



City of Frederick Climate Action Plan

CAP Review

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Agenda





1. Project Background and Climate Action Plan Process
2. GHG Inventory and Mitigation Analysis
3. Resilience Planning Process and Recommendations

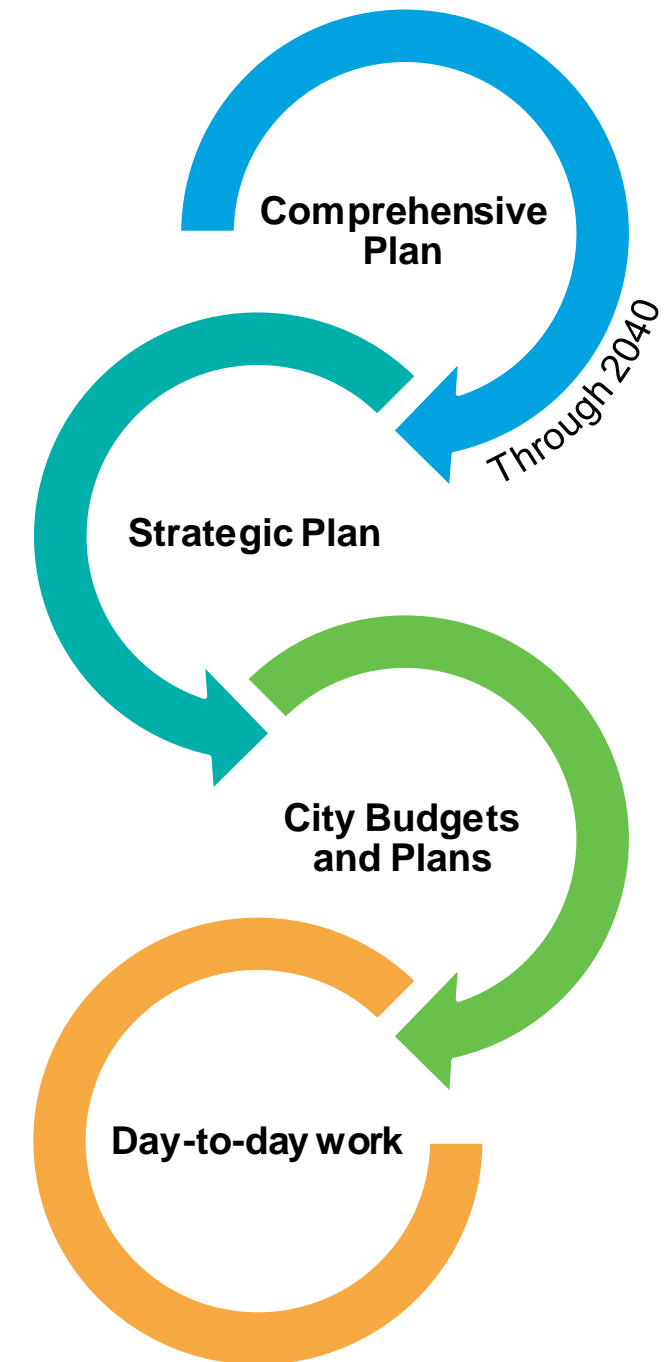
Background on Climate Action Plan

“The City of Frederick commits to considering **all significant actions** through the lens of climate change.”

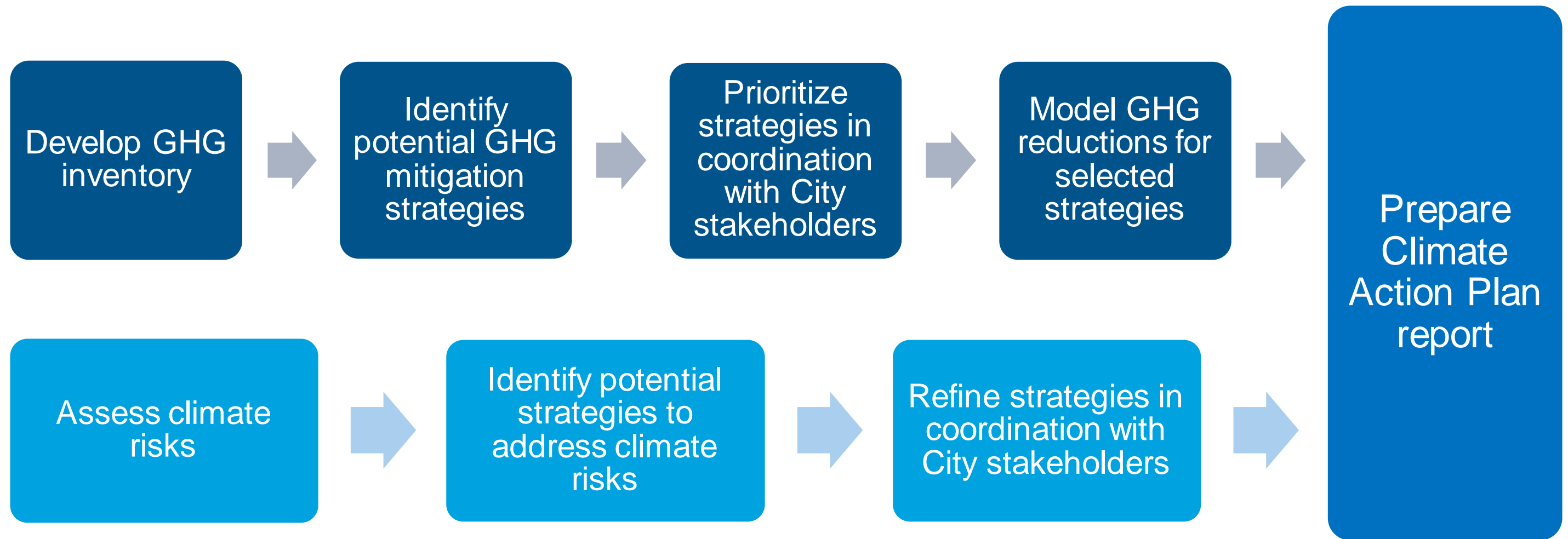
– April 2020 Climate Emergency Resolution

Goals:

-  Assess the City’s GHG footprint and baseline emissions through 2030.
-  Identify climate actions the City plans to adopt and estimate the anticipated impact of these actions on GHG emissions through 2030.
-  Assess and explain climate change risks that the City may face, including impacts and consequences across sectors, municipal departments, and populations.
-  Provide recommendations for climate-resilient strategies that the City can take.



Climate Action Planning Process



The result of this project is a Climate Action Plan (CAP), a strategy document that outlines the City's planned strategies that will reduce its carbon footprint by 2030 and help build the City's resilience to climate change.

GHG Inventory and Mitigation Analysis

Process

- Climate action planning is an iterative process that sets preliminary GHG reduction goals, evaluates specific GHG mitigation actions, considers influencing factors (e.g., cost, ease of implementation, stakeholder support, equity), and then revises final goals.
- The result of this process is a strategy document that outlines the City of Frederick's collection of measures and policies that will reduce GHG emissions.
- To develop the CAP, the Sustainability Department:
 - Worked with other departments to collect data for the GHG inventory
 - Identified potential GHG reduction strategies to reduce emissions, building on its current activities and initiatives
 - Worked with City stakeholders to refine the list of potential reduction strategies for each sector based on City priorities, available resources, cost, feasibility, and ease of implementation
 - Estimated the GHG emission benefits of each reduction strategy

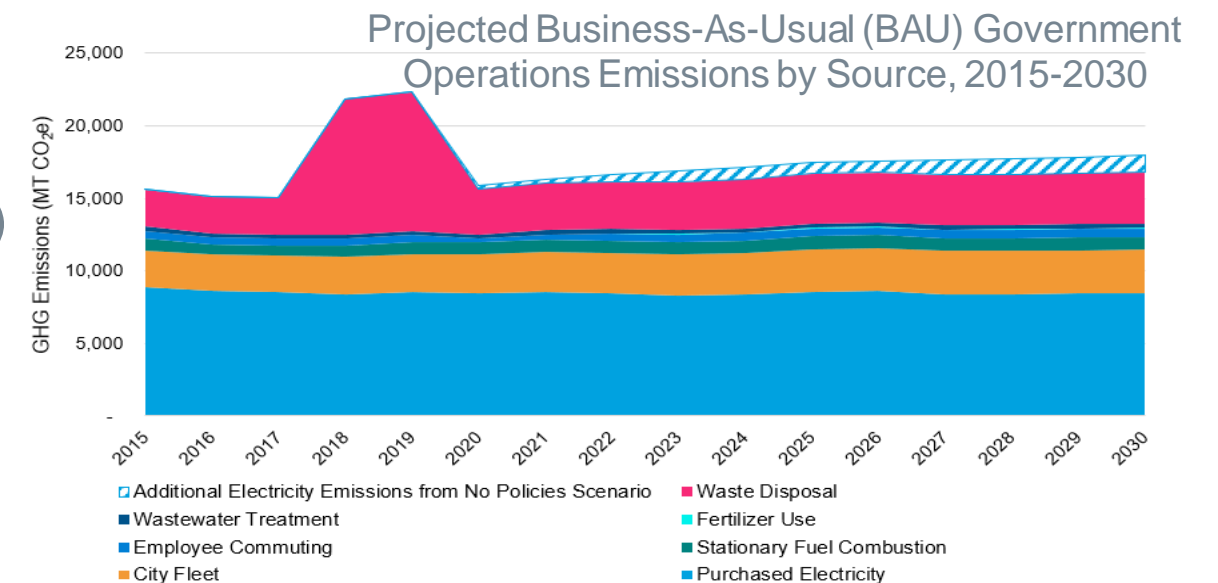
Overview of GHG Inventory

- The foundational step in climate planning is to understand baseline emissions levels and sources through a GHG inventory
- The City conducted a 2015 inventory of government operations and developed projections through 2030 for four sectors:

- Buildings and Energy Use (electricity, on-site fuel use)
- Transportation (fleet vehicles, off-road equipment, commuting)
- Waste (solid waste disposal, wastewater treatment)
- Other (fertilizer use)

- **Key takeaways:**

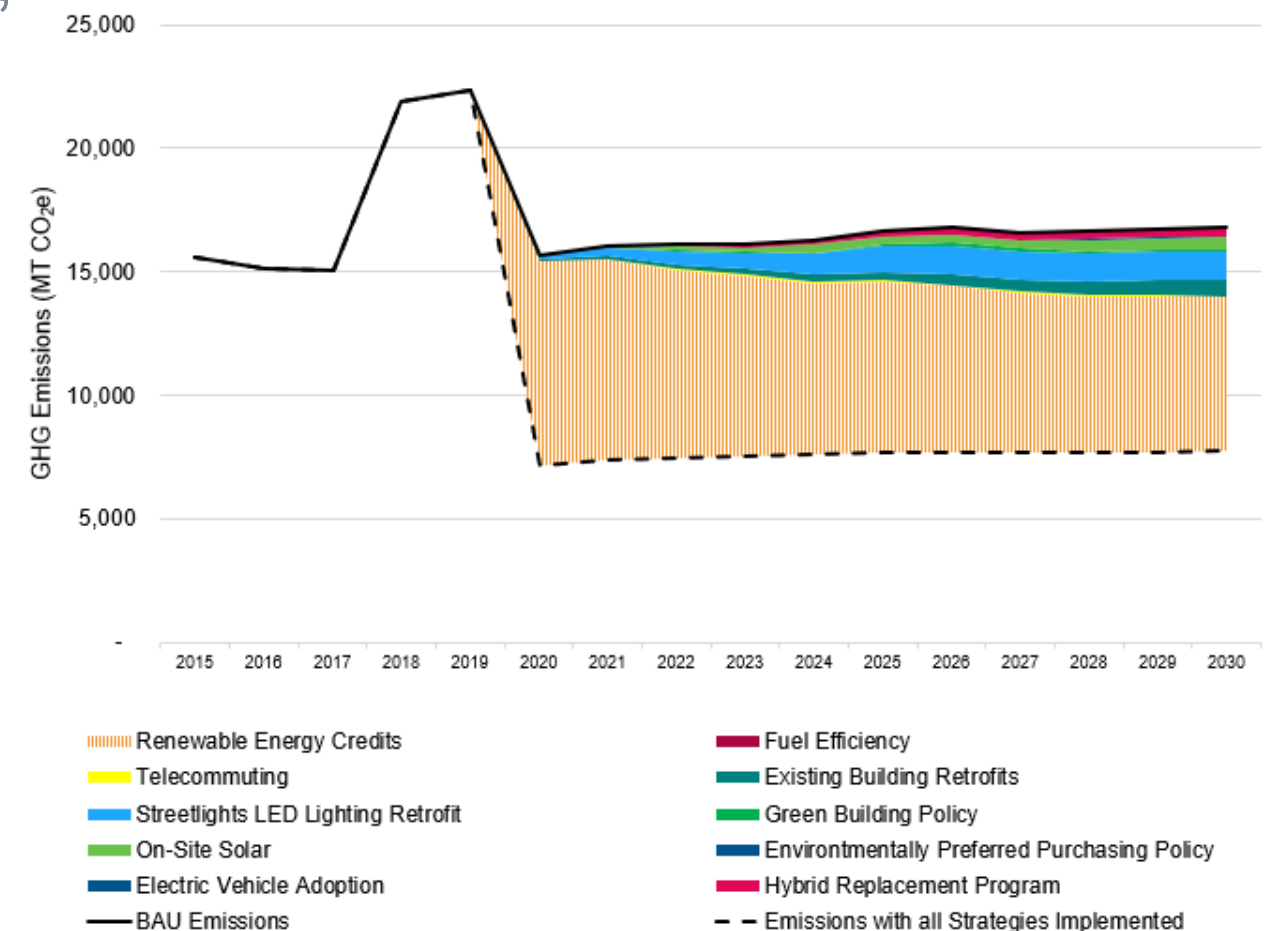
- Purchased electricity was the largest source of 2015 GHG emissions (8,920 MT CO₂e), followed by landfilled waste disposal (2,525 MT CO₂e), and the City's on-road fleet vehicles and off-road equipment (2,487 MT CO₂e).
- Emissions are projected to increase by 7% from 2015 levels by 2030 due to expansion of services related to population growth.



Overview of Mitigation Analysis

- The overall mitigation goal is to identify opportunities to reduce GHG emissions in municipal government operations (e.g., implement programs, upgrade equipment).
- The City modeled 10 strategies across the buildings and transportation sectors in the final mitigation analysis
- Implementing all mitigation strategies will result in:
 - 50% lower emissions than 2015 levels.
 - 54% lower emissions than 2030 BAU emissions.

Projected Government Operations Emissions 2015-2030 with CAP Mitigation Strategies



Mitigation Strategies

- The City identified 17 potential strategies and ultimately modeled 10 actions across the buildings and energy use, transportation, and waste sectors.

Strategies Considered for Inclusion in CAP	Included in CAP
Complete LED streetlight project	•
Retrofit existing City facilities with energy efficiency upgrades	•
Implement microgrid pilot project	
Develop LEED or above code green building policy	
Develop environmentally preferred purchasing policy	•
Install renewable energy at City facilities (i.e., solar)	•
Purchase clean power	•
Implement a Green Building policy	•
Electrify all City facilities	
Expand CHP at City facilities	
Develop energy accountability programs for employees	
Expand telecommuting opportunities	•
Convert the City fleet to alternative fuel vehicles	
Purchase an electric circulator bus	
Electrify the City fleet	•
Purchase fuel-efficient vehicles	•
Send City waste to a landfill that captures landfill gas for energy recovery	•

Next Steps and Priorities for Near-Term Action

- Strategies targeting the building and energy use sector represent the largest opportunities for emission reductions.
 - Implement energy efficiency improvements first, then use renewables to further reduce emissions.
 - Low-cost options include completing the LED retrofit of City streetlights and implementing environmentally friendly purchasing and telecommuting policies.
- Waste sector strategies had the second largest impact on future emissions.
 - Activities to reduce landfilled waste—particularly organic waste—have a significant impact on future emissions and represent an opportunity to engage with communities.
 - Engagement with external partners (e.g., landfill operators) may be required to understand emissions and identify opportunities for improvement (e.g., landfill gas capture for energy conversion)

Lessons Learned

■ Process

- It's key to engage with other departments at the beginning and throughout the process to get buy-in
- Data gaps and limitations identified during the inventory can lead to potential improvements in future collection and coordination

■ Outcomes and Roadblocks

- City infrastructure constraints or policy barriers may limit reduction opportunities (e.g., EVs, on-site renewables)
- Renewable energy credits are critical to large emission reductions in the buildings and energy sector but should follow energy conservation efforts
- Engagement with partners (e.g., county, landfill operators) may be required to identify and implement emission reduction opportunities in some cases

■ Overlap between community and government inventories

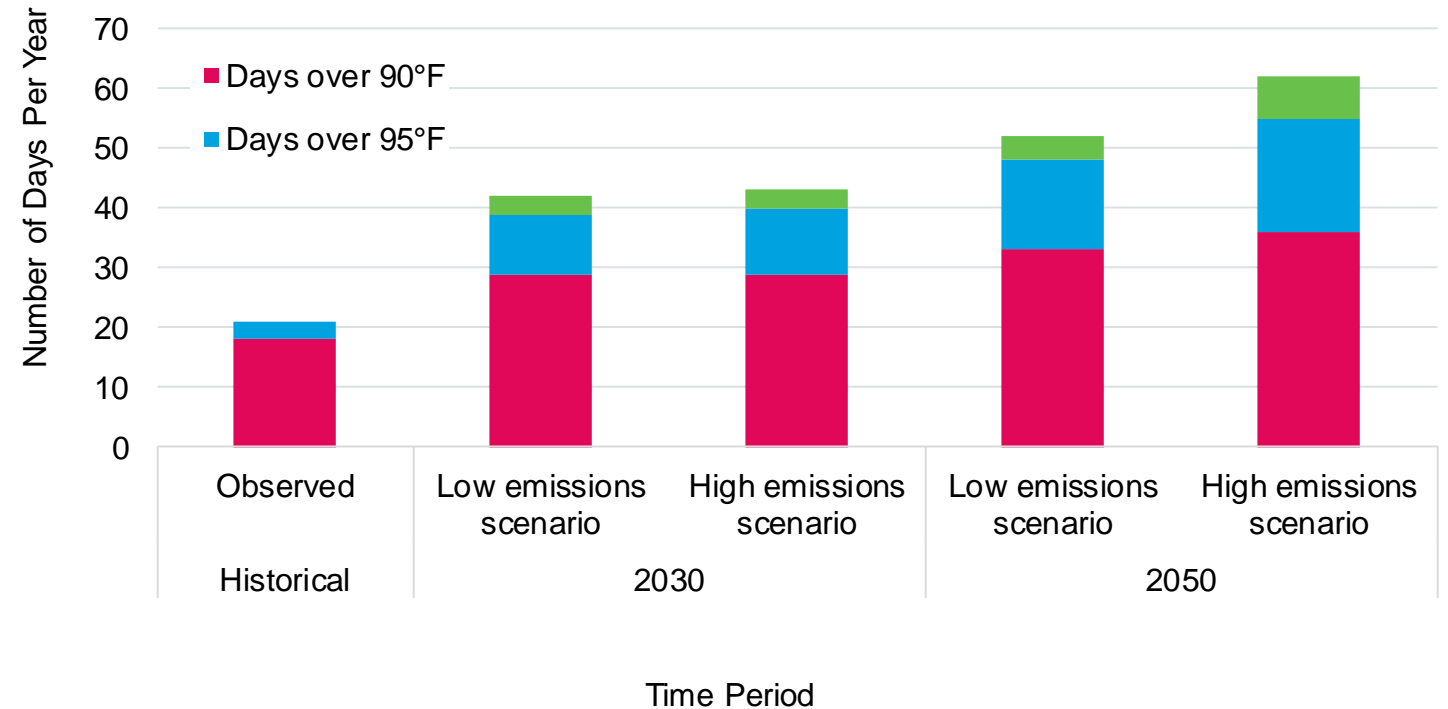
- Municipal inventories are a subset of community inventories. Data collected for a government can often inform a community inventory.
- Actions taken by government can ultimately reduce the community's emissions (e.g., waste management programs, EV charging infrastructure)

Resilience Planning Process and Recommendations

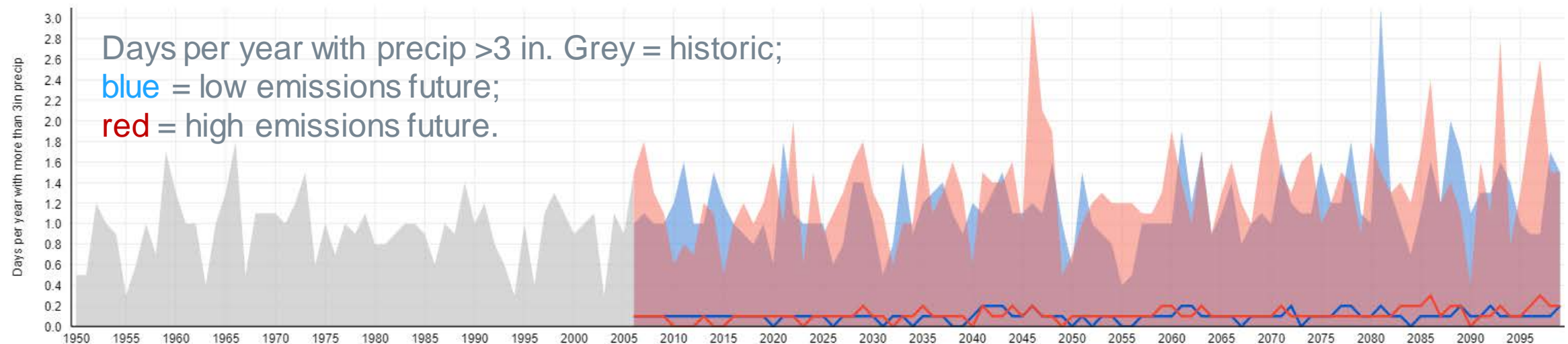
Climate Projections

- Increased average temperatures and extreme heat days
- Increased risk of drought
- Increased year-to-year precipitation variability
- Increased risk of inland flooding
- Increased frequency and intensity of storms and extreme winter conditions

Number of Days per Year with Maximum Temperatures above 90°F, 95°F, and 100°F



Data from NOAA Climate Explorer



Climate Impacts and Consequences

Extreme Heat Days

- Intensified Urban Heat Island (UHI)
 - City of Frederick Air Temperature Study identified current trends → greater UHI in future
- Public health & outdoor worker safety concerns
- Increased energy demand for cooling & reduced equipment efficiency
- Brownouts or blackouts in electric system
- Increased deterioration and damage to transportation assets

Flooding

- Reduced functionality of the stormwater system
- Increased maintenance and expenses
- Safety and health hazards from overwhelmed drainage systems and standing water
- Compromised travel, commute, and emergency routes
- Flooded low-lying or underground electric, IT and communication infrastructure
- Damaged buildings and contents; limited access to facilities

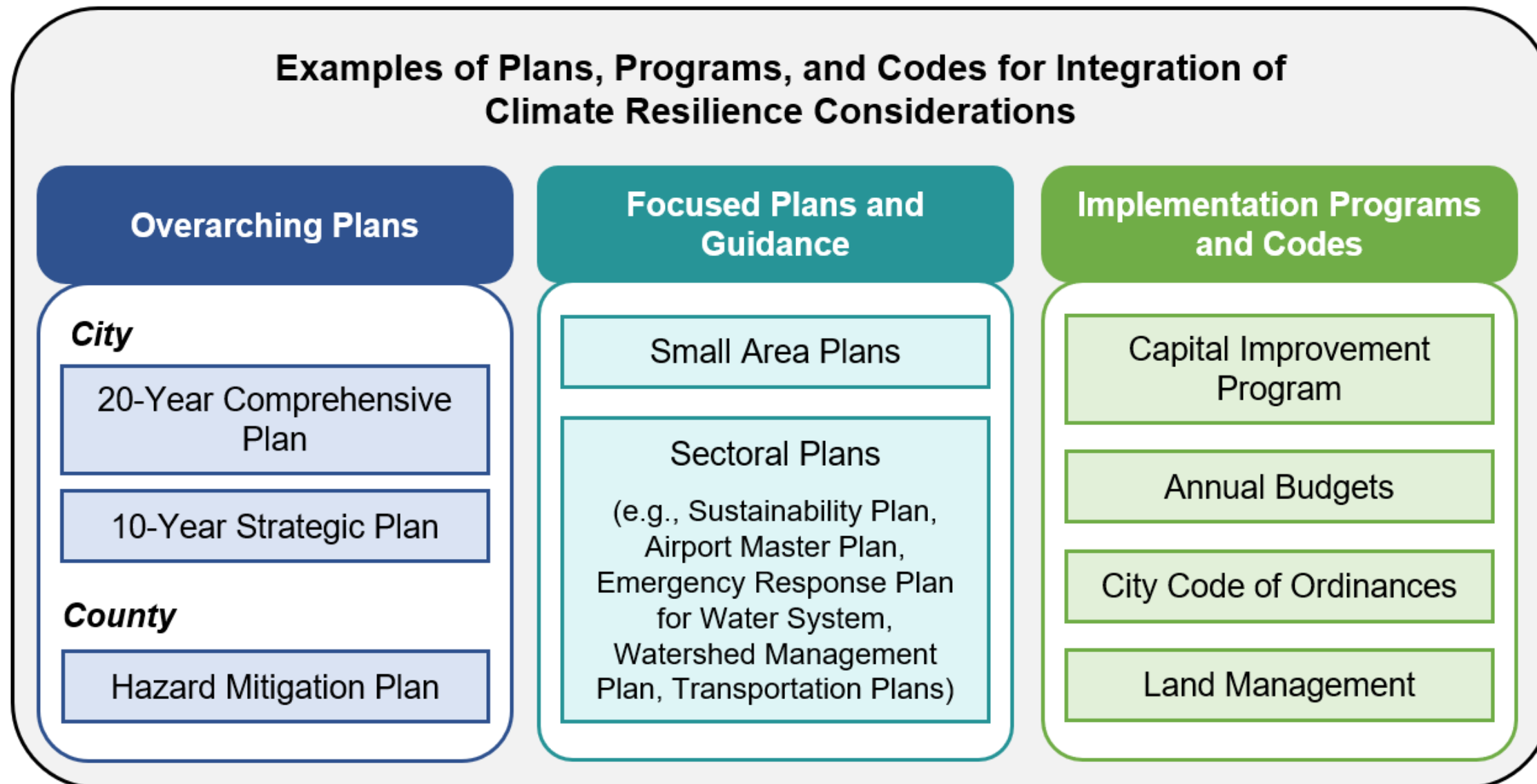
Winter Storms

- Unsafe conditions for the transportation system
- Increased freeze/thaw cycles can increase asset deterioration and lead to pavement cracking
- Tower or overhead electric line failure

Information drawn from:
County's Hazard Mitigation
Plan on historical impacts,
MWCOC's Climate Risk and
Vulnerability Assessment,
and expert knowledge.

Integrating Resilience

The overall resilience goal is to integrate climate resilience considerations into all relevant municipal decisions and activities.



Overarching Planning and Implementation

- The Comprehensive Plan and the Strategic Plan can serve as **entry points** for climate resilience considerations
- **New approach:** Apply a **climate change lens to the implementation** of the policies and strategic initiatives
- **Next step:** When updating, consider climate change risks and resilience as a **cross-cutting theme** during the planning process.

Comprehensive Plan
Transportation Policies

- **Policy 5:** Create and maintain a fully accessible sidewalk network throughout the City.
- **Climate risks:** Consider sidewalk network design that will be comfortable and functional in hotter temperatures (e.g., increased shading) and heavier rainfall (e.g., sufficient drainage), and consider these climate risks during development of the Comprehensive Pedestrian Plan.

Comprehensive Plan
Land Use Policies

- **Policy 7:** Maintain and improve an efficient and streamlined permitting process that is user-friendly and predictable.
- **Climate opportunity:** Incorporate information on climate change projections and potential impacts to development (e.g., extreme heat projections and considerations for urban heat island reduction) into the proposed guidelines, manuals, and how-to guides.

Land Management and Development

- **Recommendation:** Identify potential climate risks and opportunities in development project concepts.
- **Recommendation:** Consider revising section of the LMC to codify climate resilience measures related to land management.

LMC Section	Example resiliency measures to incorporate into the LMC
Sec. 605 Landscaping Standards	<ul style="list-style-type: none"> • Further encourage green infrastructure for stormwater management as well as urban heat island mitigation, given projected increases in flooding and extreme heat • Use flood- and drought-tolerant vegetation, given projected increases in both flooding and drought
Sec. 607 Parking and Loading Standards	<ul style="list-style-type: none"> • Encourage permeable pavement in low-traffic areas throughout the City to mitigate stormwater runoff, given projections for greater rainfall intensity
Sec. 611 Street Improvement Standards	<ul style="list-style-type: none"> • Adjust drainage requirements, considering future rainfall intensity • Further encourage street trees for stormwater management and urban heat island mitigation, given projected increases in flooding and extreme heat

Capital Planning

- **Recommendation:** Incorporate climate resilience considerations in planning for capital investments
- **Entry points for considering climate resilience in the CIP process:**
 - Identify Project Need – consider new resilience projects
 - Develop Projects – screen projects for climate change risks and opportunities
 - Project Submission – identify how the project will address climate risks
 - Mayor and Board Approval – summarize resilience considerations
 - RFP – require climate change considerations in design
- **Currently developing guidance for integrating resilience using these entry points**

Capital Planning

What to expect from the guidance for integrating climate considerations into the CIP process:

- Step-by-step guidance and resources on how to...
 - Fill out Climate Risk and Opportunity checklist for each project (checklist also provided)
 - Summarize resilience considerations as part of the project justification
 - Include climate change considerations in design RFPs, as appropriate
- Updated executive summary to be submitted to Mayor and Board
- Resources for understanding and identifying climate risks and opportunities
- Example projects (e.g., purchasing a new generator → plan to house generator on elevated platform to avoid flood damages)

Lessons Learned

- To successfully integrate resilience across the entire municipality, we need to engage teams and sectors across the city.
- Having a higher-level resolution to point to for showcasing the importance of integrating resilience into the City's actions was really helpful.
 - Specifically, the April 2020 Climate Emergency Resolution, which was passed by City Council, Board of Aldermen.
- Integrating resilience needs to cut through multiple municipal decisions, policies, and departments rather than only a standalone CAP.
 - The process needs to be emphasized rather than the plans themselves in climate change planning.

Department Engagement

- Benefits of/lessons learned from workshops
 - Engaged with people on the ground implementing the plans/projects
 - Providing specific examples from other cities as well as examples from what Frederick is doing helped reduce confusion surrounding this effort
 - Helped to build capacity of climate champions not just within Office of Sustainability but also other departments
 - Attendees now have a better understanding of why integrating resilience is important rather than simply delegating this topic to Sustainability
- Helped to work with a single point of contact to learn about the processes as a starting point, then engage with on-the-ground staff to ensure our work fits their reality



Thank you!