



Frederick County Climate and Energy Action Plan for Internal Government Operations + EVRP

March 22, 2023
M W C O G C E E P C

The Frederick County Council voted to create a Climate Emergency Resolution in July 2020.

Council adopted goals to reduce GHG 50% by 2030 and 100% by 2050. Created a community-driven Mobilization Workgroup.

Workgroup spent 18,500 hours to produce a Climate Response and Resilience Report in August 2021.

Frederick County Public Schools bus with children aboard became stuck during flooding 9/1/2021.



The County Executive and County Council implemented a series of initiatives in 2022:

Created the Division of Energy and Environment

Created the Departments of Stormwater and Climate & Energy

Created key climate and energy programs:

- Climate and Energy Action Plan
- Building Energy Performance
- Alternative Fuel Vehicles
- Clean Energy

Approved a Hazard Mitigation and Climate Adaptation Plan

2023: CEAP, AFV, and Transition Team Reccs



Frederick County Climate and Energy Action Plan for Internal Government Operations

March 2023



DIVISION OF ENERGY
AND ENVIRONMENT



Metropolitan Washington
Council of Governments



Objectives of CEAP

Measure and Reduce GHG Emissions

Identify and Reduce Climate Risks

Greenhouse Gas
Inventory

GHG Mitigation
Strategies

Risk and
Vulnerability
Assessment

Climate
Resilience
Strategies

Frederick County Government Actions

Community-Wide Issues, Benefits, and Actions

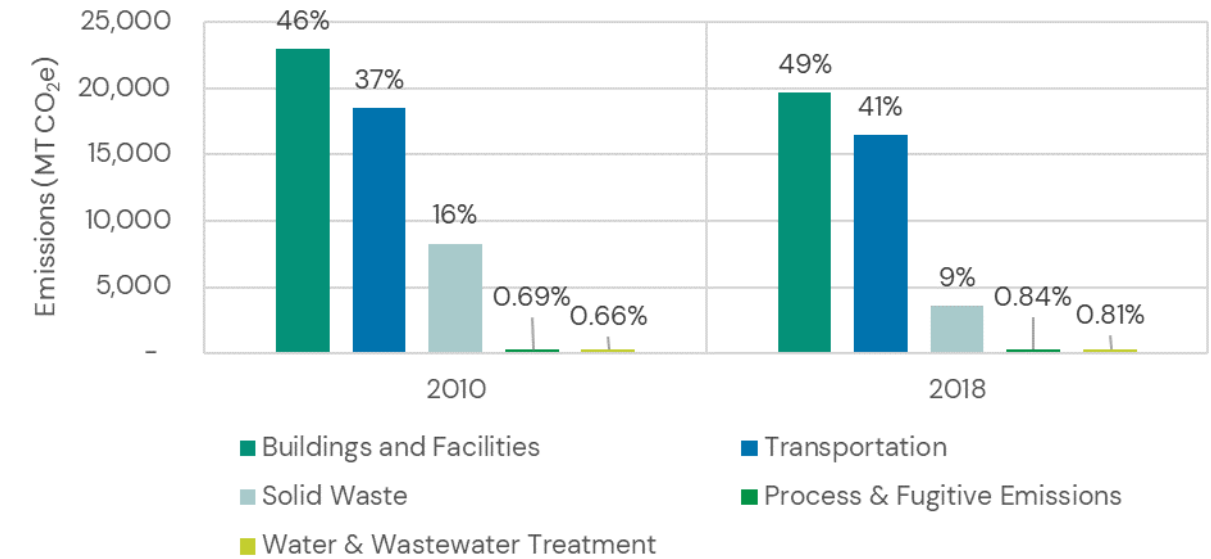
- The CEAP for government actions is being released in March 2023.
- The community-wide planning process begins this year.

GHG Inventory and Mitigation Analysis

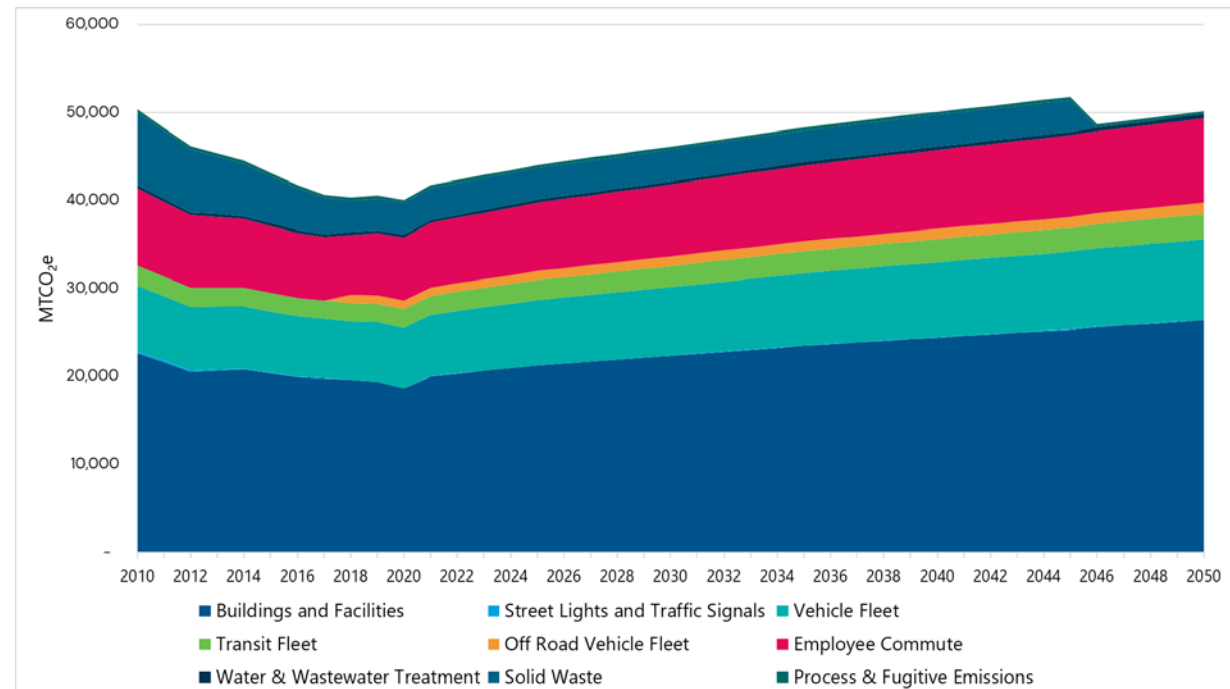
Overview of GHG Inventory

- The foundational step in climate planning is to understand baseline emissions levels and sources through a GHG inventory
- The County conducted a 2010 base year and 2018 progress year inventory of government operations and developed projections through 2050 for five sectors:
 - Buildings and Facilities Energy Use (electricity, on-site fuel use)
 - Transportation (fleet vehicles, off-road equipment, commuting)
 - Solid Waste
 - Process and Fugitive Emissions
 - Water & Wastewater Treatment
- Key Findings:
 - Energy-related Buildings and Facilities emissions account for about half of the County government's emissions
 - Buildings and Facilities and Transportation sources together account for 89% of the County government's emissions
 - 20% GHG emissions reduction between 2010 and 2018
 - FCG is 1.1% of community-wide emissions

FCG 2010 and 2018 GHG Emissions by Source



2010 through 2050 Reference Case Emissions by Source with BAU Projections



Overview of Mitigation Analysis

- The overall mitigation goal is to identify opportunities to reduce GHG emissions in government operations (e.g., implement programs, upgrade equipment).
- The County identified 12 and modeled 9 strategies across the buildings and transportation sectors

Mitigation Strategy	Reduces:			
	Electricity Use	Natural Gas Use	Mobile Fuel Use	Waste Generation
Buildings and Energy Use				
E1 Renewable Energy Procurement				
E2 Low-Carbon Gas		✓		
E3 Green Building Standards	✓	✓		
E4 Building Energy Efficiency	✓	✓		
E5 Building Electrification		✓		
Transportation				
T6 Electric Vehicle Adoption				
T7 Hybrid Replacement Program				
T8 Diesel to Biodiesel Conversion				
T9 Telecommuting			✓	
Waste				
W10 Increase County Waste Diversion				✓
W11 Reduce County Employee Waste Generation				✓
W12 Sustainable Purchasing and Procurement				✓

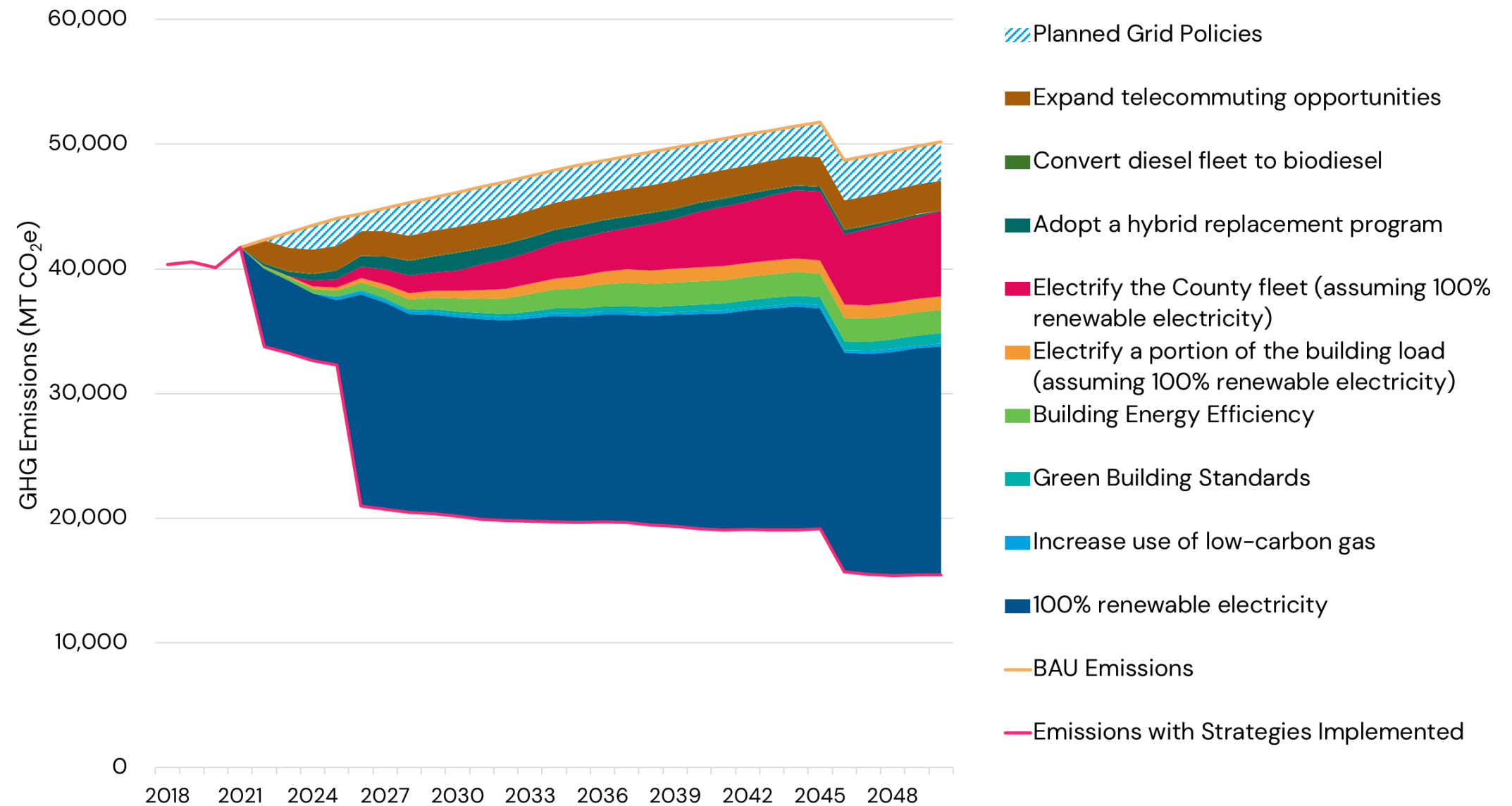
E = Energy, T = Transportation, W = Waste

Impact of Mitigation Strategies

Projected Government Operations Emissions 2018-2050 with CEAP Mitigation Strategies

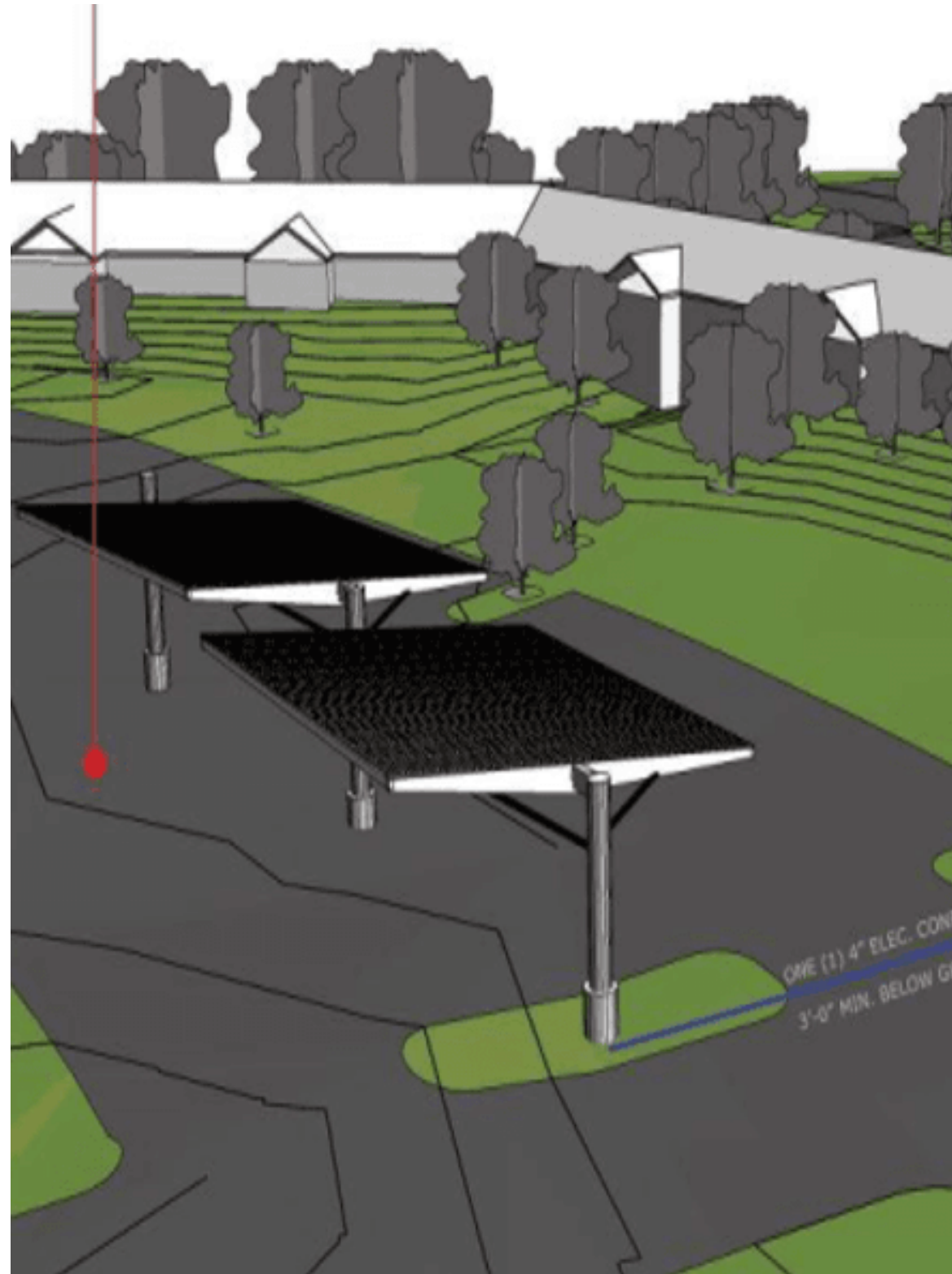
Implementing all mitigation strategies will result in:

- 62% lower emissions than 2010 levels in 2030.
- 59% lower emissions than 2030 BAU emissions.





CEAP for Internal Operations



Clean Energy Procurement and Building Energy

Strategies

The CEAP recommends:

- Building energy data management, benchmarking, and additional retrofitting
- Electrification of a portion of the building load
- Utilization of 100% renewable electricity, moving towards large-scale power purchase agreements (PPAs)



CEAP for Internal Operations



Transportation Sector

Strategies

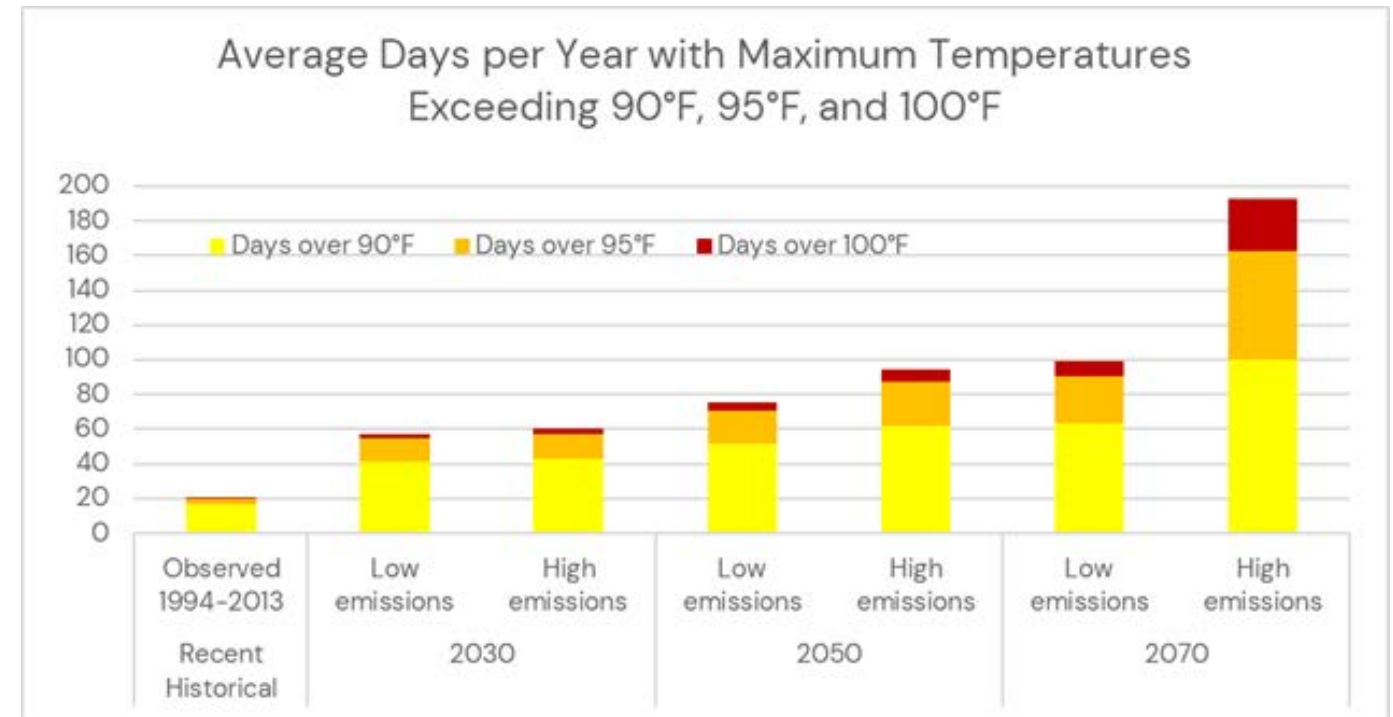
The CEAP recommends:

- Plans for clean fleet transition
- Alternative fuel use
- Reduced commuting

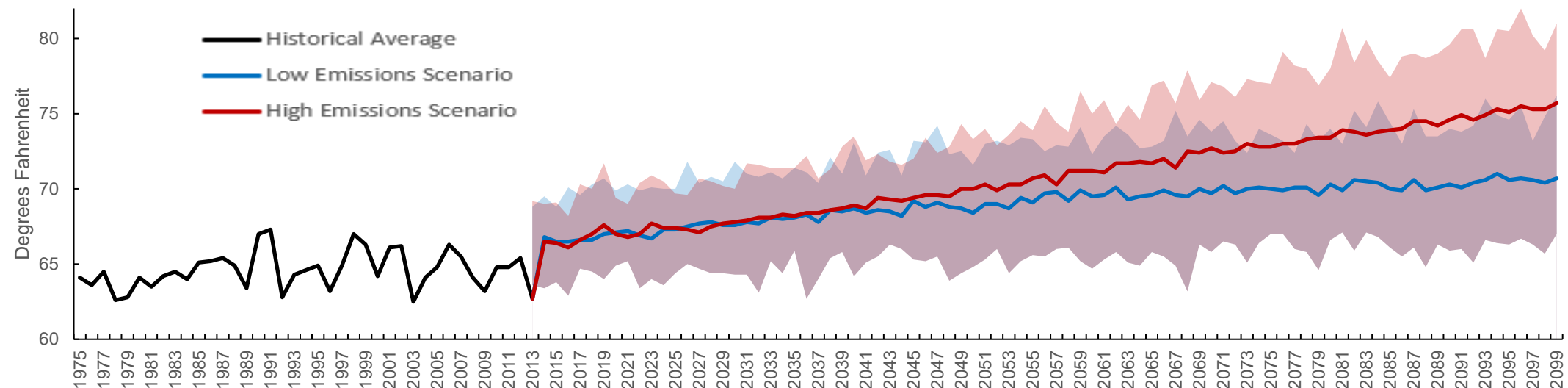
Climate Risk and Vulnerability Assessment and Resilience Strategy Recommendations

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**



Historical and Projected Average Annual Maximum Temperature
Frederick County MD



Data from
NOAA
Climate
Explorer

CRVA Results

- **Flooding and heat present high priority risks across sectors**, as these climate hazards currently present a high level of risk and are expected to present markedly higher levels of risk in the future due to climate change, particularly extreme heat. As such, the priority risks for each sector are related to flooding and heat
- Priority risks for flooding include interruptions to County services and use of County assets; damage to infrastructure; and human health impacts.
- Priority risks for heat include negative impacts to human health and stress to County infrastructure.
- Both flooding and heat create the need for backup power across County divisions.

Resilience Strategies for Climate Risks

The study team identified **14 overarching resilience strategies** to address key risks and vulnerabilities, each with its own subset of specific adaptation actions.

Multi-Hazard

- Ensure resilience efforts are equitable and support environmental justice
- Assess and update codes and ordinances to be climate-informed
- Advance monitoring and awareness of green infrastructure and nature-based solutions that meet County climate and operational goals
- Build in resilience considerations into budgeting and capital improvement processes
- Develop and adopt indicators and inter-division collaboration mechanisms to monitor and adaptively manage climate resilience measures over time
- Install generators/backup power at critical facilities

Climate resilience is the ability to prepare for, recover from, and adapt to climate risks.

Resilience Strategies for Climate Risks

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Flooding

- Develop deeper understanding of flood vulnerabilities
- Build overall resilience to stormwater flooding
- Prevent flood-related interruptions to County services and/or use of County assets
- Increase resilience of County infrastructure to flood-related damage
- Understand and reduce risk of water contamination

Climate resilience is the ability to prepare for, recover from, and adapt to climate risks.

Resilience Strategies for Climate Risks

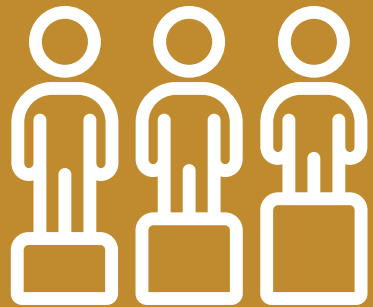
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Heat

- Protect human health from extreme heat
- Increase resilience of County infrastructure to extreme heat

Climate resilience is the ability to prepare for, recover from, and adapt to climate risks.

INCLUSION



The impacts of climate change are not distributed equally.

Sustainability

We are partnering with citizens and stakeholders to develop an equity-driven climate response.

for All

INCLUSION

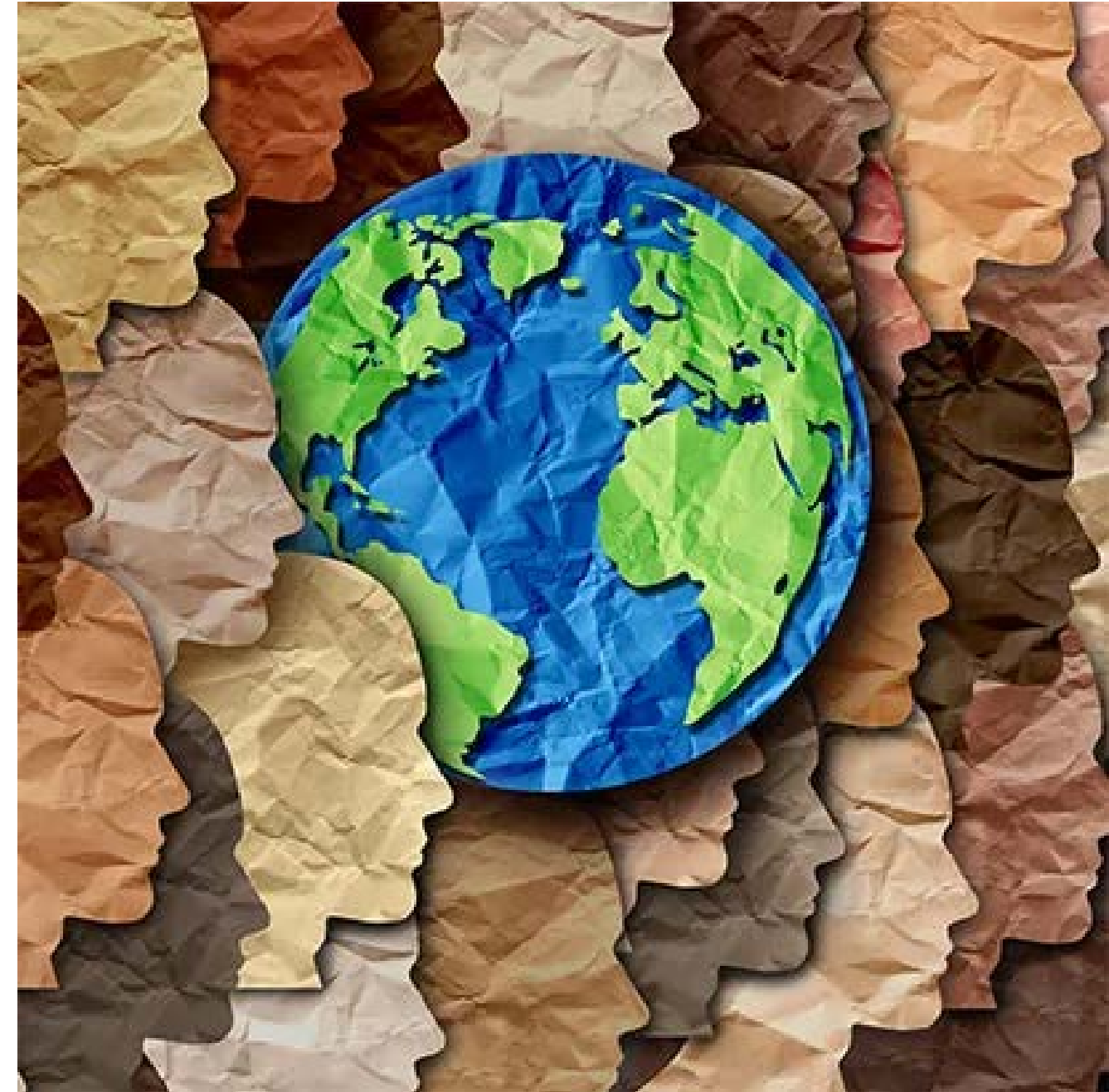


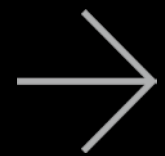
Community-focused climate action

The CEAP for Internal Operations assesses **equity impacts** from climate hazards.

- Divisions within County Government will need to take these into account and ensure resilience efforts support environmental justice.

The Community-Wide CEAP will be developed through an **extensive public process**. A goal of the project will be to identify vulnerable neighborhoods and work to actively engage these communities





Frederick County

Alternative Fuel Vehicle (AFV) Fleet Transition Plan Final Draft Summary



ICF

2/13/2023



Right-Sizing Assessment

A rightsizing assessment identifies which vehicles may not be fully utilized, necessary for fleet operations, or required the completion of projects or tasks.

Rightsizing helps fleet managers optimize vehicle count and use; reduce fuel consumption and expenses; lower emissions by retiring, reassigning, or replacing vehicles; and reduce operations and maintenance costs.

Methodology Overview: Vehicles with zero annual miles or below average annual mileage for that vehicle type are flagged as potentially underutilized and recommended for further evaluation.

Priority Departments: Animal Control, Health Department, Highway Operations, Facilities Maintenance, Public Libraries, Inspections, Parks and Recreation, Water and Sewer, Fire and Rescue, Solid Waste and Recycling, Sheriff's Office.

→ Right-Sizing Assessment Overview



Electrification Assessment

- Assessment evaluated **876** on-road light-, medium-, and heavy-duty vehicles
- Vehicles eligible for retirement between 2024 – 2036
- Evaluated based on EV model availability through October 2022
- TCO threshold scenarios: 5% and 10%
- Financial incentives considered
- Fuel prices provided by the County for gasoline, diesel, and electricity
- Light-duty pickups, heavy straight-trucks, and police vehicles were excluded from the assessment.

→ Electrification TCO Methodology

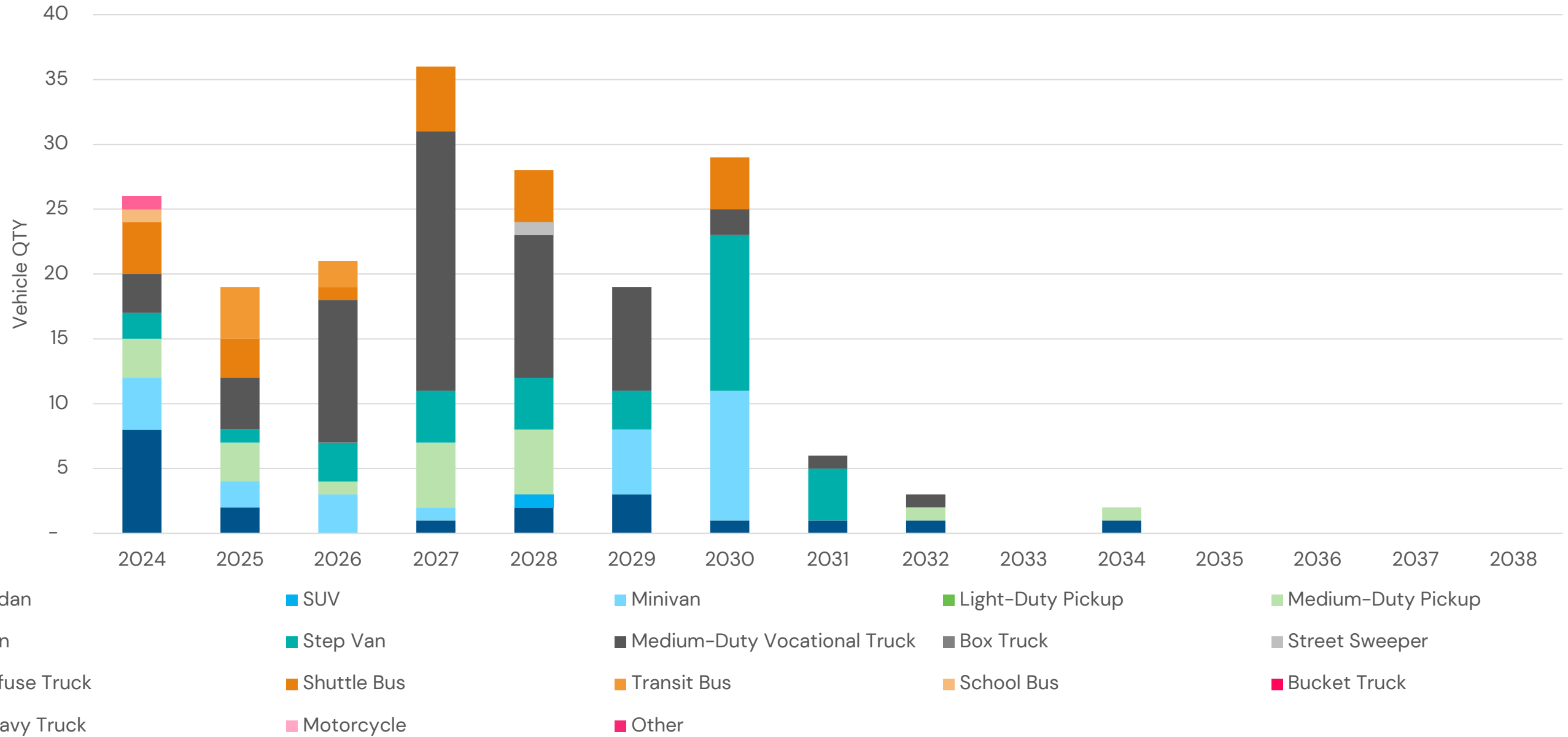
Vehicle Type	Vehicles Evaluated	Quantity Recommended for Electrification (5% Scenario)	Quantity Recommended for Electrification (10% Scenario)
Sedan	26	19	20
SUV	1	1	11
Minivan	29	24	25
Medium-Duty Pickup	19	19	19
Van	35	31	33
Medium-Duty Vocational Truck	84	61	61
Street Sweeper	2	1	1
Shuttle Bus	22	21	21
Transit Bus	15	6	6
School Bus	1	1	1
Heavy Truck	1	1	1
TOTAL	235	185	189

→ Electrification Recommendations

Vehicle Type	Recommended Make/Model*
Sedan	Nissan Leaf / Kia Niro PHEV
SUV	Kia Niro PHEV
Minivan	Canoo Lifestyle
Medium-Duty Pickup	Atlis XT (300 mile, Crew Cab)
Van	Arrival Van H1 Passenger / ELMS Urban Delivery Van
Medium-Duty Vocational Truck	Ford E-Transit (Cab Chassis)
Street Sweeper	Global M3 Supercharged
Shuttle Bus	Ford E-Transit Van (Cutaway) / SEA Electric Ford F-650
Transit Bus	Lightning eMotors – Electric City Bus
School Bus	Starcraft E-Quest XL
Heavy Truck	Tesla Semi

*These are proposed makes and models, but the fleet may opt for similar vehicles that are likely to produce similar or identical savings.

→ Electrification Recommendations



➔ Electrification Recommendations by Vehicle Type and Year

Based on our analysis, converting up to 189 vehicles to EVs is estimated to produce the following impacts:



\$12,136,290

TCO savings over 25 years*



\$6,569,596

fuel cost savings over 25 years*



\$4,556,828

maintenance savings over 25 years*



17,835

metric tons (MT) of CO2 eliminated over 25 years



Electrification Recommendation Impacts

10% Scenario



Biodiesel Recommendations

- Diesel vehicles not recommended for electrification
- Fire and Rescue vehicles were excluded
- B20 adoption year: 2024

116 diesel vehicles recommended for B20 adoption

Vehicle Type	Quantity Recommended for B20
Box Truck	3
Bucket Truck	3
Heavy Truck – Straight Truck	68
Heavy Truck – Truck Tractor	2
Light-Duty Pickup	9
Medium-Duty Pickup	3
Medium-Duty Vocational Truck	10
Shuttle Bus	6
Street Sweeper	1
Transit Bus	8
Other	3
TOTAL	116

→ B20 Methodology & Results Overview

Based on our analysis, converting 116 vehicles to B20 is estimated to produce the following impacts:



\$116,247 fuel cost savings annually



433 MT of GHG eliminated annually



55 homes' energy use for one year



Equivalent to planting **7,159** tree seedlings

→ **B20 Recommendation Impacts**



➔ **DRAFT Community-wide
Electric Vehicle Readiness Plan**

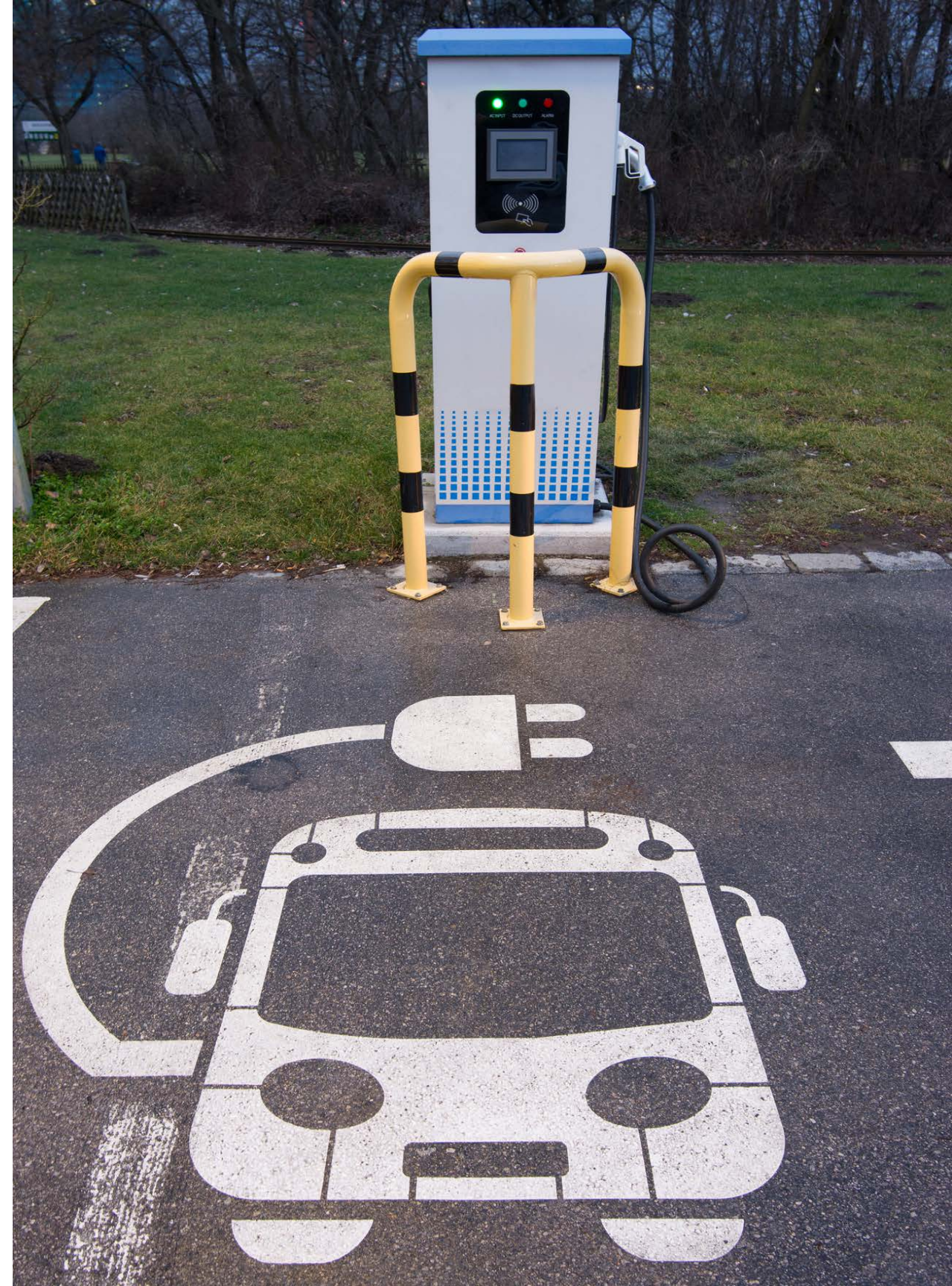


Community-wide Electric Vehicle Readiness Plan

In 2018, transportation accounted for 50% of GHG emissions community-wide in Frederick County

DEE, in partnership with MWCOCG and consultant ICF, is developing a community-wide EVRP

A stakeholder advisory group includes Frederick Health Hospital, Frederick Community College, FCPS, Hood College, Mount St. Mary's University, The City of Frederick, Ft. Detrick, Potomac Edison, Ryan Homes, and others.



Electric Vehicle Readiness Plan

- Considers the EV charging infrastructure needs and considerations of County residents, workforce members, and visitors as EV adoption increases and funding opportunities are announced. Reviews existing EV infrastructure and deployment of vehicles
- Identifies community organizations' interests, needs, and experiences related to EV readiness including equity considerations through Stakeholder Advisory Group meetings
- Helps identify priorities and opportunities for public and private investment in EV charging infrastructure to meet the community's EV charging needs
- Discusses EV technology, installation and maintenance considerations
- Reviews and recommends policies (zoning, codes, permitting, inspection codes, accessibility, and new construction development conditions) to promote EV readiness
- Identifies available funding sources and incentive programs for EV charging infrastructure
- Provides a case study for the South Frederick Corridors planning region



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