaigns that provide education and training on	Frederick County CEAP (Government Operations)

Strategy	Action	Source
	incorporating resilient infrastructure and nature-based solutions.	Howard County Climate Action & Resiliency Plan
	IBE3.3 Use equity indicators to prioritize nature-based solutions and resilient infrastructure in areas with disadvantaged communities.	Howard County Climate Action & Resiliency Plan
	IBE3.4 Update building codes to reflect specific resilience improvements and enforce updated building performance standards.	Howard County Climate Action & Resiliency Plan
HW1: Increase Urban Green Spaces.	HW1.1 Increase tree canopy, shade structures, and natural areas around schools, buildings, sidewalks, parking lots, and other areas with high pedestrian traffic.	Frederick County CEAP (Government Operations) Howard County Climate Action & Resiliency Plan CEAP Advisory Group
	HW1.2 Build on existing heat mapping and data collection work by conducting a gap analysis of current heat and tree canopy datasets to both identify further research needs and to prioritize sites for tree planting and urban green spaces.	Howard County Climate Action & Resiliency Plan
HW2: Protect Worker Health and Safety.	HW2.1 Pass legislation protecting indoor and outdoor worker rights, including implementation of weather monitoring, emergency response procedures, and heat training.	Cal/OSHA Heat Illness Prevention Standards
HW3: Increase Access to Cooling Infrastructure.	HW3.1 Identify opportunities to increase mobility and access to parks, open spaces, cooling centers, and emergency shelters.	Howard County Climate Action & Resiliency Plan City of Frederick Comp Plan
	HW3.2 Create new opportunities for cooling activities in the summer, such as community sprinklers, fountains, splash pads, and increasing public access to community pools and waterways.	CEAP Advisory Group

Strategy	Action	Source
HW4: Enhance Food System Resilience.	HW4.1 Expand food banks and distribution networks in vulnerable communities.	CRRR
	HW4.2 Conduct a food waste assessment to identify the types and quantities of food that are thrown away and create an educational program that raises awareness among communities and businesses about proper buying, storing, and disposal methods to reduce food waste.	Sustainable D.C.
EMR1: Connect People to Resources.	EMR1.1 Leverage existing tools and datasets to identify the most climate-vulnerable communities and continue leveraging relationships with community organizations and leaders to build on previous work connecting community members with resilience resources.	Frederick Hazard Mitigation and Climate Adaptation Plan
EMR2: Increase Education and Awareness.	EMR2.1 Conduct community engagement and workshops to increase awareness on climate change risks and develop shareable information materials.	CEAP Advisory Group

Appendix C: Existing Climate and Energy Plans in Frederick

Table 39. Existing Climate and Energy Plans in Frederick.

Jurisdiction	Title	Description
County	Community-wide Electric Vehicle Readiness Plan (2023)	Provides a framework for an ever-evolving network of EV charging infrastructure necessary to sustain EV market growth in the region. Outlines a comprehensive approach to prepare the county's community for the increasing adoption of EVs, including the development of EV charging infrastructure, policies to support EV deployment, community engagement to raise awareness about the benefits of EVs.
County	Climate and Energy Action Plan for Internal Government Operations (2023)	Aims to lead by example in reducing emissions from County operations and set an example for the wider community by achieving a 50% reduction by 2030 and reaching net-zero emissions by 2050. Key initiatives include upgrading County buildings with energy-efficient technologies, increasing the use of renewable energy sources, transitioning the County's vehicle fleet to EVs, and reducing county employee waste generation.
County	Hazard Mitigation and Climate Adaptation Plan (2022)	Provides an assessment of Frederick's vulnerability to natural hazards, identifies critical areas for risk reduction, and proposes both immediate and long-term strategies to enhance community resilience. Key hazard mitigation and climate adaptation actions include strengthening building codes, improving flood management infrastructure, incentivizing nature-based solutions on municipal-owned buildings and facilities, updating Frederick County's evacuation plans, expanding flood analyses, and calling for the creation of this CEAP.
City	Let's Move Frederick Plan (2022)	A multi-modal mobility plan aimed at enhancing the bicycle and pedestrian infrastructure in the City of Frederick. Builds off the 2009 Frederick Shared-Use Path Network and aligns with the City's Comprehensive Plan. Outlines the creation of a city-wide walking and bicycling network prioritizing

Jurisdiction	Title	Description
		connectivity, safety, comfort and equity. Guided by the Comprehensive Plan's aim to reduce VMT, encourage bicycling and walking, and reduce traffic congestion.
County	Transit Development Plan (2022)	Identifies current mobility and transit services in Frederick County, proposes areas for improvement, and provides short-term and long-term strategies to enhance the efficiency and accessibility of the transit system. Key recommendations include expanding service hours, increasing frequency on high-demand routes, and improving infrastructure such as bus stops and shelters.
City	Climate Action Government Operations Plan (2021)	Characterizes current sources of GHG emissions in City operations, identifies opportunities for reducing emissions, and prioritizes strategies for increasing climate resilience in City operations. Recommends implementing energy-efficiency and retrofitting projects in City buildings, electrifying the City fleet, expanding telecommuting opportunities, and encouraging waste recycling and diversion in City operations
County	Climate Response and Resilience Report (2021)	Collaboratively addresses climate change and enhances community resilience in the City and County. Provides strategies and actions for establishing a successful leadership structure for driving climate action, setting building performance standards, accelerating the deployment of renewable energy sources, transitioning to EVs, protecting farmland and NWL, increasing the county's forest canopy, and improving community resilience to extreme weather events, and more.
City	City of Frederick Comprehensive Plan (2020)	Outlines the City's vision for sustainable growth and development over the next decade. Chapters focus on the existing issues and opportunities as well as policies and implementation responsibilities. The chapters included in the plan are: land use,

Jurisdiction	Title	Description
		transportation, municipal growth, water resources, urban design, environmental sustainability, historic preservation, housing, economic development, parks and recreation, fiscal, and implementation.
County	Livable Frederick Master Plan (2019)	A framework designed to guide the long-term growth and development of Frederick County, emphasizing sustainable, healthy, and vibrant community building. The categories grounding actions in the "Making our Environmental Vision a Reality" section include land, water, air, climate and energy- each of which includes corresponding goals and initiatives. The plan integrates public input to prioritize actions that enhance the overall quality of life for the public and resilience in the community.

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