Albemarle County Climate Action

Progress Report

FY21 – FY25

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Contents

Executive Summary

This report is a summary of information about local climate action in Albemarle County, including major initiatives and successes of the County's Climate Action Program since adoption of our Climate Action Plan (CAP) in fiscal year 2021 and through fiscal year 2025, a review of five annual greenhouse gas emissions inventories, and an overview of program strategy for achieving the 2030 and 2050 emissions reduction targets set by the Board of Supervisors. The executive summary provides an overview of each report chapter.

1. Where We Stand

Climate Program staff have conducted five consecutive annual inventories of greenhouse gas emissions across our community for the calendar years 2018-2022. These inventories—which account for emissions from transportation, building energy use, agriculture and landscape, and organic waste—provide a picture of our community's emission reduction progress compared to the baseline inventory conducted in 2008. Due to the availability of state and federal datasets on which inventory calculations rely, the most recent inventory always lags by two years behind the current calendar year.

Emission amounts for each year inventories were performed are summarized by source in the chart below. The total emissions reduction from 2008 to 2022 was 22 percent. The line in the chart indicates a straight pathway from the baseline year of 2008 to the Board of Supervisors' target of 45% fewer emissions in 2030. While actual emissions reductions are not likely to be perfectly linear, the line shows the drop over time in average annual emissions required to meet Albemarle County's targets.

To be on track for achieving the Board of Supervisors' emissions reduction target for 2030, community-wide emissions should have reduced by 28.6% by 2022 (our latest inventory year). Our calculations show that emissions only dropped by 22.3% from 2008 levels, with slight emissions increases from 2020 to 2022. Albemarle County needs to increase its rate of emissions reductions if we are to achieve the Board of Supervisors' 2030 target.

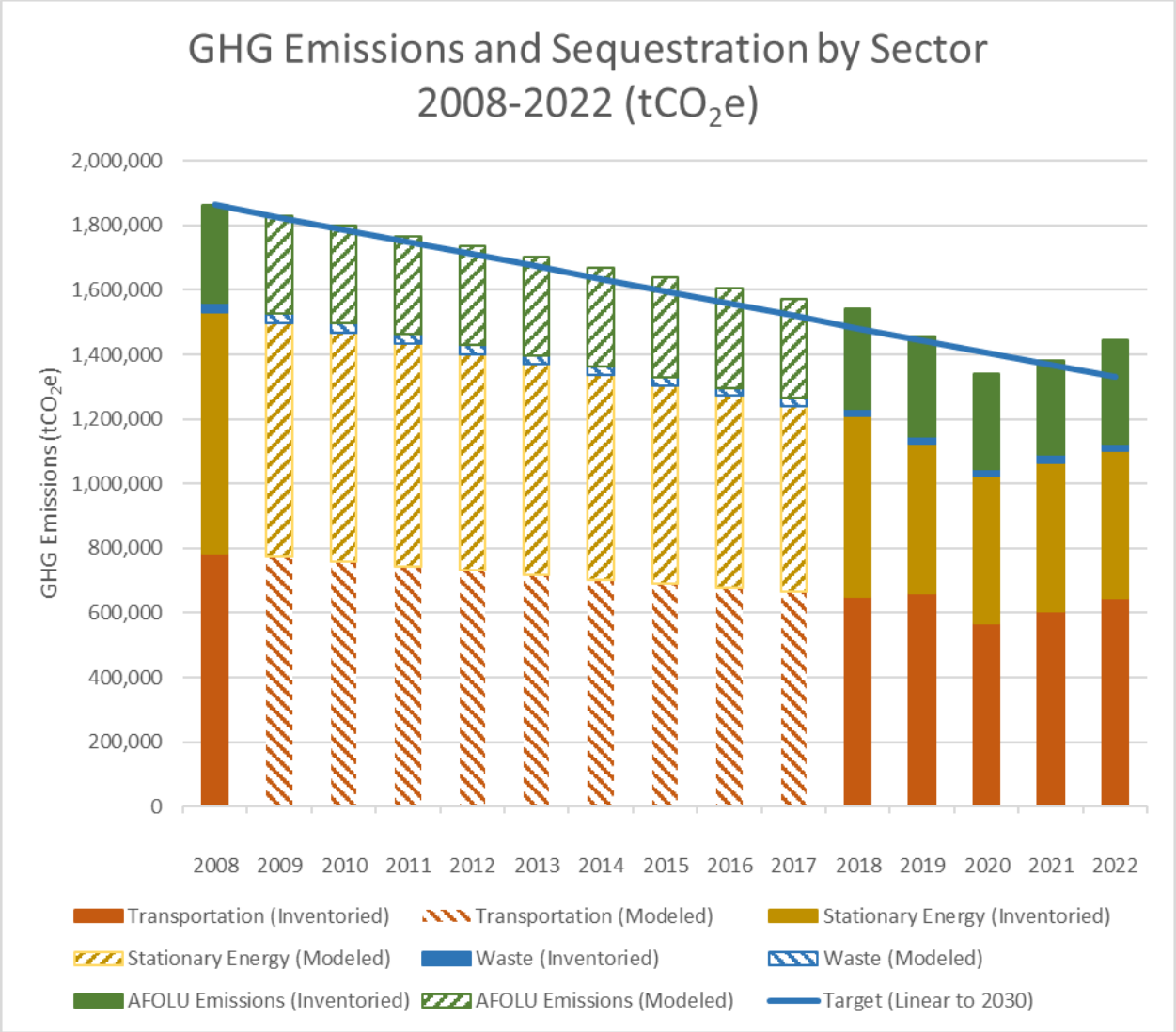

Figure 1: Net Greenhouse Gas Emissions by Sector and Target Trend Line (in blue)

2. Climate Action Program Strategy

Staff have defined a possible pathway to reach the County's 2030 and 2050 targets by setting SMART goals for each emission sector and prioritizing actions in the CAP with the highest likely benefit. The SMART acronym refers to goals that are specific, measurable, achievable, relevant, and time-bound.

As called for in Albemarle County's CAP, staff have created SMART goals for emissions reductions within each emission sector and prioritized CAP actions according to a holistic evaluation of emissions reductions, community benefits, equitable outcomes, and systemic impact. We identified the top 25 CAP actions likely to be most impactful, which reflect 12 priority strategies:

1. Accelerate distributed renewable energy and building energy efficiency.
2. Accelerate utility-scale renewable energy.
3. Set energy efficiency standards for affordable housing.
4. Improve zoning ordinance to facilitate denser, mixed-use development.

5. Support local organizations that enhance community energy efficiency.
6. Increase urban tree cover and native plants.
7. Increase composting availability and practice.
8. Increase climate-smart agricultural practices.
9. Strengthen local food network.
10. Improve transit service, coverage, frequency, reliability, and use.
11. Increase quantity, quality, and use of bicycle and pedestrian infrastructure.
12. Restore and regenerate natural areas on private land.

This work has led to a prioritized work plan for Climate Program staff that aligns with the County's five-year Strategic Plan.

Using ICLEI's ClearPath tool, we modeled the emission reduction projections through 2050 based on the adoption of SMART goals for 2030 and 2050 and the implementation of prioritized actions. The emissions trajectory (depicted in the graph below) surpasses the 2030 target, thereby leaving room for error as our community aims for zero net emissions by 2050.

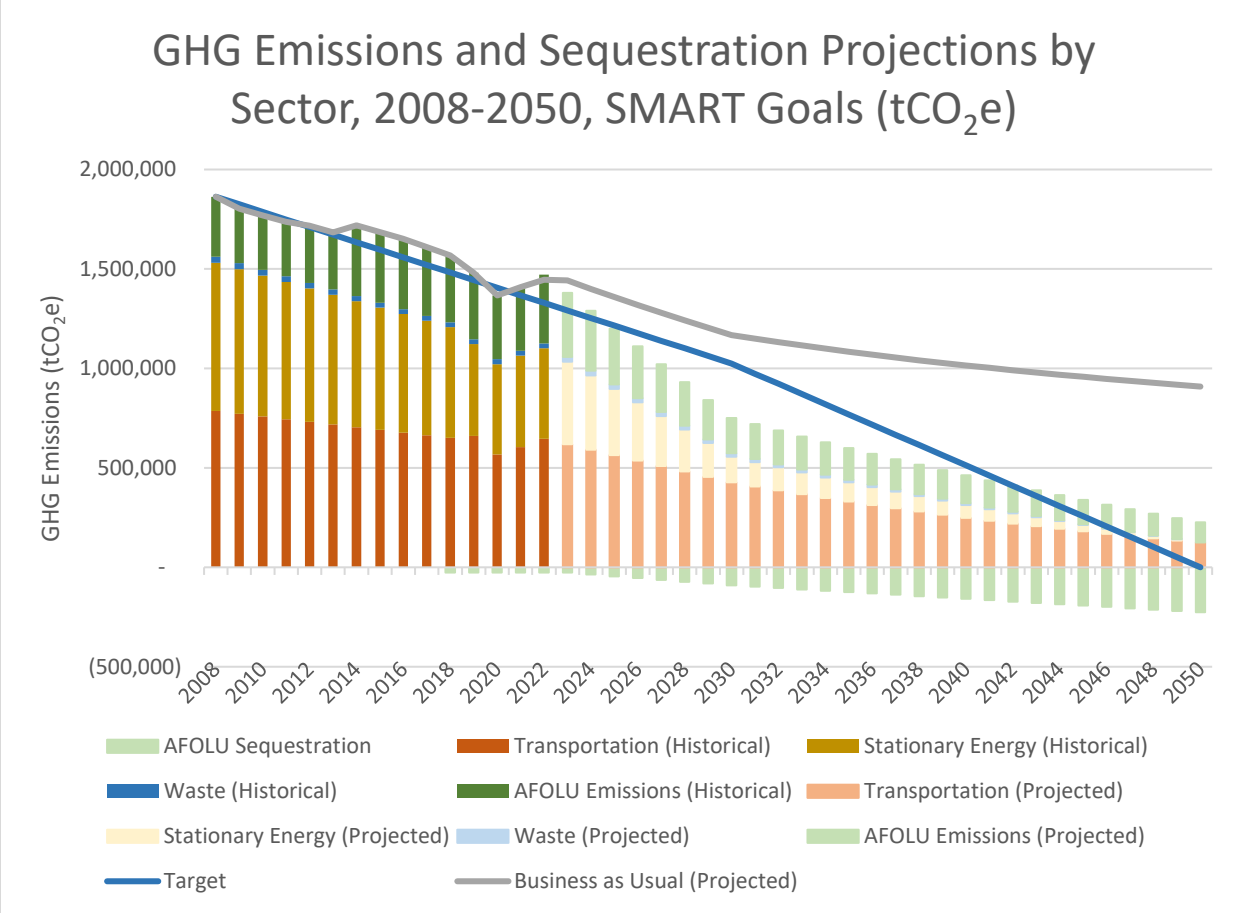

Figure 2: Greenhouse Gas Emissions and Sequestration Projections by Sector Reflecting Realized SMART Goals

3. Our Work

Albemarle County's Climate Action Program includes a wide-ranging set of activities to reduce community greenhouse gas emissions, prepare for climate change impacts, and engage community

members and organizations in local climate action. Our work focuses on systemic impact as defined by our SMART goals and strategic prioritization. Program activities include discrete projects and cyclical, recurring programming.

In this chapter, we summarize past and current projects to address climate change that have been led or supported by the Climate Program, with collaboration from staff across the organization. Projects are organized into types of work that reflect the variety of tools available to local government: regulation, planning and capacity building, partnerships and grants, outreach and education, analysis and studies, and facility and capital improvements.[1]

Highlights include:

- Launching the **Community Climate Action Grant program**, which has provided $200,000 to ten community-based projects that are reducing greenhouse gas emissions, making our community more equitable, and supporting local health, wealth, and ecology.
- Launching **Resilient Together**, a collaborative process led by Albemarle County, the City of Charlottesville, and UVA, designed to develop a climate adaptation and resilience plan – ensuring that our community is strong, safe, and healthy in the face of a changing climate.
- Launching the **Climate Resilience Cohort**, funding a community engagement initiative in support of Resilient Together to partner with community-based organizations (CBOs) that serve disadvantaged community members, helping to center the needs of our most vulnerable community members as we craft and implement strategies to build local resilience to climate change.
- Improving energy infrastructure at the 5th Street County Office Building, including a power purchase agreement (PPA) to finance the installation of rooftop solar as well as major energy efficiency upgrades to HVAC equipment that have generated significant reductions in energy usage, operational costs, and greenhouse gas emissions.

Climate action spearheaded or supported by the County's Climate Program has covered the following range of activity areas:

- **Regulation** has included adoption of a solar ordinance to streamline the application process for solar energy facilities, a C-PACE ordinance to create a local program to finance clean energy and energy efficiency projects in commercial buildings, and an ordinance to enable the County to charge fees for electric vehicle (EV) charging.
- **Planning and Capacity Building:** In addition to the Resilient Together project highlighted above, Climate Program and Office of Equity and Inclusion staff collaborated to create an Equity and Climate Action Lens that can be applied to projects across the organization to ensure they center these two fundamental priorities. Staff piloted the lens in the AC44 Comprehensive Plan process.
- **Partnerships & Grants:** In addition to the highlights described above, we have successfully applied to several federal and state grants and in turn awarded grants to community organizations serving County residents and businesses.

[1] To support alignment across the County, we group our work into similar categories as the draft AC44 Comprehensive Plan.

- **Program Outreach and Education** outside of major projects has included numerous community events, media appearances, and speaking engagements. Highlights include educational events on C-PACE, solar for rural businesses, dam safety, and on local climate change impacts.
- **Analysis & Studies** included greenhouse gas emissions inventories for five calendar years and a Climate Vulnerability and Risk Assessment completed in 2022.
- **Facility & Capital Improvement** has included reduced mowing at County parks, purchase of electric mowing equipment, acquisition of electric vehicles and charging stations, energy efficiency improvements at County buildings, and a Power Purchase Agreement for solar energy atop the County office building at 5th Street.

Entering FY26, the Climate Action Program will prioritize the following strategic projects. Some of these projects will be supported by funding earmarked by the Board in the FY26 budget.

- **Residential Energy Improvements** implemented by LEAP and AHIP and focused on low-income residents. ($237,000)
- **Energy Resource Hub** to guide community members toward government and utility energy-related incentives. ($63,000)
- **Government Building Energy Efficiency** projects to ensure the County government leads by example. ($100,000)
- **Climate Action Collaboration Initiative** to partner with other entities and leverage funding for a short list of initiative types. ($72,000)
- **County Code Review** to gradually bring the incentives within the Code into alignment with the needs of the climate crisis. (no funding required)
- **Internal Climate Action Support** to ensure all customer-facing staff play an appropriate role in climate action. (no funding required)
- **Charging Smart / SolSmart** to lower barriers for community members and industry to execute electric vehicle charging and solar projects in the County. (no funding required)
- **Resilient Together** to develop the County's Climate Adaptation and Resilience Plan.
- **Sustainable Operations** to ensure the County is leading by example when it comes to buildings, fleets, and landscape management. (no funding required)
- **Community Composting** to re-imagine our community's organic waste system and continue to engage community members in environmental efforts. (no funding required)

Conclusion: Looking Ahead

Since the Board of Supervisors adopted Albemarle County's first Climate Action Plan in 2020, County staff and community partners have worked energetically and creatively to implement solutions to climate change at the local level. Climate Action Program staff have spearheaded the creation of new community grant programs that have funded over a dozen local organizations in work with direct emissions reductions, secured federal and state grants, forged fruitful partnerships with peer institutions, and supported policymaking and regulation that will incentivize emissions reductions across the community.

Despite the immense work of County staff and community partner organizations—as well as the participation of many community members—our community's emissions are not on track to achieve the 2030 target set by the Board of Supervisors. After a downward trend from 2008 to 2020, emissions increased slightly in 2021 and 2022.

Through innovative goal-setting and strategic prioritization of our Climate Action Plan, Climate Program staff have articulated a pathway to achieve—and even surpass—our emissions reduction targets, providing numerous other community benefits in the process.

Following this strategic pathway and achieving our SMART goals requires investment of funds, interdepartmental staff time, and other resources by the County. While aspects of climate change fall outside the control of the County, we can make substantial progress by investing in the work of staff and community partners. These investments will reap rewards: "Natural hazard mitigation saves $6 on average for every $1 spent on federal mitigation grants, according to an analysis by the National Institute of Building Sciences."[2]

[2] "Natural Hazard Mitigation Saves Interim Report," Federal Insurance and Mitigation Administration, Federal Emergency Management Agency (FEMA), June 2018, https://www.fema.gov/sites/default/files/2020-07/fema_mitsaves-factsheet_2018.pdf.

1. Where We Stand

The impacts of climate change are intensifying globally as countries around the world struggle to reduce greenhouse gas emissions at the pace required to fully address the challenge. According to the Fifth National Climate Assessment (2023), published by the National Oceanic and Atmospheric Administration (NOAA), "While US greenhouse gas emissions are falling, the current rate of decline is not sufficient to meet national and international climate commitments and goals."[3]

Albemarle County is experiencing the impacts of climate change locally. In 2024, globally the hottest summer (and year) on record, the county experienced 10 days above 95° Fahrenheit,[4] double the historical average for days per year that exceed 95°F.[5] After experiencing a drought for much of 2024, parts of Albemarle County received over 10 inches of rain from the storms prior to and during Hurricane Helene.[6] The County's *Climate Vulnerability and Risk Assessment* predicts future impacts from hazards such as those exacerbated by climate change.

These impacts are costly in terms of life, health, and property. According to NOAA analysis, 2024 had the fourth-highest disaster costs in the past 45 years. The analysis continues,

> In 2024, there were 27 confirmed weather/climate disaster events with losses exceeding $1 billion each to affect United States. Overall, these events resulted in the deaths of 568 people and had significant economic effects on the areas impacted. The 1980–2024 annual average is 9.0 events (CPI-adjusted); the annual average for the most recent 5 years (2020–2024) is 23.0 events (CPI-adjusted).[7]

NOAA's Fifth National Climate Assessment summarizes:

> As extreme events and other climate hazards intensify, harmful impacts on people across the United States are increasing. Climate impacts—combined with other stressors—are leading to ripple effects across sectors and regions that multiply harms, with disproportionate effects on underserved and overburdened communities.[8]

Addressing climate change meaningfully and equitably involves both reducing greenhouse gas emissions and preparing for the extreme weather that we already face. A key starting point is knowing our own community's emissions. This chapter reports five years of greenhouse gas emissions inventories,

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[3] National Oceanic and Atmospheric Administration (NOAA), *Fifth National Climate Assessment*, 1. Overview: Understanding Risks, Impacts, and Responses, https://nca2023.globalchange.gov/.

[4] Daily Summaries Station Details, Charlottesville Albemarle Airport, VA US, National Centers for Environmental Information (NCEI), National Oceanic and Atmospheric Administration (NOAA), accessed November 8, 2024, https://www.ncdc.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USW00093736/detail.

[5] Albemarle County, *Climate Vulnerability and Risk Assessment*, June 2022, p. 57, https://www.albemarle.org/home/showpublisheddocument/13774/637937484453800000.

[6] National Weather Service, Rainfall Monitoring, weather.gov, accessed October 8, 2024, https://www.weather.gov/akq/rainfall-monitoring.

[7] NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2025). https://www.ncei.noaa.gov/access/billions/, DOI: 10.25921/stkw-7w73

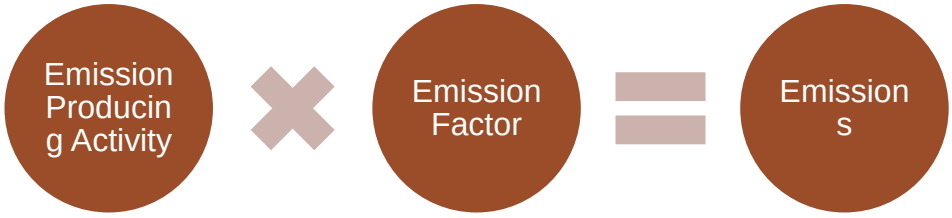
[8] National Oceanic and Atmospheric Administration (NOAA), *Fifth National Climate Assessment*, 1. Overview: Understanding Risks, Impacts, and Responses, https://nca2023.globalchange.gov/.

allowing us to monitor progress on community-wide emissions reduction. Subsequent chapters address efforts to reduce emissions and prepare for the impacts of climate change in the years to come.

Greenhouse Gas Emission Inventories

A greenhouse gas emission inventory is a method used by governments and other organizations to quantify their contribution to global climate change by estimating the amount of greenhouse gas emissions that result from activities or processes within the community or organization. In developing this inventory, we have followed the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)—a set of standards developed specifically for local governments.[9]

Greenhouse gas emissions are calculated by multiplying local activity data by emission factors. Examples of activities include driving an automobile, using electricity in a building to power lights, or burning natural gas on a gas stove. Emission factors reflect the quantity of various greenhouse gases emitted per unit of activity. The resulting product reflects the greenhouse gas emissions associated with that activity.



Most activities, especially those involving the combustion of fossil fuels, generate quantities of several significant greenhouse gases—primarily carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Each of these contributes to global warming with varying intensity, referred to as a global warming potential (GWP). To provide a single number that can be compared easily over time, we use the global warming potential to convert the total of each greenhouse gas into an equivalent amount of carbon dioxide, reported as metric tons of carbon dioxide equivalent units (tCO_2e).

In a resolution on October 16, 2019,[10] the Albemarle County Board of Supervisors adopted community-wide greenhouse gas emission reduction targets: **reduce emissions by 45% from 2008 levels by 2030 and achieve zero net emissions by 2050**. Greenhouse gas emission inventories provide a standardized accounting of community-wide greenhouse gas emissions based on available data from the applicable calendar year. Each inventory builds on past inventories to allow for an evaluation of progress made towards the emission reduction targets. Inventories provide new benchmarks to assess future progress on the County's commitment to reduce emissions. Further, the inventories serve to better inform community members and elected and appointed officials on the sources and volume of greenhouse gas emissions resulting from emission-producing activities within our community.

[9] World Resources Institute, C40 Cities, and ICLEI Local Governments for Sustainability, Global Protocol for Community-Scale Greenhouse Gas Emission Inventories: An Accounting and Reporting Standard for Cities (World Resources Institute, 2014), https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf.

[10] https://albemarle.legistar.com/View.ashx?M=F&ID=7762461&GUID=12EB6942-B598-49D4-8842-8DAE512A4DC9

Albemarle County's Climate Action Plan, adopted by the Board of Supervisors in 2020, commits the County to complete a community-wide greenhouse gas emission inventory every two years. Given the value of having annual data for trend analysis, the Climate Action Program has been developing inventories each year beginning in 2018. The County calculates its emissions in-house with the help of data from a variety of sources. For quality control, we compared our in-house results for the 2018 greenhouse gas inventory with the results using ICLEI's[11] ClearPath software, the leading tool used by local governments for such inventories. The total greenhouse gas emissions from the two methods differ by less than 1%.

Methodological Improvements and Limitations

Calculating greenhouse gas emissions at the community scale is limited by the quantity and quality of data available.[12] To be perfectly accurate, communities would need to have much more robust and precise data collection techniques.

However, techniques for calculating greenhouse gas emissions are advancing rapidly. Many more cities and counties are conducting inventories in response to community demands for local climate action. As communities seek best practices for conducting their inventories, federal, state, and private firms have developed new datasets and technologies to improve measurement.

Accordingly, Albemarle County's inventory method has and will likely continue to evolve over time. For the County's 2018 and 2020 inventories, staff made major methodological changes to reflect developments in best practice since the 2008 inventory. As new data, formulae, and tools become available, staff will consider whether and how to adjust our approach to the calculations based on the benefits and costs of doing so.

When methodological adjustments are made, as with the 2018 and 2020 inventories, staff revise previous inventories to align with the improved methodology and create consistency from one year to the next.

Inventory Results

As shown in Figure 2, community-wide emissions have decreased overall since the baseline year of 2008 but increased from 2020 to 2022. The straight blue line depicts a steady reduction required to meet the 2030 target. Emissions are categorized into several areas, or sectors, of related types of activities that generate greenhouse gases. These sectors are Transportation, Stationary Energy (i.e. buildings), Waste, and Agriculture and Landscape.[13] No emission inventories have been completed for the years 2009 through 2017. Therefore, emissions for these years are interpolated from 2008 and 2018 emissions.

[11] International Council for Local Environmental Initiatives

[12] For a detailed review of most of the methodological elements of the inventories, see the County's *2018 Greenhouse Gas Inventory Report*, https://www.albemarle.org/home/showpublisheddocument/10553/637659234201630000.

[13] A common category used in greenhouse gas inventories is "Agriculture, Forestry, and Other Land Uses (AFOLU)." The County's Climate Action Plan refers to this category as Landscape, Natural Resources, and Agriculture. For simplicity, both of those concepts will be captured by the phrase "Agriculture and Landscape" in this document.

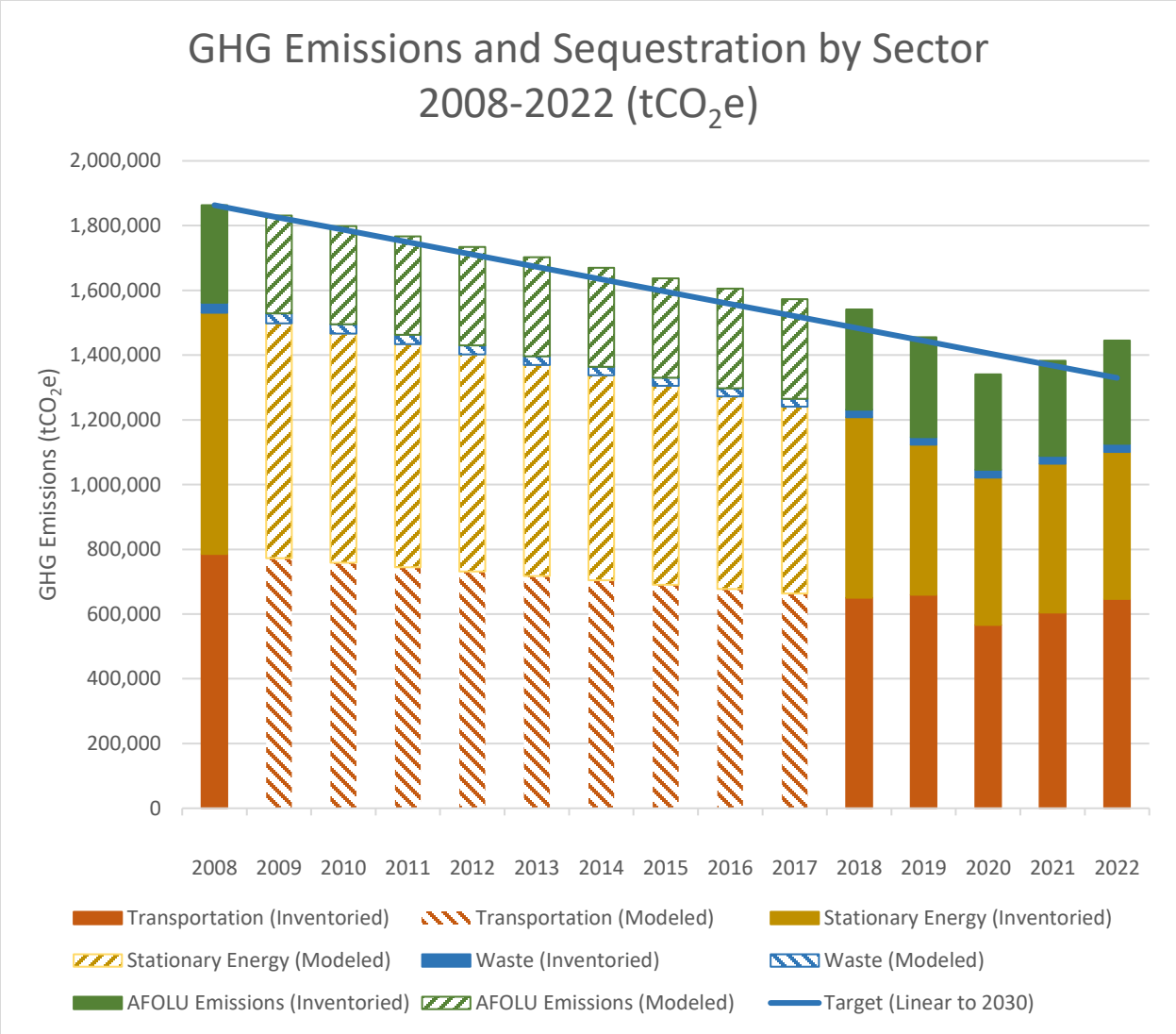


Figure 3: Greenhouse Gas Emissions Attributed to Albemarle County (2008 is the baseline year)

Year	Emissions (tCO_2e)	Nominal Change from Previous Inventory (t CO_2e)	% Change from Previous Inventory
2008	1,861,109	N/A	N/A
No inventories were conducted between 2008 and 2018			
2018	1,567,369	-293,740	-16%
2019	1,481,668	-85,701	-5%
2020	1,366,265	-115,403	-8%
2021	1,408,716	+42,451	+3%
2022	1,445,345	+36,629	+3%

Table 1: Greenhouse Gas Emission Inventory Results and Year-Over-Year Changes

Transportation

Transportation activities generate the largest proportion of emissions in the county – ranging from 42 to 47 percent during the inventory years and increasing in proportion over time[14]. Emissions reflect travel on all public roads by all vehicles. Vehicles with internal combustion engines (ICE) generate direct greenhouse gas emissions while electric vehicles (EVs) generate emissions indirectly through their use of electricity. The indirect greenhouse gas emissions of an EV depend on the percentage of renewable energy powering the grid, which differs from state to state. According to the Alternative Fuels Data Center, EVs in Virginia produce about 16 percent of the emissions produced by similarly sized gas-powered vehicles.[15]

Emissions in this sector increased from 2018 to 2019 due to growth in vehicle miles traveled. Vehicular traffic dropped significantly in 2020 due to people staying home much more often during the height of the pandemic. As people started to return to work and generally travel more, emissions began to climb accordingly. By 2022, transportation emissions had almost returned to 2018 levels.

Stationary Energy

Stationary Energy is the sector with the next highest proportion of emissions, ranging from 30 to 40 percent and comprising a generally smaller proportion of total emissions over time. This sector's emissions come from grid electricity use in residential, commercial, industrial, and government buildings; and use of natural gas, fuel oils, propane, or wood burning for heating and cooking in those buildings.

This is the only sector in which both actual emissions and the proportion of community-wide emissions are both decreasing. That is largely due to the utility grid's increasing reliance on renewable energy sources for power generation, though that flattened out between 2020 and 2022. Actual usage dipped in 2020 due to much of the commercial sector slowing down that year. After increasing in 2021, overall emissions in the sector came back down in 2022.

Agriculture and Landscape

The Agriculture and Landscape sector is the third largest contributor of emissions, ranging from 16 to 23 percent of total emissions and generally increasing in proportion to other sectors over time. Unlike other sectors, this category includes the effects of carbon *sequestration*, which is the capture and retention of carbon by vegetation and soil. Sequestration is considered along with emissions to arrive at the net emissions for the sector.

Net emissions in this category are a product of both land use change and agricultural activities, and come from the following sources:

- Raising livestock, including enteric fermentation, methane released from manure, and direct and indirect nitrous oxide from manure;
- Fertilizer and lime application in agricultural operations;

[14] This percent range accounts for updates to our inventory methodology that account for emissions from agriculture and land cover change. 2018, 2008, and other older inventories reflected an inflated transportation proportion because they did not include the sizable emissions from the agriculture and landscape sector.

[15] "Emissions from Electric Vehicles," Alternative Fuels Data Center, United States Department of Energy, accessed October 16, 2024, https://afdc.energy.gov/vehicles/electric-emissions.

- Soil emissions, including natural processes and topsoil removal;
- Fuel use on farms, including gasoline, diesel, liquid propane, and other fuels; and
- Changes to land cover, including disturbances to forests and trees across the county (the largest source in this sector).

County forests and trees outside of forests have historically played – and will continue to play – a significant climate mitigation role by sequestering carbon. Throughout the county, forests cover approximately 68% of the land. In addition, tree canopy covers approximately 25% of the land outside of forests. Based on an analysis of the years 2008 – 2019 utilizing the ICLEI tool called Land Emissions and Removals Navigator (LEARN), forest and trees outside of forests resulted in a net sequestration of 894,095 CO2e per year. Because this sequestration has been happening throughout recent history, it is regarded as the baseline condition and not factored into the net emissions inventory.

However, land cover changes – such as the development of historically-forested land – results in immediate emissions resulting from the land use change and lasting changes to the amount of sequestration. Through LEARN, we estimate that an average of 89 acres of land have been converted each year to permanent development – mostly in the urban areas. In addition, non-developed land cover (particularly in the rural areas) constantly changes from one condition to another over time – resulting in forest loss in one area and forest gain in another. On average, the county has experienced an annual loss of approximately 426 acres of forest. Therefore, sequestration by forests is slowly diminishing over time.

Most of the data for agricultural emissions comes from the US Department of Agriculture's census, which USDA conducts every five years. Staff based calculations for a given inventory year on the most recent census year, so emissions from 2018 and 2019 are derived from the 2017 census, and emissions from 2020 through 2022 are derived from the 2022 census. Important beneficial agricultural practices such as cover cropping and no-till planting are on the rise among agricultural producers in the county.

Waste

The Waste sector accounts for the lowest proportion of emissions in the County, ranging from 1.4 to 1.7 percent and trending slightly upwards in absolute terms and relative to other sectors. Emissions from this sector come from organic materials that end up in landfills, where they release methane as they decompose under anaerobic conditions. Materials included in our calculations are food waste and scraps, paper, paperboard, lumber, organic textiles, and yard trimmings.

Local data in the Waste sector is generally unavailable. Staff extrapolate from national-level EPA data, and 2018 was the last time EPA updated its Waste report. In the absence of data to the contrary, staff assume that waste composition has remained constant from 2018 to 2022. Therefore, the key change from 2018 to 2022 has been population growth. Staff also holds per capita waste generation constant. Therefore, the total waste generation and the associated emissions appear to increase in line with population growth and did not see a decrease or increase during the height of the pandemic.

Local Government

Emissions from local government operations are important to consider as part of the community's overall emissions profile, as we can play a critical role in modeling climate action for the rest of the community.

For local government calculations, staff rely on several sources. For transportation, relevant staff provide fleet and fuel use data. For buildings and streetlights, staff use an internally developed energy tracking workbook. Employee commute mileage has been more challenging to calculate due to data access limitations since 2018. For our 2020 methodology adjustment, we estimated employee commute miles based on the number of employees working in County buildings during the height of the COVID pandemic. For each energy source, staff use the base data to calculate the emissions using the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) in an internally developed Excel workbook.

Emission reductions in 2018 and 2019 were generally in line with the reductions needed to reach the Board's 2030 target. In 2020, the COVID pandemic forced more than 75% of the County's employees to work from home. That led to a significant reduction in employee commute miles, along with a decrease in fleet and building usage. 2021 saw a significant return to work for many employees, although COVID rates were still influencing employee practices, resulting in increased emissions in both 2021 and 2022. Figure 4 shows building and fleet usage increase along with commute miles as more and more staff returned to the office.

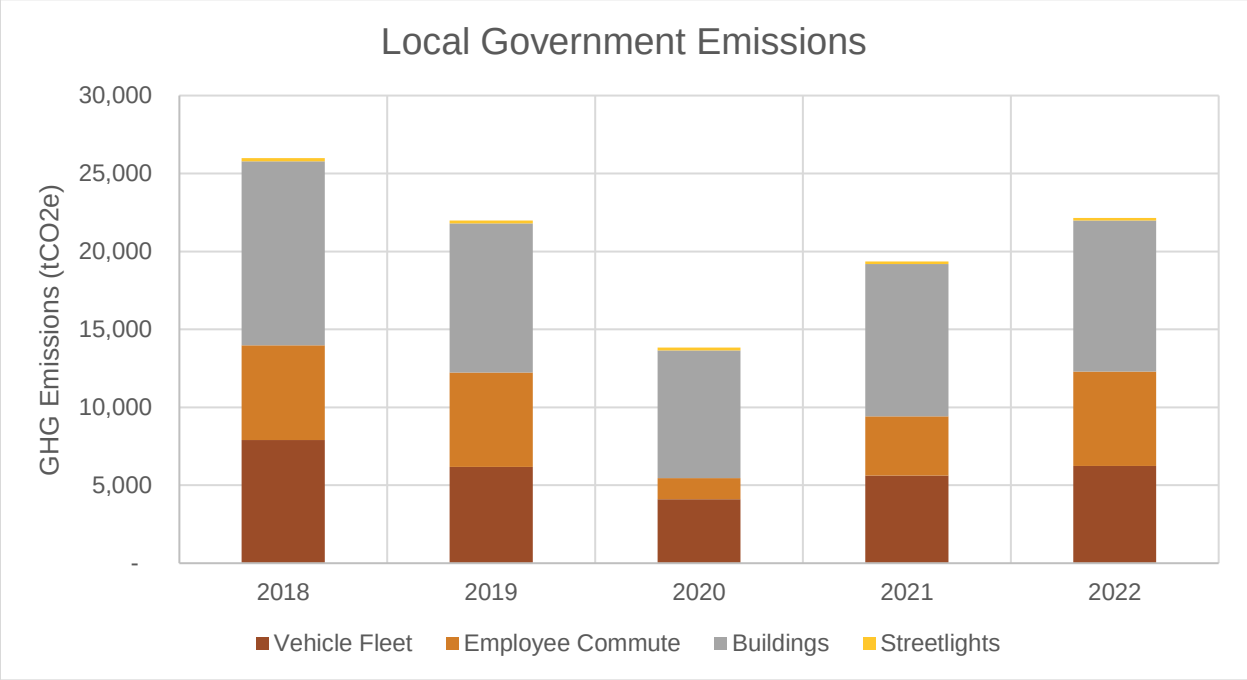


Figure 4: Emissions from Local Government Operations (2018-2022)

Note that emissions from local government operations are just over 1% of our community's total contribution to climate change. Therefore, broad and deep community member involvement in climate action is essential if we are to reach the Board of Supervisors' targets.

Connecting the Inventories to Our Emission Reduction Targets

According to our inventories, the total emissions reduction from 2008 to 2022 was 22 percent. Figure 3 shows a blue line indicating a straight pathway from the baseline year of 2008 to the Board of Supervisors' target of 45% fewer emissions in 2030, followed by a steeper drop to reach the goal of net zero emissions by 2050. While actual emissions reductions are not likely to be perfectly linear, the blue

line shows the average annual reduction required to meet Albemarle County's targets. The black line shows actual emissions for inventory years (2008, 2018-2022) and modeled emissions for historical non-inventory years (2009-2017). Continuing where the black line ends, the gray line shows a modeled projection of future emissions if we continue to reduce them at our current pace (2022-2050).

To be on track for achieving the Board of Supervisors' emissions reduction target for 2030, community-wide emissions should have reduced by approximately 29% by 2022 (our latest inventory year). Our calculations show that emissions only dropped by about 22% from 2008 levels, with slight emissions *increases* from 2020 to 2022. The Albemarle community needs to reduce its emissions more rapidly if we are to achieve the Board of Supervisors' 2030 target and, more importantly, the 2050 target.

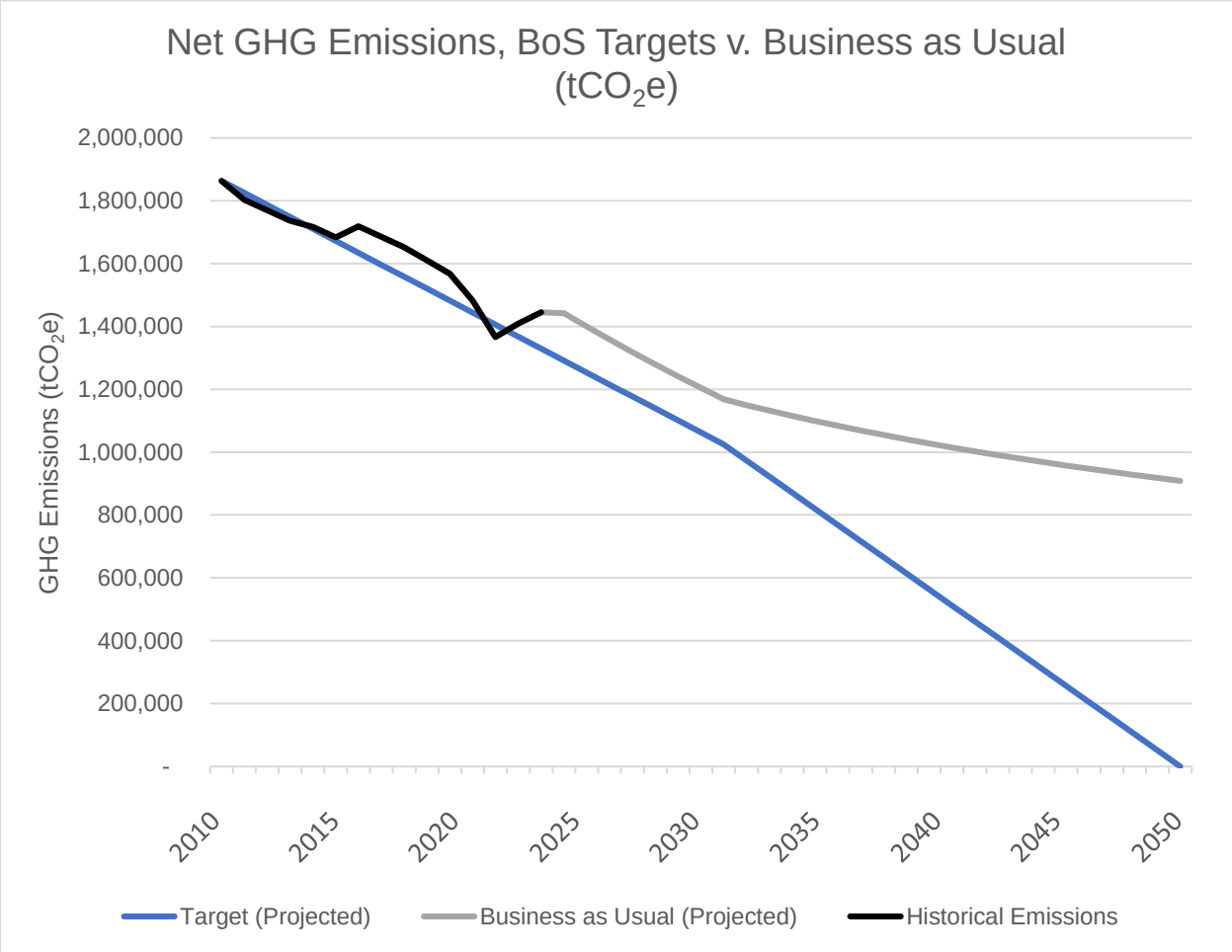


Figure 5: Net Greenhouse Gas Emissions Targets and Business-as-Usual (BAU) Scenario

In the next section, we discuss how setting SMART goals for each emission sector and prioritizing CAP actions with the highest likely benefit have helped us to define a clearer pathway to reach the County's 2030 and 2050 targets.

2. Climate Action Program Strategy

The wide-ranging and disproportionate nature of climate change impacts, discussed in Chapter 1, requires action at all levels of society, including by local, state, and federal governments. One reason that public sector action is key to addressing climate change is that reducing emissions requires interventions in overlapping market, energy, food, agriculture, and transportation systems. Albemarle County Climate Program staff have found it helpful to approach our work as a challenge of complex systems change.

Complex systems, as defined by business leaders and scientists, are different than simple and complicated systems. *Simple* systems are easy to understand and require straightforward, linear solutions to change the system or address a problem. *Complicated* systems may have many components but can still be reduced to a set of simple relationships. With adequate information, changing a complicated system can be achieved with standard rules and formulas.[16] *Complex* systems, on the other hand, have interrelated parts that affect each other in multiple directions, which leads to feedback loops, ripple effects, tipping points, and other forms of nonlinear causality. These systems often involve humans with different priorities, perspectives, and emotions. The results of intervention are often not immediately measurable or visible.[17]

Considering this, Albemarle County's Climate Action Plan (CAP) calls for several important strategic steps to enable successful implementation, including creating SMART goals; evaluating each action in terms of likely costs, emissions reductions, community benefits, and impacts on social equity; and prioritizing the actions according to this holistic evaluation.

Implementing these steps has yielded a set of SMART goals for the major emission sectors in the Climate Action Plan and a prioritized list of actions based on a set of holistic impact indicators. The next two sections summarize the results of this work and our methodological approach. Combined, this work has led to a prioritized work plan for Climate Program staff that aligns with the County's five-year Strategic Plan and elevates actions that contribute to local systems change above actions that produce smaller scale, linear results within existing systems.

SMART Goals

"SMART" is an acronym and framework for setting effective goals in the context of project management. While individual terms can vary, the County's Climate Action Program applies the following concepts to our emissions reduction goals: Specific, Measurable, Achievable, Relevant, and Time-bound. We define these terms as follows:

SMART Acronym Term	Meaning
Specific	Target a discrete area for improvement
Measurable	Use progress indicators that can be quantified
Achievable	Results that can be achieved given available resources

[16] A classic example of a complicated system is sending a rocket ship to the moon; applying the right measurements, equipment, and procedures will lead to the desired result.

[17] Perhaps the most relevant example of complexity is the global climate system itself: Through greenhouse gas emissions, humans continue to disrupt this system, which leads to nonlinear ripple effects, tipping points, and feedback loops.

Relevant	Goal is directly related to the topic (e.g., climate action)
Time-bound	Specify by when the result should be achieved

Table 2: SMART Acronym Term Meanings

Each chapter in the Climate Action Plan lists broad goals for emissions reduction in the associated sector—transportation and land use, buildings and renewable energy, sustainable materials management, and agriculture and landscape. Although these goals are measurable and relevant to climate action, they lack the specific, time-bound, and achievable quantitative benchmarks required for SMART goals. Converting the Climate Action Plan's goals to SMART goals improves the likelihood of achieving the emissions reduction targets set by the Board of Supervisors and enables better monitoring and evaluation.

The following table shows how staff modified the original goals in the Climate Action Plan into SMART goals. The metrics for the original goals and SMART goals are not always one-to-one due to the method and tools used to create the latter.[18] However, all major strategy areas in the Climate Action Plan are reflected in the SMART goals.

Original Climate Action Plan Goals		SMART Goals
Transportation and Land Use	→	By 2030, limit transportation emissions to 427,712 tCO_2e.
Reduce overall vehicle miles traveled.	→	• Increase walking mode share to 2.5% by 2030. • Increase biking mode share to 2% by 2030. • Increase transit mode share to 2% by 2030.
Reduce use of single-occupancy vehicles.		
Increase use of alternative modes of travel such as biking, walking and public transit.		
Shift towards lower-emissions and zero-emissions vehicles.	→	Increase percent of electric vehicles to 28% by 2030.
Stationary Energy (Buildings & Renewable Energy chapters)	→	By 2030, limit annual stationary energy emissions to 128,777 tCO_2e.
Increase on-site renewable energy production.	→	By 2030, install 469 megawatts (MW) of renewable energy generation capacity.
Increase renewable energy generation capacity to the electrical grid system.		
Reduce overall energy use in buildings.	→	• By 2030, convert 40% of natural gas appliances to electric appliances. • Improve electricity and natural gas efficiency by 20%.
Sustainable Materials Management	→	By 2030, limit waste emissions to 16,951 tCO_2e
Increase the percentage of recyclable materials put to positive use and	→	Divert tonnage of recyclable organic materials from landfills to reuse/recycling by 88% from 2020 to 2030.

[18] Staff used the ClearPath software to model the relationship between goals for specific strategies (e.g., increasing transit use) and the impact on emissions for each sector (e.g., transportation). ClearPath only accepts certain types of strategies, which in some cases required changing the details of a CAP goal to create a SMART goal with the same outcome. For example, ClearPath does not allow the user to set a goal for vehicle miles traveled. However, setting goals for increasing walking, biking, and transit will necessarily impact vehicle miles traveled.

Original Climate Action Plan Goals		SMART Goals
diverted from landfills.		
Increase the percentage of organic materials diverted from landfills and composted.	➔	Divert 50% of food waste and yard trimmings from landfill.
Landscape, Natural Resources, and Agriculture	➔	By 2030, limit annual agriculture, forest, and other land use emissions to 87,231 tCO_2e.
Protect and restore natural carbon sinks.	➔	• Limit conversion from trees cover to 578 acres annually. • Restore tree cover on 1,205 acres annually.
Promote practices on managed land that trap carbon and minimize carbon emissions.	➔	• 266 livestock operations use prescribed grazing. • Adopt cover crops on 1,725 acres of ag land. • Adopt no-till planting on 8,145 acres of ag land. • Limit conversion from trees cover to 578 acres annually. • Restore tree cover on 1,205 acres annually.

Table 3: Relationship of SMART Goals to Original CAP Goals

The SMART goals in the right column:

1. Help the Climate Action Program prioritize work broadly across sectors;
2. Serve as benchmarks against which we can measure progress; and
3. Provide clear aims that can be integrated into the new AC44 Comprehensive Plan.

Creating these SMART goals involved first evaluating how the existing goals in the CAP met or fell short of each element within the SMART framework. Most goals in the CAP were already *relevant* and somewhat *specific* in that they named strategic areas of work that result in emissions reductions (e.g., "reduce overall energy use in buildings," or "increase use of alternative modes of travel such as biking, walking and public transit"). The *time-bound* nature of our work was set by the Board of Supervisors' 2030 and 2050 targets; however, the deadline for each goal needed to be made explicit. The goals were already *measurable* in that they stated concepts from which units could be derived and measured, but often they did not list numbers and units. The bulk of the work involved identifying *achievable* numbers for each goal; doing so involved balancing the desire to be ambitious and the need to be realistic.

Our process for setting achievable goals included several steps: first, we researched local, state, and national trends for each emission sector and sub-sector to create *constrained*, *moderate*, and *ambitious* options for each goal. Through additional research, consultation with staff colleagues, and feedback from partner organizations with relevant expertise, we selected what appeared to be the most appropriate option for each sub-sector. Generally, we chose a constrained goal in cases for which the local context is unfavorable for action in a given area, a moderate goal when state or national policy is moving in the right direction, and an ambitious goal when there appears to be strong national, state, *and* local momentum or resource allocation. Our decision to classify a goal as ambitious, moderate, or constrained considered both how far we are from the 2030 goal and how quickly we're moving towards that goal.

We used software and independent calculations to estimate the impacts of realizing these goals on countywide emissions by sector. These future projections provide a pathway for achieving the County's 2030 and 2050 targets.[19]

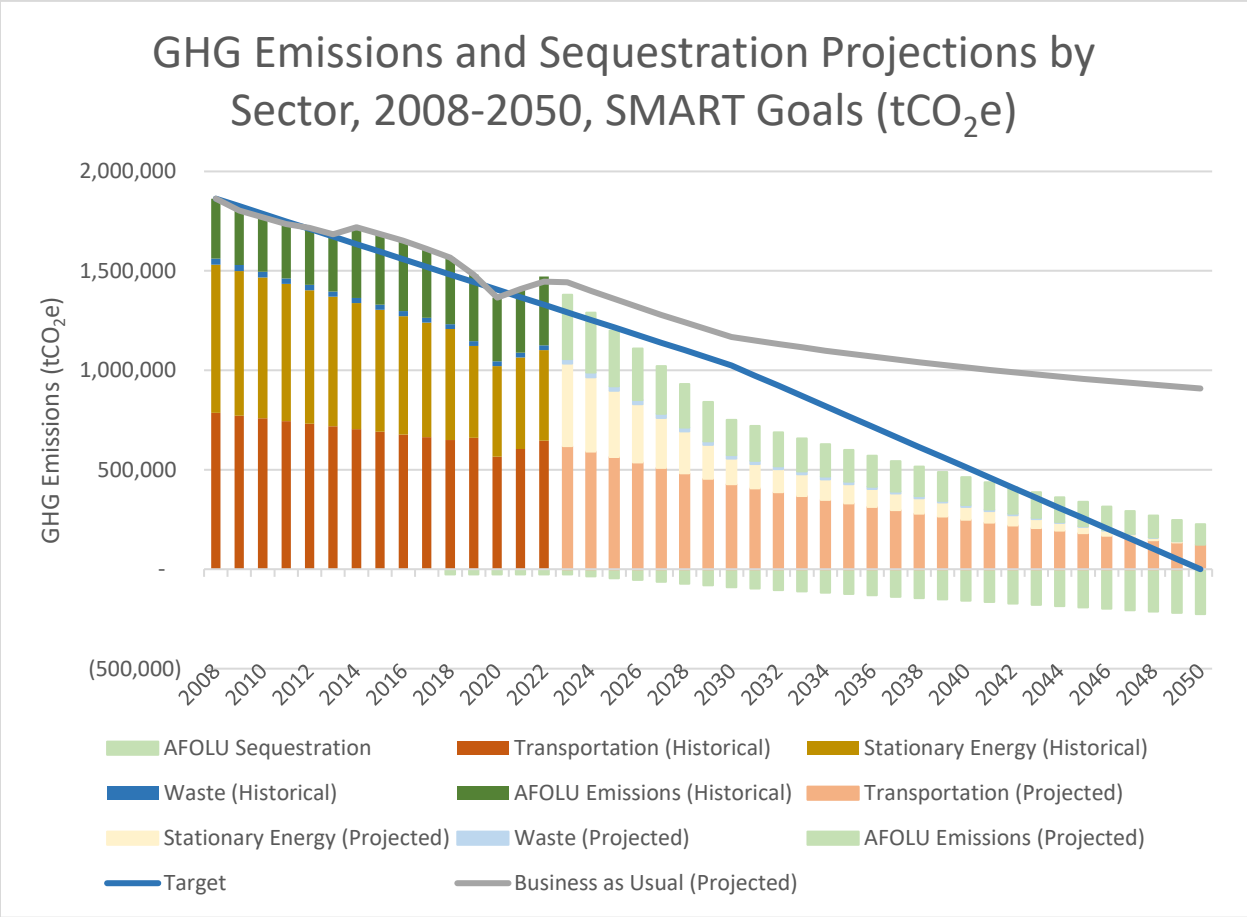


Figure 6: Greenhouse Gas Emissions and Sequestration Projections by Sector Reflecting Realized SMART Goals

SMART Goal Summary

Sector and Solution Areas	Current (2022)	Goal (by 2030)	Ambition
Reduce emissions from the transportation sector to 427,712 tCO_2e.	646,402 tCO_2e	427,712 tCO_2e	N/A
Electric vehicles account for 28% of all registered vehicles.	0.73%	28%	Moderate
Achieve 2.5% of all commuting trips by walking.	1.0%	2.5%	Moderate
Achieve 2% of all commuting trips by bicycle.	1.2%	2%	Moderate
Achieve 2% of all commuting trips by transit.	1.8%	2%	Constrained
Reduce emissions from the stationary energy sector to 128,497 tCO_2e.	454,485 tCO_2e	128,777 tCO_2e	N/A

[19] Our independent calculations also include estimates for past years for which we did not complete an inventory.

Install 469 MW of renewable energy generation capacity.	1 MW	469 MW	Ambitious
Improve electricity and natural gas efficiency by 20%.	6,871 terajoules	5,497 terajoules	Ambitious
Convert 40% of gas appliances to electric.	67% (electric)	74% (electric)	Moderate
Reduce emissions from the agriculture and landscape sector to 87,231 tCO_2e.	319,658 tCO_2e	87,231 tCO_2e	N/A
266 livestock operations use prescribed grazing.	189 farms	266 farms	Ambitious
Adopt cover crops on 1,725 acres of ag land.	1,376 acres	1,725 acres	Moderate
Adopt no-till planting on 8,145 acres of ag land.	4,587 acres	8,145 acres	Moderate
Limit conversion from trees cover to 578 acres annually.	1,248 acres (2019)	578 acres	Ambitious
Restore tree cover on 1,205 acres annually.	1,496 acres (2019)	1,205 acres	Ambitious
Reduce emissions from the waste sector to 16,951 tCO_2e.	24,800 tCO_2e	16,951 tCO_2e	N/A
Divert 50% of food waste and yard trimmings from landfill.	35% (2018)	50%	Ambitious
Divert 88% of paper products from landfill to recycling.	68% (2018)	88%	Ambitious

Transportation SMART Goals

Actions to reduce emissions in the transportation sector include electrifying vehicles and shifting to walking, cycling, and transit from driving personally owned vehicles. The Climate Program set SMART goals for those four sub-sectors: electric vehicles, walking, cycling, and transit.

Mitigating the potential hazards of climate change requires significant shifts in transportation. Given the percentage of local emissions from sector, this is an area where dramatic and beneficial transformation is vital. Because much development and infrastructure have been designed around reliance on personally owned automobiles for travel, shifts in our transportation system must be accompanied by shifts in land use planning and the ways in which we build our communities.

Albemarle County faces constraints in terms of the pace of change, especially its investments in transit, cycling, and pedestrian infrastructure. Because the Virginia Department of Transportation (VDOT) owns and maintains most county roads, controls the design of new projects, and determines the funding schedule for infrastructure improvements, achieving a walkable, bikeable community with robust public transit is a decades-long endeavor.

Due to these systemic constraints and the large geographic size of Albemarle County, we anticipate personally owned vehicles to be a persistent mode of transportation even as we invest in alternative modes. Hence, we are more ambitious in setting goals for electric vehicle adoption than for shifting modes of transportation by 2030. However, transit, cycling, and pedestrian infrastructure will be more important for reaching our 2050 target of zero net emissions and improving community livability and resilience.

Stationary Energy (Buildings and Renewable Energy Sourcing) SMART Goals

Albemarle County's second largest source of emissions according to our greenhouse gas emission inventories is building energy use. This sector includes SMART goals for three sub-sectors: renewable energy generation, electricity and natural gas use efficiency, and switching from fossil fuel-burning to electric equipment.

We set an ambitious goal for renewable energy generation by 2030 for two reasons: first, the Board of Supervisors has demonstrated support for locating clean energy facilities locally by approving several medium and large solar projects. Second, the County is preparing a zoning text amendment that will improve the application, review, and approval process for accessory and utility solar facilities.

We also set ambitious goals for the improved energy efficiency of gas and electric appliances given the tax incentives, rebates, and other funding opportunities available to households and businesses. However, we set a moderate goal for electrification of major household appliances because, while funding programs support this transition, much of the county already uses electric appliances.

As the county decreases its reliance on fossil fuels, creating incentives and infrastructure to support renewable energy generation has illuminated important considerations about land use and development. Locally, our community's conversation on solar energy development has emphasized the need to balance generating our fair share of renewable energy with goals for conservation, water quality, and biodiversity.

Agriculture and Landscape SMART Goals

Agriculture and Landscape is the one sector in which removing carbon from the atmosphere offsets emissions, which makes this an extremely important area of work. For example, Albemarle County contains significant areas of forested land that provide opportunities for stewardship to ensure long-term carbon storage. Similarly, regenerative agricultural practices can draw down carbon from the atmosphere *into* the soil, in addition to reducing carbon emissions *from* the soil. Our goals for this sector reflect both reductions in emissions and increases in carbon sequestration (negative emissions). When summed, emissions and sequestration yield *net emissions*.

Net emissions reflect the sum of activities that result in emissions, on the one hand, and that remove carbon dioxide from the atmosphere, on the other hand. In agriculture, such activities include fertilizer application and rotational grazing, respectively. In forest management, activities include conversion of forested land for development and reforestation, respectively.

Agriculture in Albemarle County includes livestock and crop production. Staff set ambitious goals for net emissions from livestock production and moderate goals for net emissions from crop production. Substantial funding by national and state agencies for locally appropriate, beneficial practices creates important opportunities both areas. However, because most production agricultural operations in Albemarle County are livestock, there is more potential for growth in prescribed grazing practices. Cover cropping and no-till planting have momentum nationally, but there is a lower percentage of crop operations in our area.

Forested areas populate the land in much of Albemarle County. These forests sequester carbon, but staff only account for such sequestration (negative emissions) when forested land is protected through legal or policy tools, such as conservation easements. Because protecting and enhancing the negative

emissions from our forests represents a huge opportunity for local climate action, staff set ambitious SMART goals for limiting deforestation and for improving reforestation. The level of ambition considers conflicting pressures to conserve forests and develop forested land into other uses.

Sustainable Materials Management (Waste) SMART Goals

The waste goal focuses on the reduction of organic waste going to landfill, as organic waste is responsible for the mostly methane emissions in this sector. In Albemarle County's context, that generally includes food waste, yard trimmings, and paper products. There are other important considerations when it comes to the waste stream, such as plastics and reduced consumption more generally. However, the scopes of both the CAP and greenhouse gas emissions inventories are currently limited to the organic elements of the waste sector.

Because waste reduction is a priority for our community—reflected in the Solid Waste Alternatives Advisory Committee (SWAAC)—staff set ambitious goals for diverting food waste, yard waste, and paper products from the landfill to more beneficial uses. However, due to the difficulty of measuring local waste streams, staff did not set goals for wood products or textiles.

Cumulative Emissions and the Importance of Near-Term Action

The global climate crisis is driven by the *cumulative* emissions in our atmosphere. While we often hear news of which countries contributed the most in terms of annual emissions, what really matters is the emissions that have collected over time since the beginning of the Industrial Revolution. Therefore, the annual rate of change for how our community reaches the Board's net zero emissions target matters greatly. For example, the county could theoretically follow a business-as-usual pathway until 2045, and then heavily invest in reducing emissions to zero by 2050. However, doing so would contribute a great deal more cumulative emissions over time than if we pursue the proposed SMART goals.

The chart below illustrates the modeled net emissions under the proposed SMART goals, represented by the light tan shaded area. The black line represents linear reductions from 2008 to 2030 and from 2030 to 2050. The gray line represents projected emissions if we continue without any significant investment in climate action. Potential cumulative emissions are represented by the area between the x-axis and the gray business-as-usual line. The faster the community reduces emissions in line with the proposed SMART goals—the lower we can get our emissions sooner—the better for climate change mitigation.

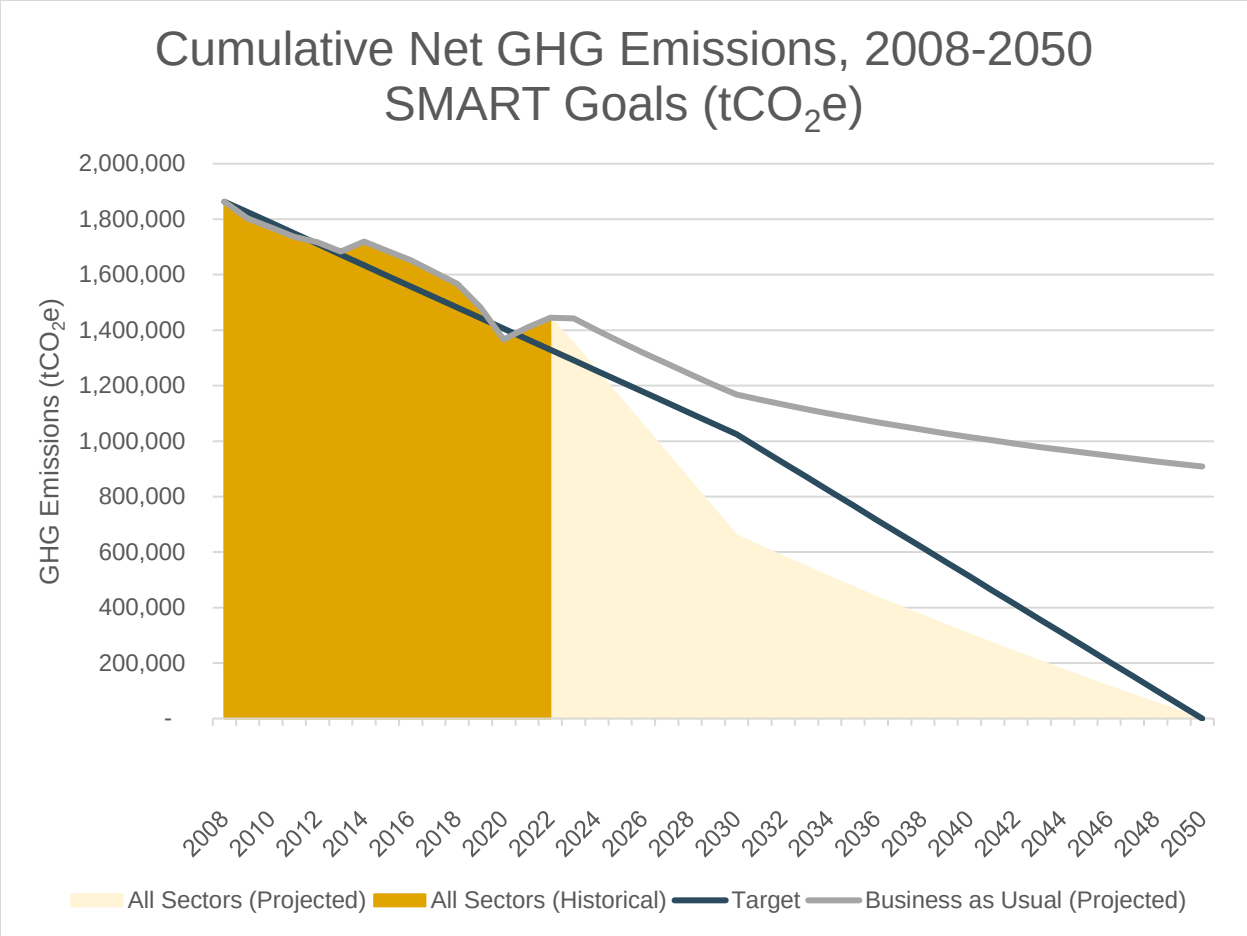


Figure 7: Cumulative Net Emissions Gap Between SMART Goals and Business-as-Usual (BAU) Scenario

CAP Action Prioritization

In addition to developing SMART Goals, Phase 2 of the County's Climate Action Plan required the County to "prioritize actions with consideration of the costs, benefits, and effects on equity in order to best allocate limited staff, financial, and community resources."

Purpose

County staff first developed a prioritization methodology to compare the relative and holistic return on investment or potential positive impact of actions with a direct emission reduction potential. Prioritizing these CAP actions helped staff select a narrower group of actions on which to focus during the near term based on their relative potential impact. Given the small number of resources available to the Climate Action Program, staff limited the near-term actions on which to focus to 25, which reflect 12 strategies in the CAP. This prioritization reflects the understanding that climate action requires complex systems change and that actions affecting entire systems are more valuable in the long run than small steps with immediately measurable results.

Methodology Overview

To prioritize the CAP actions, we developed seven criteria reflecting the purpose of the CAP and additional community priorities associated with local climate action. These criteria include the following, which are explained further below:

1. greenhouse gas reduction potential
2. behavior to structure spectrum
3. likely benefits health and wellbeing in the community
4. likely benefits local wealth generation
5. likely benefits the local environment
6. likely advances equitable impacts
7. possible systemic impact

We selected 70 of 135 actions to score with these criteria, focusing on actions that are community-wide and have direct impact potential.[20] For each criterion, we evaluated the extent to which relevant CAP actions met that criterion. Finally, for each scored action, we combined the scoring criteria into a holistic impact score that could be sorted in order of magnitude.

Greenhouse Gas Reduction Potential

To estimate and compare the greenhouse gas reduction potential of each of the 70 actions scored, we combined several factors. First, we coded actions by one or more "solution" identified by Project Drawdown, the only comprehensive resource for quantifying the emission reduction potential of numerous types of actions to address climate change across all major sectors of the economy. Using this coding, we calculated the average of two scenarios provided by Project Drawdown that weigh different factors in their methodology. Because Project Drawdown's quantification is expressed in terms of potential gigatons of carbon dioxide equivalent avoided or sequestered at a global scale, we converted these magnitudes into a 0-1 range that would be more easily factored alongside the other criteria we scored. Finally, we multiplied this converted value by a factor representing our estimate of goodness of fit between a given CAP action and the coded solution(s) in Project Drawdown. The result is the GHG-Focused Impact Score.

Behavior to Structure Spectrum

This criterion distinguishes between actions that urge people to change behaviors within the confines of existing structures and actions that change structures to shift the real or perceived choices that people have available to them. Using keywords from the CAP action and broader context, scores fall into three groups along the spectrum: at the low end, rhetoric (information, encouragement, education to change behavior); in the middle, money (financial incentives, County services, or other monetary investments by the County that impact behavior or choices); and, at the high end, law (policy, code, or regulation).

[20] Many actions in the CAP focus on local government operations or educational work required to support the success of other actions. We opted not to score these actions in our prioritization method because the impact of the former category is not comparable to actions affecting the entire community and the latter category reflects prerequisite activities for scored actions (thus posing a risk for double counting).

Likely Benefits Health and Wellbeing

Climate action often involves work that also makes communities healthier, such as reducing conventional air pollution, increasing active modes of transportation and healthy lifestyles, and increasing vegetation and wildlife. This criterion evaluates whether an action is likely to contribute to local health and wellbeing.

Likely Benefits Local Wealth Generation

Climate action can strengthen the local economy through investments in clean energy generation and energy efficiency, which create jobs. Reducing emissions can also lower building operational costs to households and businesses by reducing energy burden, which is especially important for lower income community members and people living in older homes. This criterion evaluates whether an action is likely to contribute to these ends.

Likely Benefits Local Environment

Although the focus of climate action is reducing greenhouse gas emissions that drive global climate change, this work also benefits local ecosystems. Conservation protects habitat and healthy waterways, and dense, walkable communities reduce sprawl. This criterion evaluates whether an action is likely to support local environmental health.

Likely Advances Equitable Impacts

The effects of climate change will not impact all community members in the same way or to the same degree, and local impacts will likely worsen existing disparities. Some actions to address climate change can also intensify inequality. However, if designed well, local climate action can serve the most vulnerable among us and improve quality of live for everyone. This criterion evaluates whether an action is likely to advance equity or serve disadvantaged communities in a meaningful, intentional way.

Possible Systemic Impact

Climate change and actions to address it are ultimately bigger than any one locality. To the extent that actions can contribute to larger changes in societal systems that produce the previous benefits, our work will be more effective. This criterion considers whether an action may have a systemic multiplier effect by virtue of facilitating implementation of other actions in this Climate Action Plan or by inducing emissions reductions outside Albemarle County.

• • •

After scoring actions by these criteria, we factored them together to create a single Holistic Impact Score by which we could sort actions.

Staff formed an interdisciplinary team both to develop and refine the methodology and to score the 70 CAP actions with direct impact on greenhouse gas emission reductions. Scorers provided justification for each score. We also consulted local community-based organizations for feedback on our draft scoring.

Results

Staff organized the top 25 CAP actions into 12 groups that reflect CAP strategies. Below are short descriptions of the groups in priority order:

1. Accelerate distributed renewable energy and building energy efficiency.
2. Accelerate utility-scale renewable energy.

3. Set energy efficiency standards for affordable housing.
4. Improve zoning ordinance to facilitate denser, mixed-use development.
5. Support local organizations that enhance community energy efficiency.
6. Increase urban tree cover and native plants.
7. Increase composting availability and practice.
8. Increase climate-smart agricultural practices.
9. Strengthen local food network.
10. Improve transit service, coverage, frequency, reliability, and use.
11. Increase quantity, quality, and use of bicycle and pedestrian infrastructure.
12. Restore and regenerate natural areas on private land.

Interdepartmental Project Leadership

Achieving the 2050 goals will require long-term work to promote mixed-use development, transportation mode shifts, and natural resource conservation across the county. Doing so requires the collective effort of County staff across departments, as well as community members. Most climate action work must be led by people outside of the Climate Action Program. To be successful, we need a whole-of-government and whole-of-community approach, with appropriate resource allocation to each.

In that spirit, staff convened the County's Climate Action Leadership Team in early 2025. The purpose of doing so is to provide leadership intent by elevating climate from a Program priority to an organizational priority. The role of the team is to:

- Advise Climate Action Program leadership;
- Assist in climate action project implementation through the dedication of department resources;
- Periodically review progress on climate action projects; and
- Advocate with the Executive Leadership Team and Organizational Leadership Team as appropriate.

The Climate Action Leadership Team is composed of leaders from the following areas of work:

- Chief Operating Officer
- Department of Community Development
- Department of Facilities and Environmental Services
- Department of Human Services
- Office of Communications and Public Engagement
- Office of Economic Development
- Office of Equity and Inclusion

The Climate Action Leadership Team has been meeting monthly throughout calendar year 2025. The leadership team has endorsed several strategic, staff-time-only climate action projects for FY26, including:

County Code Review

Most of the County Code has been written without explicit connection to the context of the climate crisis. As such, our ordinances and regulations contain a number of incentives and disincentives that are not supportive of our emissions targets. The Climate Action Program will support the work of the

Department of Community Development in reviewing and making recommendations on Chapter 18 during the Zoning Modernization process.

Internal Climate Action Support

All County staff have roles to play in supporting the climate action of our community members. The Climate Action Program will be working with select customer-facing teams to identify opportunities to integrate climate action materials, resources, or tools into routine customer engagement. Those tools will be appropriate for the context, convenient for staff, and effective at empowering community member climate action.

Charging Smart / SolSmart

Our community needs to shift its energy sources away from fossil fuels. Both Charging Smart (for electric vehicle charging infrastructure) and SolSmart (for solar energy infrastructure are certification programs for their respective industries. Achieving appropriate certification levels in both programs will reduce barriers for community members and those industries to install the respective infrastructure. Climate Action Program staff will work with other departments as appropriate to develop the County's pathway toward certification in each program and implement the steps to meet the criteria. Over the next three fiscal years, the intent is to be certified at a higher level each year.

Climate Resilience Planning

As called for in the Climate Action Plan, the County committed to developing a climate resilience plan. The resulting project, called Resilient Together, is described in more detail in chapter 3.

Sustainable County Operations

There is some value to the County as an organization modeling the changes we want to see in the broader community. There are three areas in particular in which the County might inspire broader emission reductions: (1) building equipment energy efficiency, envelope, and renewable energy sourcing; (2) fleet transition to electric vehicles; and (3) landscape management (for both emission reductions and carbon sequestration). The Climate Action Program will engage the appropriate departments and develop plans and policies as appropriate to establish County leadership in these areas.

Community Composting

Our waste streams play a relatively small role in our territorial emissions. However, research shows that waste is a gateway topic for community members to become engaged in other environmental initiatives, including climate action. We also know from community surveys that County community members care deeply about composting and recycling. Given the importance of community engagement and a well-rounded program, this project would work with Rivanna Solid Waste Authority, the City of Charlottesville, and the University of Virginia to re-imagine our organic waste system. As a one-year design process, Climate Program staff would work with partners to engage industry and subject-matter experts to create a new vision for food waste and yard refuse streams.

In addition to the strategic, staff-time-only projects, Climate Action Program staff developed the following list of Board-funded projects for FY26, utilizing $200,000 in existing climate funding and an additional $300,000 appropriated by the Board as part of the FY26 budget:

Residential Energy Improvements

Climate Program staff is allocating $237,000 toward residential improvements, especially for low-income households. Given the benefits to County residents, the Board approved the Housing Office's contribution of an additional $150,000 to this work. The Local Energy Alliance Program (LEAP) and the Albemarle Housing Improvement Program (AHIP) will work together to assess and improve residents' HVAC equipment and energy envelope.

Energy Resource Hub

Following a $100,000 investment in FY25 and matching a grant from the City of Charlottesville, the Climate Program will allocate $63,000 to the Energy Resource Hub. Implemented by LEAP and the Community Climate Collaborative (C3), the Hub exists to help community members leverage energy-related incentives from local, state, and national sources as well as from utilities. The Hub hired an Energy Navigator to guide community members through the process of realizing the appropriate incentives.

Government Building Energy Efficiency

The Climate Program will allocate $100,000 toward energy efficiency improvements in County facilities. The most likely use of the funds will be toward LED lighting fixture installments.

Climate Resilience Cohort

The Climate Program will allocate $50,000 to match City funding toward the Climate Resilience Cohort. The Cohort was funded by a $460,000 US Environmental Protection Agency Grant that was terminated by the Trump Administration in March 2025. This funding will be to complete the planning portion of the larger USEPA grant, which allows the members of the Cohort to contribute input to our respective Climate Adaptation and Resilience Plans. More information can be found in chapter 3.

Climate Action Collaboration Initiative (CACI)

The remaining funds in the Climate Action Reserve will be allocated to the CACI. This will be a short list of initiative types in which the Climate Program would identify and partner with internal and/or external entities to carry out those initiatives by leveraging existing funding. For example, if Albemarle County Parks and Recreation wanted to purchase a new piece of equipment but only had enough funding for the fossil fuel-burning model, this funding could cover the difference between that model and the electric model.

3. Our Work

Albemarle County's Climate Action Program includes a wide-ranging set of activities to reduce community greenhouse gas emissions, prepare for climate change impacts, and engage community members and organizations in local climate action. Program activities include discrete projects and cyclical, recurring programming. In this chapter, we summarize projects to address climate change that have been led or supported by the Climate Program, with collaboration from staff across the organization. Projects are organized into types of work that reflect the variety of tools available to local government: regulation, planning and capacity building, outreach and education, analysis and studies, partnerships and grants, and facility and capital improvement.

Symbol Key

☑ Completed Project ⟳ In-Progress Project ↻ Recurring Program

Regulation

C-PACE Ordinance ☑

In December 2022, the Board of Supervisors adopted a local ordinance to opt into the statewide program for Commercial Property-Assessed Clean Energy (C-PACE). C-PACE is an innovative financing tool that incentivizes improvements to new construction and existing buildings that reduce greenhouse gas emissions and enhance building resilience to climate change impacts. C-PACE helps property owners overcome two common obstacles to making energy efficiency and clean energy improvements to their properties. First, because C-PACE functions similarly to a loan, the program provides the up-front financial capital that a property owner might not otherwise be able to access. Second, C-PACE loans are structured to save property owners money immediately and over the life of the loan. Because C-PACE payments stay with the property rather than the individual or business (as in the case of a loan), property owners benefit regardless of whether they occupy the building or own the property for the full loan term. Additionally, due to the high security of the repayment structure, C-PACE programs generally offer lower interest rates than a conventional loan, reducing the overall costs to the property owner. Put together, these benefits mean that loan payments are more than offset by cost savings due to lower energy bills, and business owners save money.[21]

Electric Vehicle (EV) Charging Fee Ordinance ☑

In 2021, the County installed six electric vehicle (EV) charging stations with capacity to charge nine vehicles simultaneously at the office building at 401 McIntire Road. Originally intended as a pilot to assess the demand for EV charging facilities, and with some ambiguity about whether local governments in Virginia had enabling authority to sell electricity, the charging stations were offered for free public use. After observing steadily increasing usage for three years and confirming clear enabling authority to sell electricity for EV charging, staff researched and prepared an ordinance to charge competitive rates for use of EV charging facilities on County property. Adopted by the Board of Supervisors in June 2024,

[21] Enabling C-PACE in the County completed Action B.3.3 in Albemarle County's Climate Action Plan (2020).

the ordinance will make it financially viable for the County to invest further in publicly accessible EV charging stations, thereby expanding clean transportation infrastructure in the community.[22]

Solar Ordinance

The County's Community Development Department (CDD) led the process of a zoning text amendment to set clear parameters for small- and large-scale solar energy generation facilities in the county. CDD hired a consultant with expertise in this field to draft the ordinance and has sought feedback from the County's Climate and Conservation Programs, as well as the general public. Based on feedback received during a public comment period in February and March 2024, staff from CDD, the Climate Program, and the Office of Communications and Public Engagement organized a workshop of subject matter experts from UVA and local organizations with a broad diversity of perspectives on solar energy. Held at the County Office Building on June 6, 2024, the workshop facilitated participants to develop innovative recommendations for enabling the ordinance to balance the County's priorities for clean energy generation, water resource protection, conservation, and biodiversity. The ordinance was adopted on July 16, 2025.[23]

Planning and Capacity Building

AC44: Integrating Equity & Climate Action

In response to a Board of Supervisors (BoS) directive to integrate equity and climate action in the AC44 Comprehensive Plan, the Climate Action Program partnered with the Office of Equity and Inclusion to create the Equity & Climate Action (ECA) Lens. In collaboration with the Long-Range Planning team and staff subject-matter experts across the organization, staff used this tool to evaluate and revise the goals, objectives, and actions of the new Comprehensive Plan so that it reflects these community priorities.[24]

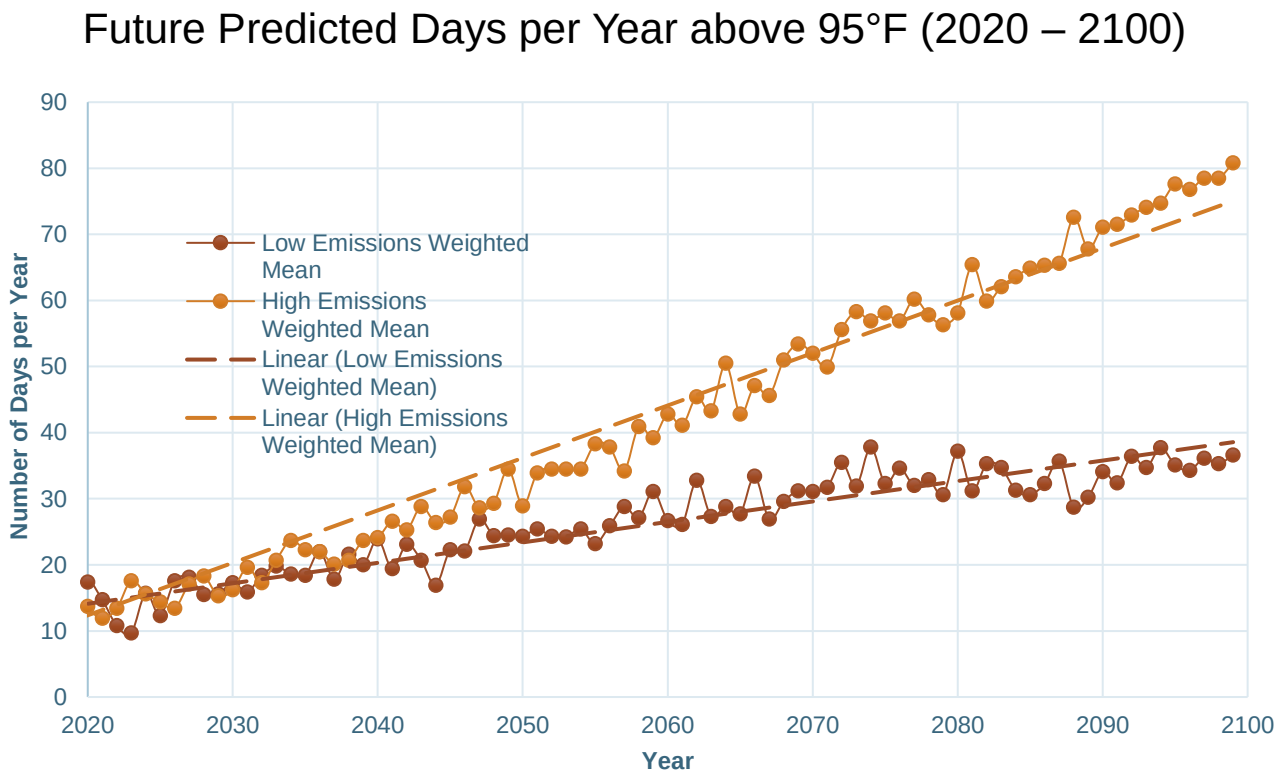
During the process of developing and applying the ECA Lens to AC44, we conducted three workshops to train over two dozen County staff in applying the tool. The workshops provided valuable feedback that we used to improve the ECA Lens and laid the foundation for applying this tool to other work across the organization in future years. The application of this tool will help to align local policymaking and regulation with best practices in emissions reductions and climate change preparedness.

Resilient Together

The impacts of climate change are already being felt in Virginia. Locally, we are experiencing longer, hotter heat waves, more destructive storms, wildfire smoke, and invasive pests. Scientific projections show these challenges will increase in the coming years and decades, with implications for our community's health and well-being.

[22] This ordinance continues the active implementation of operational Actions T.3.2, T.6.4, and T.7.2 in the County's Climate Action Plan.
[23] Adoption of this ordinance will complete Actions B.1.1, R.1.1, R.2.1, and partially L.2.5 in the County's Climate Action Plan.
[24] The efforts of staff to integrate climate action into AC44 advances nine actions in the County's Climate Action Plan; the subsequent County Code update and Zoning Modernization Process that will follow AC44 will complete these and an additional seven actions.

For example, the following chart from the County's Climate Vulnerability and Risk Assessment (2022) depicts the number of days per year when maximum temperatures (daytime highs) are predicted to exceed 95° Fahrenheit.



Source: Albemarle County Climate Vulnerability and Risk Assessment (2022)

Figure 8: Future predicted days per year above 95°F (2020 – 2100). The two trajectories represent scenarios that reflect varying degrees of global emissions reductions.

Resilient Together is a collaborative process led by Albemarle County, the City of Charlottesville, and UVA, designed to ensure our community is strong, safe, and healthy in the face of a changing climate.

Resilient Together launched publicly with two kick-off events in September 2023:

- a presentation to staff and leadership from the County, City, UVA, and other government partner agencies, including Rivanna Authorities, the Thomas Jefferson Planning District Commission, and the Thomas Jefferson Soil and Water Conservation District; and
- a public open house at Carver Recreation Center with a museum-style display of information about local climate change impacts, how Resilient Together aims to address these, and interactive exhibits for community members to engage the topic.

In the project's first year since launch, we engaged with a wide variety of people through numerous events to help shape our collective response to climate change. The project's Discover phase, completed in May 2024, involved workshops with staff from the County, City, UVA, partner agencies, and community organizations. Additionally, we reviewed extensive notes from community engagement

conducted during other recent planning processes like AC44. Over the summer of 2024, we completed the Define phase, in which we developed guiding principles and long-term goals based on themes identified from the Discover phase. Additionally, we researched over a thousand strategy options from around the country and curated a list of the most locally relevant for consideration in the Design phase. In the fall, we onboarded the Climate Resilience Cohort (see Grantmaking) up to speed to be able to participate fully in the upcoming Design phase.

In the first half of calendar year 2025, Resilient Together project staff have re-engaged staff and subject matter experts several times to review the project's strategy focus areas and develop specific content for the respective plans. Staff help several community engagement events throughout the City and County to share updates and allow input into the direction and strategy areas in the plans. Additionally, County leadership received project updates and helped develop the pathway for adopting the Climate Adaptation and Resilience Plan as an appendix to AC44.

The Resilient Together project is on track to deliver a framework that will guide Albemarle County and Charlottesville toward a more resilient future. Though our region's direct risks are lower than many other areas, preparing in advance for the shocks and stressors brought on by a warming world will reduce the harmful impacts on our community. The more we work together to prepare for these impacts, the more resilient our community will be. Resilient Together follows through on commitments made by the County's Climate Action Plan to the Board of Supervisors and the community to prepare for the local impacts of climate change.

Partnerships and Grants

Grantmaking

In addition to the Community Climate Action Grants and the Climate Resilience Cohort described previously, the County has awarded grants to support the impactful work of several local partners.

Climate Resilience Cohort

Within our area, some community members do not experience the same level of access to public services and therefore may face greater vulnerability during extreme weather events. Because disadvantaged members of the community stand to be most impacted by climate change, it is especially important that Resilient Together includes their voices so that solutions can benefit everyone in the community.

To that end, Albemarle County Climate Program staff applied for and received a competitive Environmental Justice Government-to-Government (EJG2G) grant of just over $460,000 from the US Environmental Protection Agency (EPA) to create the Climate Resilience Cohort. Led in partnership with Charlottesville's Climate Program, the Climate Resilience Cohort funds community-based organizations (CBOs) to support equitable community engagement within Resilient Together. Participating CBOs receive subgrants to help center the needs of our most vulnerable community members through our process of crafting and implementing strategies to build local resilience to climate change.

The EPA terminated the EJG2G grant to the County in March 2025. In response, and given the importance of this work, the City and County decided to contribute $50,000 each to complete the first phase of the work under the USEPA grant. With the funds from this grant, participant CBOs will work

with the County's Climate Program staff and partner agencies to conduct community engagement events, as well as design and evaluate strategies for building climate resilience.

The organizations receiving subawards are: Community Climate Collaborative (C3), Cultivate Charlottesville, International Rescue Committee (IRC) New Roots, Local Energy Alliance Program (LEAP), Market Central, The Haven, and Virginia Clinicians for Climate Action (VCCA).

Resilient communities work together to ensure everyone has access to a safe, healthy, and thriving future, and the Climate Resilience Cohort will help us do so here in Albemarle County. More information can be found about this project on the Resilient Together website: https://engage.albemarle.org/resilient-together-climate-resilience-cohort.

Community Climate Action Grant Program

To spur local partnership in climate action, Climate Program staff collaborated with colleagues in Public Engagement, the Office of Equity and Inclusion, and Community Development to design and implement a grant program that funds community-centered projects.

In its second year, the Community Climate Action Grant program supported creative local projects that build capacity to reduce greenhouse gas emissions in Albemarle County. The program's purpose was to leverage community resources outside local government to help implement the County's Climate Action Plan. These grants have helped make local climate action a more inclusive, participatory process.

In the first year, we funded five projects:

	**Bicycle Recycling, Refurbishment, & Redistribution:** With this grant, Charlottesville Community Bikes grew its program to provide affordable and sustainable transportation options to underserved communities in Albemarle County. Community Bikes hosted four mobile repair clinics in the county during the grant cycle. Their Kids' Bike Program saw a 60% increase in capacity, and their Referral Bike Program for Teens & Adults grew by 120%.
	**Clean Energy Workforce Training:** FLIPP Inc. held two Installing and Designing Photovoltaic (PV) Systems training programs in the area, serving 28 community members, including 17 Albemarle residents. These weeklong workshops prepared students for professional certification and careers in the design, installation, and maintenance of solar energy facilities. As of June 30, 2024, 6 participants had become certified as PV Associates with the North American Board of Certified Energy Practitioners (NABCEP), the national professional standard.
	**Community-Based Vermicomposting:** Autism Sanctuary started a vermicomposting program that will reduce greenhouse gas emissions, collect organic waste from nearby neighborhoods in Albemarle County, provide compost and promote green gardening practices for the local community, and support jobs and internships for people with autism in Central Virginia.
	**New Roots Farm Electrification and Governance:** With this grant, the International Rescue Committee expanded the New Roots Farm's transition to electric farming equipment and convened farmers to plan for the farm's future at a new site. Funds supported the purchase of an electric weed eater and several additional 40V batteries to work with an electric tiller purchased during the 2023 growing season. After learning that the existing farm site is in a FEMA floodplain, New Roots also convened a steering committee composed of New Roots Farm gardeners to

	determine the future of the farm site and a strategic planning process for the 2024 growing season. Through this process, the New Roots community identified and secured a new, nearby site in Albemarle County that will be more resilient to climate change.
	**Darden Towe Postage Stamp Prairie Parks and School Partnership:** Peabody School students, in partnership with the Center for Urban Habitats and other community organizations, are restoring a 10,000-square-foot area of Darden Towe Park to Piedmont native grasses. Later phases of the project could ultimately include 1.5 acres of restored grassland.

For the second year, we awarded grants for five additional proposals:

- Building on work from the pilot grant, **Charlottesville Community Bikes** will expand its bicycle recycling, refurbishment, and redistribution programs, providing affordable, sustainable transportation to underserved communities in Albemarle County.
- **Community Climate Collaborative (C3)** will conduct climate action workshops for leadership of places of community gathering, such as congregations, community centers, youth centers, and education centers, focused on reducing greenhouse gas emissions through energy efficiency, solar power, electrification of both buildings and vehicles, and waste management.
- Building on work from the pilot grant, **International Rescue Committee's New Roots Farm** will begin a major re-design and expansion of New Roots Farm while also phasing out additional fossil fuel-based equipment in favor of electric alternatives powered by solar.
- The **Local Energy Alliance Program (LEAP)** will provide roof repairs and energy efficiency upgrades to low-income households that are otherwise eligible for and on track to receive Dominion Energy's Income- and Age-Qualifying Solar Program, which expires at the end of 2024.
- **Wildrock** will install a composting system to reduce emissions from food waste generated by visitors and develop educational curricula on composting, soil health, and nutrient cycling.

If we implemented these types of solutions at a larger scale, then we could anticipate significantly greater emission reductions. Two examples will illustrate this potential. First, agricultural producers in Albemarle County emit over 7,000 tons of CO_2e annually just from burning fossil fuels equipment as part of their operations. If our county's producers all switched to electric equipment in the style of New Roots Farm, that could account for up to half of our agriculture and forestry SMART goal for 2030. Second, Albemarle County administers 3,775 acres of parkland. If 50% of that parkland, or 1,887 acres, adopted native grassland restoration in the style of Darden Towe's Postage Stamp Prairie Parks, we could avoid over 13,412 tons of CO_2e emissions. That is equivalent to over 15 percent of our agriculture and landscape goal for 2030.[25]

[25] This grant program continues the active implementation of operational Actions B.2.1, B.2.2, B.2.3, L.4.3, and L.5.2 in the County's Climate Action Plan.

Community Energy Resource Hub

In partnership with Climate Program staff from Albemarle County and the City of Charlottesville, the Local Energy Alliance Program (LEAP) and the Community Climate Collaborative (C3) will design and implement a Community Energy Resource Hub to ensure residents and businesses in the two jurisdictions have the tools and information they need to access federal financial incentives that will accelerate cost savings and emission reductions. The Inflation Reduction Act (IRA) created ten years of tax credits and rebates to install clean residential, business, and vehicle technologies; this project will help our community take full advantage of this unprecedented opportunity. The Energy Resource Hub will provide an easy-to-navigate website to connect people with resources based on their circumstance and will deliver personalized assistance through both in-person office hours and telephone consultations.[26]

Residential Energy Efficiency and Renewable Energy

For a decade, Albemarle County has supported the invaluable work of the Local Energy Alliance Program (LEAP), which provides home energy audits that help residents make informed decisions about energy and cost savings; home energy efficiency retrofits that leverage funds from Dominion Energy's income-qualifying weatherization program; and access to discounted and free rooftop solar through Solarize and Dominion Energy's income-qualifying solar program, respectively. Since its founding in 2009 by Albemarle County and the City of Charlottesville, LEAP has served over 13,400 homes in Virginia.

Multiple County departments have also supported the Albemarle Housing Improvement Program, which, in addition to making improvements to home safety for income-qualifying residents, has partnered with LEAP to undertake necessary upgrades that are prerequisites for energy efficiency measures for some of our most vulnerable residents. With County funding through the Assisted Home Performance Program, AHIP and LEAP served 110 households over a three-year period.

LEAP and AHIP have served as key partners to advance local climate action in ways that tangibly benefit residents' home comfort and reduce energy burden for low-income households.[27]

Schools Engagement

The County's Climate Program has supported the Community Climate Collaborative (C3) for several years to provide Climate Action Activity Kits to fourth graders in Albemarle County Public Schools. The Climate Kits, provided in both English and Spanish, include fun educational activities for kids and instructions for parents that explain the activities and direct them to energy efficiency programs that reduce household emissions and energy bills. The kits have seen increasing popularity among teachers due to their educational value and ability to foster community and agency among students and parents.[28]

[26] This project continues the active implementation of operational Actions B.2.1, B.2.2, and B.4.3 in the County's Climate Action Plan.
[27] This support continues the active implementation of operational Actions B.2.1 and B.2.2 in the County's Climate Action Plan.
[28] This grant continues the active implementation of operational Actions B.4.6, L.5.4, R.5.4, S.4.5, and T.8.2.

Grant Seeking

In addition to the grant that we received from the EPA to create the Climate Resilience Cohort described previously, the County has pursued numerous federal and state grants to advance local climate action and livability.

Community Flood Preparedness Fund Award

The County's Environmental Services Division, which houses the Climate Program, applied for and received an award from the Virginia Department of Conservation and Recreation (DCR) to undertake flood resilience planning, one of the primary hazards exacerbated by climate change that Albemarle County will face. The results of this planning process will be reflected in the climate adaptation and resilience plan that we produce during the Resilient Together project. Following acceptance by DCR of the flood resilience plan, the County will be eligible to apply for additional funds to support flood resilience capital projects. The Community Flood Preparedness Fund was created through revenue generated from the state's participation in the Regional Greenhouse Gas Initiative (RGGI), an innovative, multi-state, market-based approach to climate action that has brought millions of dollars to benefit Virginia residents.

Electric School Bus Acquisition for Albemarle County Public Schools

Albemarle County Public Schools has acquired two electric school buses through grant funding and is currently pursuing additional grants to electrify its fleet.[29]

Energy Efficiency and Conservation Block Grant Formula Funding (EECBG)

The County's Climate Program anticipates a formula funding award of $78,940 to support energy efficiency in our community.[30] Per our project proposal, we expect to partner with the Community Climate Collaborative (C3) to engage the local business community in promoting energy efficiency. The project will include workshops for businesses to understand how to reduce energy use and access federal incentives, formal energy audits to identify areas for improvement unique to each business, and distribution of smart thermostats and other small energy efficiency equipment to help businesses start the journey toward greater efficiency and reduced emissions.[31] As of this writing, the US Department of Energy has placed a hold on this grant.

EPA Environmental Justice Government-to-Government (EJG2G)

Albemarle County Climate Program staff applied for and received a competitive Environmental Justice Government-to-Government (EJG2G) grant of just over $460,000 from the US Environmental Protection Agency (EPA) to create the Climate Resilience Cohort (see above). Prior to the termination of the grant, and in addition to funding subgrants to the participant organizations in the Climate Resilience Cohort, the EPA grant would have supported a creative documentary project to tell the story of the Cohort's collaborative work. This story will help more members of our community participate in local climate resilience.

[29] This work continues the active implementation of operational Action T.6.5 in the County's Climate Action Plan.
[30] Formula funding is a type of award that is all but guaranteed, pending review of a brief application describing the intended uses of the funds to ensure that they comply with the federal program guidelines.
[31] This grant will continue the active implementation of operational Actions B.2.1 and B.4.3 in the County's Climate Action Plan.

RAISE

Transportation planning staff successfully applied for a $2 million RAISE grant to support the planning of a multi-use trail intended to connect Charlottesville, Crozet, and the Blue Ridge Tunnel. The award from RAISE—which stands for Rebuilding American Infrastructure with Sustainability and Equity—will help the County take the first step towards creating an alternative mode connection between development areas.

Program Outreach and Education

Community Engagement and General Education

Community engagement has been central to the County's Climate Program since its inception. Climate Program staff have invested in long-term relationship building with numerous community organizations and partner agencies. We have held meetings with all Community Advisory Committees (CACs), at Yancey Community Center, and with many community groups. Additionally, we have provided facilitation support for events organized by our colleagues leading the AC44 Comprehensive Plan.

Since 2021, Climate Program staff have presented at six conferences, a dozen university and high school classes, and numerous community engagement events. Participation in these events represents a key element of relationship building with the community and encouraging residents to talk about climate change, which research shows is one of the biggest obstacles to meaningful climate action.[32]

Key to our community engagement has been consistent outreach to new and existing community partners. Our emphasis on this part of our work is driven by our recognition that, in the words of one of our partners, climate action is not something that local government can do *for* the community; rather, it is something that we must achieve *together*.[33]

C-PACE Education & Outreach

At the invitation of the Charlottesville Area Development Roundtable (CADRe), Albemarle County's Climate Program and Economic Development staff organized a webinar on Commercial Property Assessed Clean Energy (C-PACE), a powerful financing tool that helps the private sector lead the way toward achieving our community's greenhouse gas emissions reduction targets. (See above for more information about C-PACE.) The webinar provided an overview of the C-PACE program for commercial property owners, developers, and lenders in the Charlottesville-Albemarle area.

Dam Safety Outreach

Environmental Services staff initiated a new program to engage with the owners of dams, with the intent of reducing the risk of dam failure exacerbated by a changing climate. Hundreds of dams and large stormwater management facilities lie within Albemarle County – mostly privately-owned and operated and almost all earthen. At least 150 of these dams are large enough to be regulated by the Virginia Dam Safety Program, but State and County staff know little about the condition of many of the dams. Extreme storm events pose a risk to the integrity of dams and the possibility or consequence of

[32] Matthew Ballew et al., "Who is most likely to talk about climate change?" *Climate Note*, Yale Program on Climate Change Communication, May 18, 2023, https://climatecommunication.yale.edu/publications/who-is-most-likely-to-talk-about-climate-change/.

[33] This community outreach and education helps implement numerous actions in the County's Climate Action Plan.

dam failure across much of the County is relatively unknown. Through this program, staff endeavor to increase dam owner awareness regarding maintenance and regulatory compliance and to offer guidance specific to individual dams. Staff launched this program with an open house event in January 2024. Since then, staff have assisted the owners of 12 dams.

Education on Climate Vulnerability and Risk Assessment

Prior to launching the Resilient Together project (see above), Climate Program staff organized two panel discussions to educate the community about the local impacts of climate change and next steps in our work to address these challenges. In the first event (January 2022), we partnered with the City of Charlottesville and the University of Virginia to provide an inside look into the thinking and decision-making of leaders in key systems in our community.[34] The event featured speakers working in the areas of conservation, public health, public safety, and social services; it reached nearly 300 people. Following the publication of the County's Climate Vulnerability and Risk Assessment (more information in the next section), we hosted a second event with local experts to help contextualize the report's themes within the daily lives of community members.[35] The event, held in October 2022, closed with an outline of the next steps in preparing for resilience, including our community engagement process to help develop a climate adaptation and resilience plan.

Environmental Stewardship Hub

Staff across the organization collaborated to create the Environmental Stewardship Hub, which provides information about the County's work in this area and on ways that community members can contribute to these efforts at home, on larger amounts of land, and in the community. The Hub provides a list of resources for financial and technical assistance. These webpages have received among the highest volume of visitors to the County website.[36]

Green Fleet Exchange

Environmental Services staff convene a quarterly roundtable among fleet managers for Albemarle County, the City of Charlottesville, and UVA to share knowledge, experience, and best practice related to transitioning our organizations' fleets from vehicles with internal combustion engines to electric vehicles.[37]

Solar for Rural Businesses

Climate Program staff supported Piedmont Environmental Council (PEC) and the Community Climate Collaborative (C3) to organize a "Solar for Rural Businesses" event to help rural and agricultural landowners learn about opportunities to add solar energy generation to their operations. Hosted by the Baldwin Center in North Garden on May 7, 2024, dozens of attendees heard from solar developers, community-based organizations (CBOs), the Thomas Jefferson Soil and Water Conservation District, and

[34] "Climate Action Together: A Roundtable Discussion About Local Implications of Climate Change," YouTube, January 21, 2022, https://www.youtube.com/watch?v=0x_Ap1ktn1M.
[35] "Climate Resilience Planning: Understanding Local Impacts," YouTube, October 6, 2022 https://www.youtube.com/watch?v=DdANdqrVkZY.
[36] The Hub implemented numerous actions in the County's Climate Action Plan to increase access to educational resources for residents and businesses, including B.4.1, B.4.3, L.1.3, L.1.6, L.1.11, L.3.3, L.5.3, L.5.4, L.5.6, S.4.4, S.4.5, T.8.1, and T.8.2.
[37] This ongoing work implements Action T.8.1 in the County's Climate Action Plan.

Climate Program staff. Topics included the solar policy context of Albemarle County, funding opportunities, and best practices for rural business owners. There was lively discussion with presenters and amongst attendees.[38]

Analysis and Studies

2018 Greenhouse Gas Emission Inventory – Methodological Update ☑

Shortly after the Board of Supervisors adopted the County's Climate Action Plan (2020), we undertook a major update to the County's greenhouse gas emissions inventory, calculating new numbers for 2018 with an in-house methodology that provided increased transparency and reproducibility.[39]

2020 Greenhouse Gas Emission Inventory – Methodological Update ☑

As the Climate Program expanded to include new staff expertise, we updated our methodology to better account for activities in the County's rural area, including emissions from agriculture and forest loss *and* carbon sequestration from agricultural and land management best practices. Albemarle County is one of few counties in the country with large urban and rural areas, and we have used this unique situation to innovate in the context of emissions inventories.[40]

2019, 2021, and 2022 Greenhouse Gas Emission Inventories ☑

Combining the methodological improvements from our 2018 and 2020 inventories, we calculated additional inventories for 2019, 2021, and 2022. Five consecutive years of such calculations provides us a clearer picture of recent trends and allows us to make better predictions about where the community needs to go in the coming years to meet the 2030 and 2050 emissions reduction targets set by the Board of Supervisors. For more details on our emission inventories, see Chapter 1: Where We Stand.[41]

Climate Vulnerability and Risk Assessment ☑

Prior to launching the Resilient Together project (see above), Albemarle County partnered with Piedmont Environmental Council, Resilient Virginia, and Sobis to produce a Climate Vulnerability and Risk Assessment—a report on the current and future local impacts of climate change. The report provided detailed information on future climate predictions for our region and the impacts of increasing extreme heat, drought, intense precipitation and flooding, wildfire, and pests.[42]

Facility and Capital Improvement

In addition to the electric vehicle charging stations at the McIntire County Office Building and the energy efficiency upgrades and solar power purchase agreement at the Fifth Street County Office Building (discussed previously), the County has undertaken numerous facility improvements to help reduce operational and community emissions.

[38] This workshop continued the active implementation of Action R.5.2 in the County's Climate Action Plan.
[39] This inventory reflected the first inventory in a decade and meets a commitment of the County's Climate Action Plan.
[40] This inventory meets a commitment of the County's Climate Action Plan.
[41] These inventories meet and exceed a commitment of the County's Climate Action Plan.
[42] This assessment meets a commitment of the County's Climate Action Plan.

5th Street County Office Building Energy Efficiency and Renewable Energy

For several years, County staff have sought to install a rooftop solar photovoltaic system on the County Office Building (COB) at 5th Street, whose roof is large and solar-ready. In the absence of funding for a County-owned system, staff pursued a power purchase agreement (PPA) to finance the installation of rooftop solar. The PPA allows a solar developer to own and maintain the system, while the County pays the developer for solar energy just as it would a utility.

Based on preliminary estimates, the solar energy generation system size will be approximately 660 kW. It is estimated that the system will produce about 900,000 kWh of electricity annually, which is approximately half of what COB 5th Street currently consumes. This will save the County $1.2 million and help us avoid almost 10,000 tCO_2e of emissions over the 30-year term of the PPA, or the equivalent of removing 2,159 cars from the road for one year.

In addition to pursuing rooftop solar for COB 5th Street, Facilities staff have undertaken major energy efficiency upgrades to HVAC equipment that have generated significant reductions in energy usage, operational costs, and greenhouse gas emissions. The following chart shows how these equipment upgrades—most of which were performed in 2023 and early 2024—have affected energy usage. Monthly energy usage through September 2024 (the time of writing) is consistently lower than prior years. Because upgrades continued into 2024, the full scale of energy savings will occur in 2025.[43]

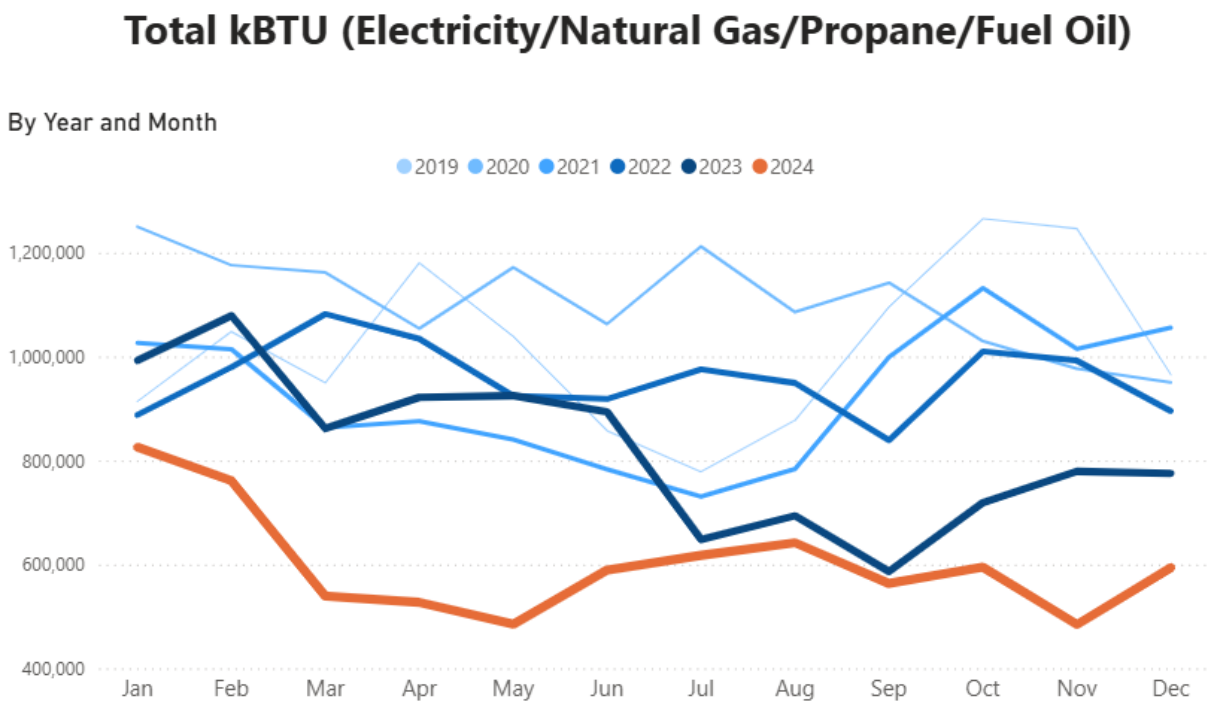


Figure 9: Monthly Energy Usage at the 5th Street County Office Building (January 2019 – December 2024)

With strategic investment, the significant improvements observed at COB 5th Street could be replicated across County-owned buildings, realizing greater energy and cost savings for local government

[43] These investments implement Actions B.7.4, B.7.5, and R.3.1 in the County's Climate Action Plan.

operations and improving our stewardship of the public trust. There are nearly 400,000 square feet of additional rooftop space, above and beyond COB 5th Street, which could yield an additional 2,000 kW of solar energy generation capacity. Additionally, making comparable energy efficiency investments in other County buildings could yield up to 50% energy use savings, cutting operational costs, reducing greenhouse gas emissions, and increasing the resilience of our facilities to extreme weather events.

Electric Vehicle Charging for the Community

In 2021, Albemarle County installed six electric vehicle (EV) charging stations with capacity to charge nine vehicles simultaneously at the office building at 401 McIntire Road. These charging stations have increased infrastructure in the community, helping incentivize EV adoption by community members for whom reliable access to charging would otherwise be an impediment. Since installation, the chargers have exhibited rapid growth in usage, indicating that they have been an effective investment. The chart below shows a model of the greenhouse gas emissions avoided through use of these charging stations.[44] In the first three years of operation, these avoided emissions represent the equivalent of having removed 15 fossil fuel cars in the first year, 40 in the second year, and 66 in the third year.[45]

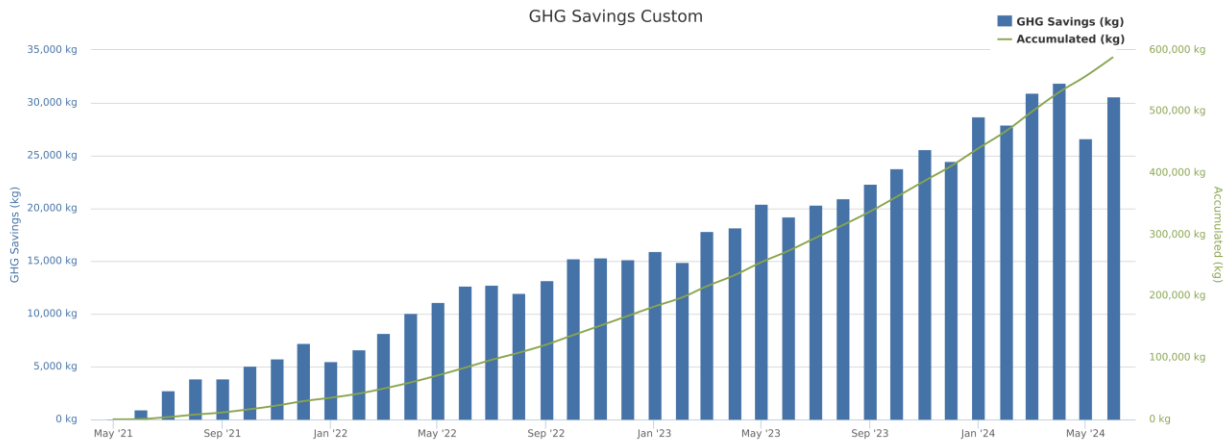


Figure 10: Monthly and lifetime avoided greenhouse gas emissions associated with the County's EV charging stations

These charging stations have been an important early addition to the community's EV charging infrastructure, implementing Actions T.3.2, T.6.4, and T.7.2 in the Climate Action Plan. However, we need many more to reach our SMART goal of electric vehicles accounting for 28% of all registered vehicles in Albemarle County by 2030. Calculations based on projections for vehicle ownership and population by 2030 estimate that the likely total number of registered vehicles in the county in 2030 will

[44] Provided by ChargePoint, the operator of the charging stations, the chart shows an estimate based on the assumption that without infrastructure like these charging stations, more vehicles powered by fossil-fuels would have been on the road. Models like these generally account for emissions associated with electricity generation required to charge EVs, which are lower than the emissions from internal combustion engines. Actual emissions avoided may differ from the model. "Custom" in the chart title refers to the custom time period used to generate the chart.

[45] These estimates use information reported by the EPA that the "typical passenger vehicle emits about 4.6 metric tons of carbon dioxide per year" (https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle).

be 81,712.[46] For 28% of those vehicles—22,879—to be EVs, Albemarle County would need 740 public Level 2 charging ports and 63 public DC fast charging ports.[47] The County can accelerate the EV transition—and meet its 2030 SMART goal in service of the Board of Supervisors' 2030 emissions reduction target—by investing in additional charging ports on County property and by incentivizing local businesses to do the same, such as through a grant program similar to Charlottesville's.[48]

Electric Vehicle and Equipment Acquisition

The County has purchased three electric vehicles and is planning to acquire more. Additionally, several grounds maintenance tools have been replaced with electric models, including a zero-turn mower.[49]

Reduced Mowing in County Parks

The Parks and Recreation Department has reduced mowing in numerous County parks to reduce emissions from fuel consumption and to allow native grasses and wildflowers to improve landscapes and sequester carbon. [50]

[46] For vehicle projections, see "By 2030, the transport sector will require 138 million fewer cars in Europe and the US," PWC, December 3, 2024, https://www.pwc.com/sk/en/current-press-releases/by-2030-transport-sector-will-require-138-million-fewer-cars.html. For population projections, see Weldon Cooper Center for Public Service, "Virginia Population Projections," Demographics Research Group, accessed February 23, 2021, https://demographics.coopercenter.org/virginia-population-projections/.

[47] Calculations are based on the "EVI-Pro Lite: Daily Charging Need Tool," Electric Vehicle Infrastructure Toolbox, Alternative Fuels Data Center, US Department of Energy, https://afdc.energy.gov/evi-x-toolbox#/evi-pro-ports.

[48] EV Charging Infrastructure Grant, https://www.charlottesville.gov/1717/EV-Charging-Infrastructure-Grant.

[49] These purchases help implement Action L.4.4 in the County's Climate Action Plan.

[50] These changes help implement Action L.4.4 in the County's Climate Action Plan.

Conclusion: Looking Ahead

Since the Board of Supervisors adopted Albemarle County's first Climate Action Plan (2020), County staff and community partners have worked energetically and creatively to implement solutions to climate change at the local level. Climate Action Program staff have spearheaded the creation of new community grant programs that have funded over a dozen local organizations in work with direct emissions reductions, secured federal and state grants, forged fruitful partnerships with peer institutions, and supported policymaking and regulation that will incentivize emissions reductions across the community.

Despite the immense work of County staff and community partner organizations—as well as the participation of many community members—our community's emissions are not on track to achieve the 2030 target set by the Board of Supervisors. After a downward trend from 2008 to 2020, emissions increased slightly in 2021 and 2022.

Through innovative goal-setting and strategic prioritization of our Climate Action Plan, Climate Program staff have articulated a pathway to achieve—and even surpass—our emissions reduction targets, benefiting the community in multiple ways in the process. Guided by the Climate Action Leadership Team, the County stands to make the more strategic, inter-departmental, and community-focused decisions about how to use our limited resources for significant emissions reductions.

Following this strategic pathway and achieving our SMART goals requires investment by the County. While aspects of climate change fall outside the control of the County, we can make substantial progress by investing in the work of staff and community partners. The County can demonstrate its intention to drive meaningful, material progress by investing in robustly staffed and funded local climate action across the organization. These investments will reap rewards: "Natural hazard mitigation saves $6 on average for every $1 spent on federal mitigation grants, according to an analysis by the National Institute of Building Sciences."[51]

[51] "Natural Hazard Mitigation Saves Interim Report," Federal Insurance and Mitigation Administration, Federal Emergency Management Agency (FEMA), June 2018, https://www.fema.gov/sites/default/files/2020-07/fema_mitsaves-factsheet_2018.pdf.