



Climate Change

***Baseline, Goals, Regional Coordination, and
Frederick County Plans and Actions to Date***

Shannon Moore

Office of Sustainability and Environmental Resources

June 23, 2020



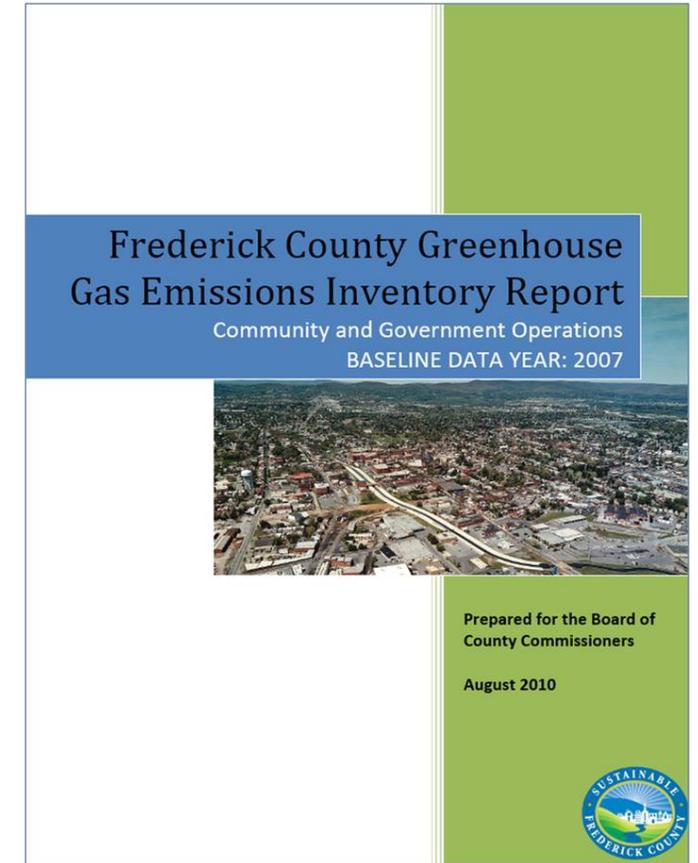
Overview

- Baseline greenhouse gas (GHG) emissions inventories for internal operations and community-wide
- Progress scenarios from baselines
- Reduction goals and coordination of Climate Action Plan with MWCOG
- Coordination with Comprehensive Energy Plan and Livable Frederick
- Actions taken by County Divisions



Internal Baseline

- 2007 amended GHG inventory baseline
- Emissions estimated at 128,925 MTCO₂e (metric tons of carbon dioxide equivalent)
 - Buildings and Facilities
 - Streetlights & Traffic Signals
 - Water Delivery Facilities
 - Wastewater Facilities
 - Solid Waste Facilities
 - Vehicle Fleet
 - Employee Commute
 - Transit Fleet
- 2007 is first reliable year of internal data collection and baseline year for first Comprehensive Energy Plan





2010 and 2012 Progress

	2012	2010	2007	Change 2007- 2012	% 2007- 2012
Buildings and Facilities	12,741	14,127	14,812	2,071	13.98%
Streetlights & Traffic Signals	141	293	276	135	48.91%
Water Delivery Facilities	4,487	4,656	3,380	-1,107	-32.75%
Wastewater Facilities	5,906	5,626	5,662	-244	-4.31%
Solid Waste Facilities	75,785	81,786	87,197	11,412	13.09%
Vehicle Fleet	4,349	7,518	6,492	2,143	33.01%
Employee Commute	9,755	9,755	8,861	-894	-10.09%
Transit Fleet	2,254	2,255	2,245	-9	-0.40%
	115,418	126,016	128,925	13,507	10.48%

- 2007-2012 GHG reduced by 10.5%!
- County building electricity use stable from FY'12-FY'19 despite 8% increase in population. 17% of building electricity use to be provided by renewable energy as of June 2020.



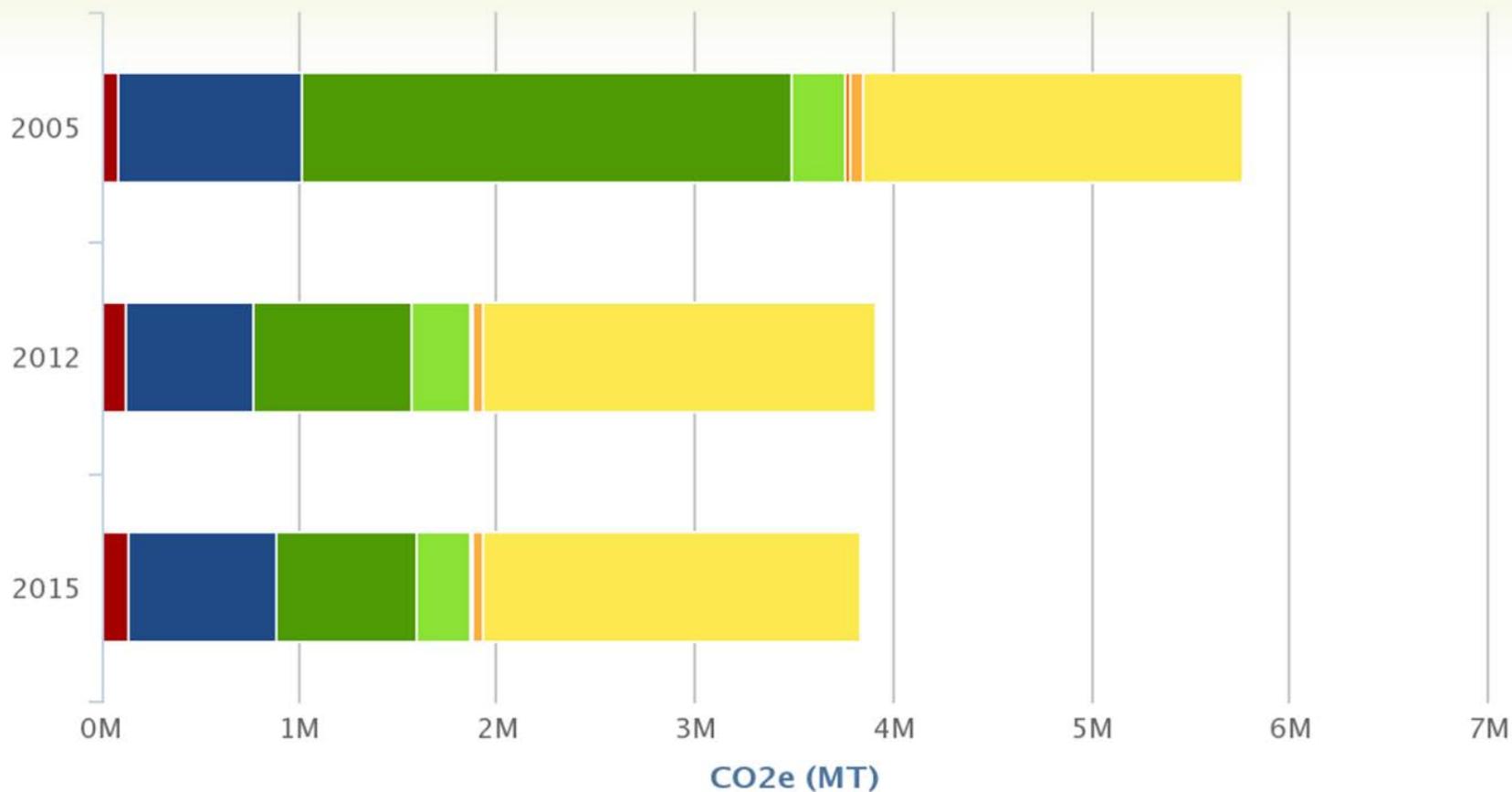
External Baseline & Progress



- Conducted by MWCOG for Frederick County
- 2005 Baseline year consistent with region
- Despite a 12% growth in population, GHG emissions reduced from 5.76 MMTCO₂e (million metric tons of carbon dioxide equivalent) in 2005 to 3.83 MMTCO₂e in 2015.
- 34% reduction in GHG from 2005-2015!
- In 2015, transportation and mobile sources accounted for 50% of GHG emissions; energy consumption (residential and commercial) accounted for 38%.
- Working on 2018 progress update.



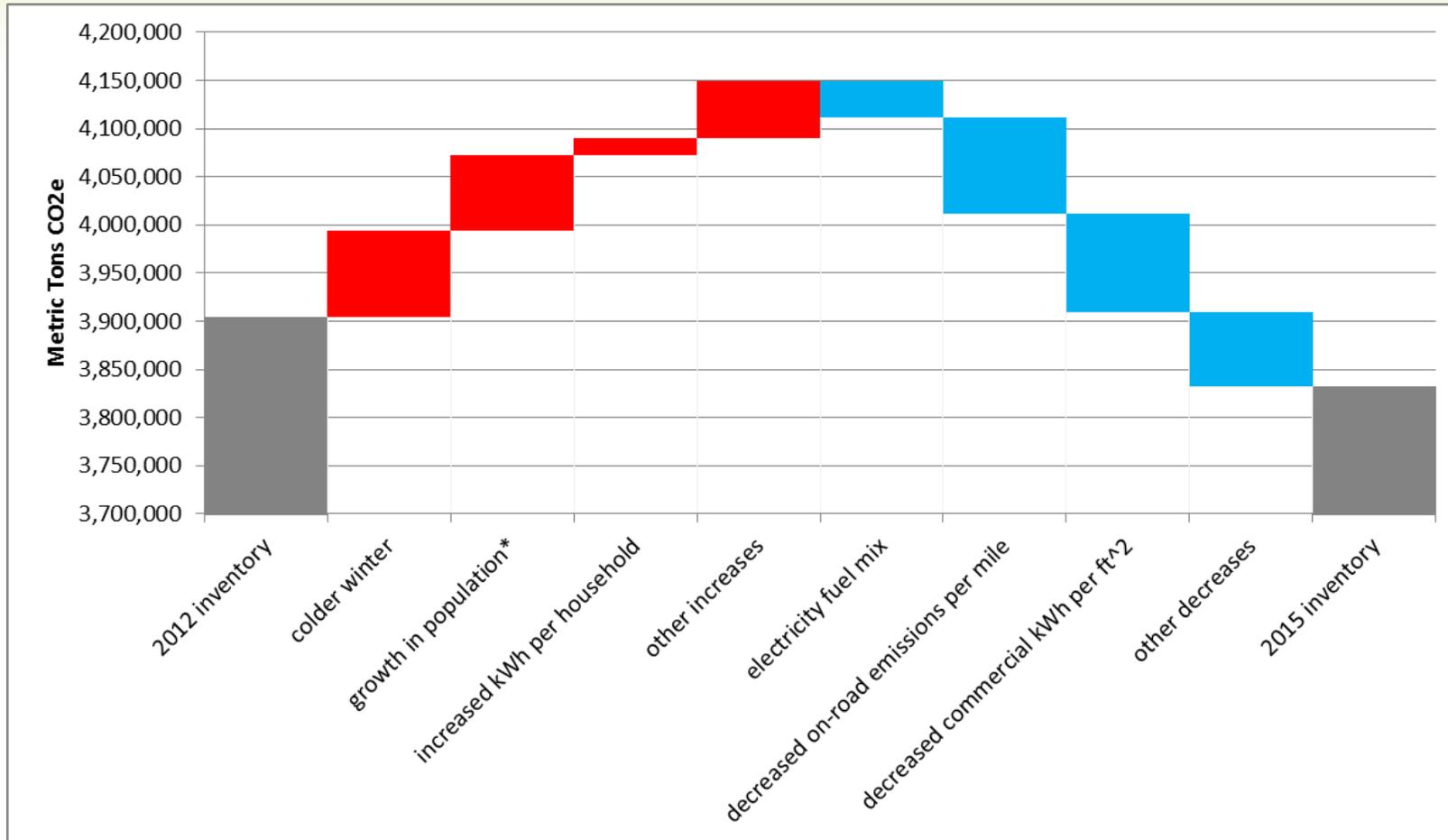
MWCOG GHG Inventories



- Process & Fugitive Emissions
- Residential Energy
- Commercial Energy
- Agriculture
- Water & Wastewater
- Solid Waste
- Transportation & Mobile Sources



MWCOG GHG Inventories



Drivers of Community GHG increases and reductions 2012-2015

- Loss of Eastalco, switching to cleaner fuel sources and energy efficiency key drivers



MWCOG GHG Reduction Goal

- Regional Climate and Energy Action Plan 2017-2020
 - 20% by 2020 below 2005 levels, 80% by 2050
 - 10% reduction in GHG emissions below 2005 levels by 2012 was achieved!
- MWCOG signed on to Global Covenant of Mayors (GCoM) in September 2019. Signatories “develop citywide goals and plans that aim at least as high as the country’s own climate protection commitments or Nationally Determined Contribution (NDC) to the Paris Agreement.”
- 40-50% by 2030, carbon neutral by 2050 in discussion. Resilience: Climate Ready Region by 2030, Achieve Regional Resilience by 2050





2030 Climate & Energy Action Plan

MWCOG region-wide coordination

- Basis for Frederick County efforts going forward
- Schedule for Regional 2030 Climate And Energy Action Plan
 - June 2020: review scenarios with technical committee and provide detailed spreadsheets of plan technical elements to local jurisdictions
 - July 2020: Webinar to review elements July 8, Deadline for committee comments July 15, Climate Energy & Environment Policy Committee (CEEPC) review of scenarios July 22
 - September 2020: Present draft plan language and Climate Goals Resolution to committees. CEEPC would need to approve resolution for COG Board adoption
 - December 2020: Submit to GCoM; will be first region to fully meet GCoM global standards for climate planning



County Plans

Comprehensive Energy Plan

- First Comprehensive Energy Plan Adopted 2010, Updated four-year plan for FY 2020-2023
- Key elements:
 - Optimize equipment operation to increase energy efficiency in buildings, vehicle fleet, and utilities and solid waste facilities.
 - Continue to implement and seek opportunities for energy conservation and to convert older equipment to more efficient versions.
 - Increase the substitution of renewable energy forms for purchased non-renewable fuels and electricity, with preference given to fuels and energy produced within Maryland, when life-cycle analyses show these actions are financially sustainable and are in the best interests of the County.
 - Improve the tracking and management of energy data.



County Plans

Livable Frederick Master Plan

- Planning reports on implementation annually; climate actions to align



Category: Land

Goals in this category concern preserving and protecting our land systems from degradation due to natural forces and human interventions and increasing their resilience.

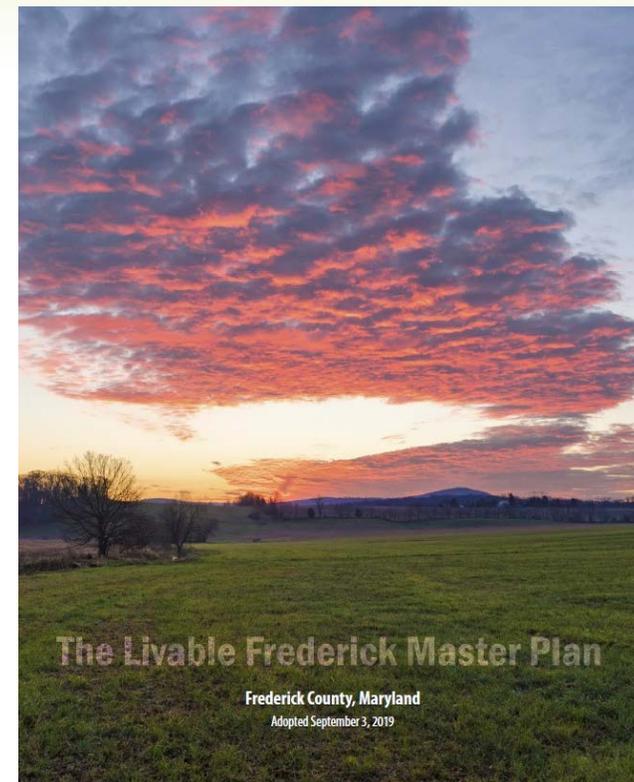
- Natural Resources and Green Infrastructure, Agriculture, Solid Waste and Recycling, Built Environment



Category: Climate and Energy

Goals in this category concern affordable and scalable solutions to address resiliency from extreme weather events and changing weather patterns.

- Climate Resiliency, Clean Energy
- Intersections with other areas of LF to protect the vulnerable
- Ties in with budget and performance indicators for County
- Implementation Plan





County Climate Actions

- Actions tracked beginning 2007
 - basis of first Sustainable Action Plan, Comprehensive Energy Plan, internal GHG inventory
- Continuous progress and tracking
- The following slides are actions taken to date
 - Includes large projects and key initiatives
 - Many more actions taken than fit here



County Climate Actions

Electric Buses, powered by the sun

- TransIt had the first fully electric bus fleet in the state. It has 5 refurbished electric buses, 3 new electric buses (including two delivered today!), and 1 new one on the way. Two hybrid electric buses
- DUSWM's Solar Electric Array at Reichs Ford Road Site A Landfill (closed portion): In the summer of 2019, a photovoltaic (PV) array generating approximately 3.7 million kilowatt hours/yr was completed on the closed landfill to supply power to seven large County government buildings and electric buses through virtual net metering with Potomac Edison
 - Project coordinated by Office of County Executive
 - Owned by Tesla with 20 year Power Purchase Agreement (PPA), option to buy after 20
 - County owns Solar Renewable Energy Credits (SRECs)
 - Built on the site of the closed Site A Landfill



County Climate Actions

Division of Utilities and Solid Waste Management

Landfill Gas to Energy Project

- In January 2009, Frederick County teamed with the Northeast Maryland Waste Disposal Authority and its contractor DCO Energy (DCO), to build and operate and privately own a landfill gas-to-energy facility at the Reichs Ford Road Landfill.
- As part of the agreement DCO purchased and installed a landfill gas collection system for the County.
- Operations began in 2010
- Facility reduced methane, generated approximately 2 Megawatts (MW) of electricity, enough to power 1,200 homes and offset greenhouse gas emissions from fossil fuel plants.
- Facility ceased operation in June 2018 due to diminished landfill gas.



County Climate Actions

Division of Utilities and Solid Waste Management

Ballenger-McKinney Waste Water Treatment Plant Solar Array

- Project is largely funded by a Maryland Department of the Environment (MDE) Water and Energy Infrastructure Grant, secured by DUSWM in 2017, facilitated by County Executive's Office, managed by Northeast Maryland Waste Disposal Authority. Project is owned by County.
- Project includes construction of a 3,528 module PV Array, with a 1 Mega Watt (MW) generation capacity adjacent to the Ballenger-McKinney Wastewater Treatment Plant (WWTP).
- Will generate approximately 1.85 million kWh per year.
- Project also includes an on-site Battery Energy Storage System (BESS) providing some additional (limited) back-up power beyond the plant's two-line electric utility service.
- The electricity generated by the solar array supplies approximately 17% of the plant's annual electrical usage. Plant runs 24/7.
- Project goes online in Summer 2020!



County Climate Actions

Division of Utilities and Solid Waste Management Variable Frequency Drives

- DUSWM has adopted a practice of utilizing variable frequency drives for appropriate motors.
- A variable frequency drive is a type of motor controller that drives an electric motor by varying the frequency and voltage of its power supply.
- Energy efficiencies typically are realized because it allows a motor (or pump) to run at an optimal speed needed for the process.
- With the completion of the Ballenger-McKinney Enhanced Nutrient Removal Wastewater Treatment Plant in December 2014, various VFDs were installed in certain portions of the facility.



County Climate Actions

Division of Utilities and Solid Waste Management

LED Lighting Upgrades

- Lighting upgrades accomplished through Potomac Edison EmPower Maryland Small Business Direct Install (SBDI) programs
 - Program covers up to 70% of program costs with Potomac Edison's current vendor, Willdan
 - Performs energy audits and installation of upgraded fixtures. Current focus is on upgrade of current lighting fixtures to energy efficient LED fixtures and motion activated sensors.
 - Work completed in January 2020 provides an estimated annual savings of 177,477 kWh through upgrades at the Reich's Ford Landfill's Administration Building, Transfer Station, and Old Shop; Urbana High Zone Booster Pump Station.
- Lighting retrofits at the New Design WTP under Potomac Edison's EmPower Maryland Energy Solutions for Business Program
 - This work included the replacement of 121 (high bay metal halide lighting fixtures) in the Filter Building, High Service Pump Building and Chemical Building completed in February 2020. with energy savings at 104,272 kWh per year.



County Climate Actions

Division of Planning and Permitting

Permitting and Development Review: INFOR Land Management System

- Implemented Dec. 9, 2020
- Significantly less paper from paperless submittals, automation
- Applicants submit electronically and reduce vehicle trips.
- Remote workers conduct reviews with no loss of service during pandemic; Telecommunications tools like Microsoft Teams allow for virtual inspections to avoid vehicle trips.
- By 6/13/2020, 2993 portal accounts were created. 8426 permits were created, 21,486 permit reviews were conducted, 30,304 inspections were completed, and 7,906 permits were issued. 406 Development Review applications were processed, and 3,048 reviews were completed for development reviews.
- Frederick County's success is being held up as a model by organizations like Maryland Society of Professional Engineers and NAIOP's Maryland Chapter.



County Climate Actions

Division of Planning and Permitting

Agricultural Preservation

- Purchase of development rights limits exurban development that is GHG intensive
- Some easements have a forest non-conversion clause meaning forest cannot be clear-cut and has to be managed in perpetuity. Forests sequester carbon and benefit air quality.
- Frederick County/MALPF approved two stream restoration overlays on existing MALPF easements which add trees for carbon sequestration.
- They have facilitated Chesapeake Bay Foundation tree plantings.



County Climate Actions



Division of Public Works

Office of Highway Operations: Replace traffic signal bulbs with LEDs

- Bulbs were replaced in 2010-2012 to save on operating costs and extend bulb life.
- Expenditures in the fund primarily used for electric for traffic signals went from \$70,565.32 in Fiscal Year 2009 to \$12,746.44 in FY'17

Department of Fleet Services

- Two EV charging stations have dual heads to charge 2 vehicles at a time; one station has single charging capability. The County currently has 5 plug-in hybrid cars. OSER purchased with funding from MEA grant
- Newly purchased Toyota Prius for Housing

LEED Certification

- DPW worked with engineer and contractor to build the Brunswick Library to LEED standards; branch opened in Spring 2011



County Climate Actions

Division of Public Works

Office of Project Management & Facilities Maintenance LED Lighting upgrades

- Utica District Park Phase II LED lighting project completed January 2020 included street lamp retrofits, maintenance building, equipment shed, pavilion, and athletic field lighting
- 118 North Market Street Office of Economic Development Renovation completed March 2020 included all third floor lighting replacement
- Public Safety Training Facility replacement of exterior poles, wiring, controls and lights with for an estimated savings of 100,468 KWh/year. Annex Engine Bay lights April 2020
- Middletown Fire Station LED August 2018
- Animal Control & Health Lab LED pole lights June 2019
- Scott Key Center pole, canopy and wall pack LED light replacements February 2020
- C Burr Artz LED interior lights September 2019
- Exterior LED lighting at multiple sites including the Adult Detention Center (ADC), ADC Work Release, the Law Enforcement Center, 30 N. Market Street, the C. Burr Artz Library, and Citizens.
- Interior lighting at the Courthouse Complex



County Climate Actions

Division of Public Works

Office of Project Management & Facilities Maintenance Energy Efficiency

- Roof replacements: Roofs were replaced on the west wing of Winchester Hall and the Adult Detention Center.
 - Material was changed from ethylene propylene diene monomer (EPDM) rubber to light gray thermoplastic polyolefin (TPO), resulting in an estimated savings of 110,000 kilowatt hour (kWh)/year.
- HVAC systems: upgrades at the Senior Center, Courthouse, Spring Ridge Fire Station 10/19, C Burr Artz Maryland Room 11/19, 118 North Market 3/20, PSTF Maze Building 3/20, PSTF Annex 4/20, and Westview Fire Station
- HVAC control system upgraded at the Spring Ridge Fire Station, 118 North Market 3/20, Point of Rocks 9/19
- Use of Variable Refrigerant Flow (VRF) HVAC Systems: At Extension Services and 340 Montevue Lane, HVAC units were replaced with variable refrigerant volume units. VRF HVAC system features several smaller air handlers that can be individually controlled and piped back to one system, saving energy.
- Winchester Hall replacement of 29 water source heat pumps in November 2019



County Climate Actions

Division of Parks and Recreation

- Upgraded the lights in the Browning building and Ballenger Creek Community building to LED and have made standard for all shelters.
- Installed 2 solar lights at Urbana Community pump track.
- Regenerative Agriculture: Coordinates with community regenerative agriculture workgroup. Conducted native meadow plantings at Catoctin Creek in 2008 and will do at Othello District Park in Fall 2020. Conduct wildfire plantings at Othello Park in Fall 2020
- Reforestation with OSER at Creagerstown Park, Utica Park, Othello Park and Robin Meadows SWP. Parks planted 150 trees at Utica Park as a natural buffer.



County Climate Actions

Finance Division

- Divested of fossil fuels in County's General Funds. Pension plan assets have de minimis investments in fossil fuels in stock mutual fund bundles.
- Proactively gave bond rating agencies with sustainability documentation including infrastructure investment related to climate resiliency

Climate Resiliency Efforts

- Division of Emergency Management: Hazard Mitigation Plan
- Drainage Area Response Team (DART) Plan: DPW, OSER, Parks, Planning

Internal Audit

- Went paperless

Senior Services Division

- Eliminated disposable silverware, cups and plates, uses a high efficiency dishwasher
- Collected compost and used it in garden
- Restructured meals on wheels routes for fuel efficiency when delivering 3,200 meals per week during pandemic



County Climate Actions



Chesapeake
Forest Champion

Office of the County Executive

- Proposed legislation to improve Forest Resource Ordinance and Zoning Ordinance- in process
- Kicked off Sugarloaf small area plan with Planning to have a conservation focus
- Improvements to County forest buffer legislation passed
- Improvements to enforceability of Developer Rights and Responsibilities Agreements (DRRAs)
- What's Next: Solid Waste management community-based initiative, included Recycling and Composting. Provided funding support for compost coaches in schools.
- LEED City and Community Silver Certification
- Executive Gardner wins Forests for the Bay Champion Award





County Climate Actions

Office of the County Executive

Office of Sustainability and Environmental Resources: Creek ReLeaf

- Runner-up Best Urban BMP in the Bay Award
- Multi-year reforestation program assisting with the County's MS4 permit requirements
- Designed to increase the total amount of forested area within Frederick County, including privately owned lands and public properties.
 - 2017 Applicants = 148 Acres
 - 2018 Applicants = 186.4 Acres
 - 2019 Applicants (offers made) = 72 Acres
 - County Owned = 116.7
 - Total estimated acres after all properties including the 2019 (third round) private properties = 523.1





County Climate Actions

Office of the County Executive

Office of Sustainability and Environmental Resources

- PACE: OSER worked with County Divisions to create a Property Assessed Clean Energy loan program for businesses that can be borrowed and repaid through a special tax assessment.
- Green Homes Challenge: As of 6/17/2020, 2,372 Frederick County Households are participating in the Green Homes Challenge
 - Be a Power Saver, Be a Renewable Star, Be a Green Leader challenges
 - Solarize and Solar Co-op initiatives: Over 100 households installed through bulk purchase initiatives
 - Refrigerator exchange: 234 refrigerators replaced
 - Power Saver Retrofits: Over 550 households retrofitted to date



County Climate Actions

TOTAL DOLLARS SAVED



\$ 1,502,910

	Total metric tons of CO ₂ averted	15,186
	Total kilowatt-hours of electricity saved	11,513,618
	Total gallons of water saved	41,521,696
	Total gallons of gasoline saved	153,519

Green Homes Challenge: Rate of Savings Per Year as of 6/19/2020



Thank You!

Shannon Moore

OSER

301.600.1413

Smooore@frederickcountymd.gov

www.sustainablefrederickcounty.org