



# Climate Action Plan

## DRAFT

### PHASE ONE

*A plan to guide local government actions to reduce long-term contributions to climate change throughout the community*

- Winter 2020 -



# The Community We Envision

This Climate Action Plan is consistent with and supports Albemarle County's overall vision for the community.

**The purpose of this Climate Action Plan is to reduce the community's contributions to global climate change while advancing the County's vision of a thriving, vibrant community for every resident.**

In particular, the Climate Action Plan seeks to:

- benefit the health of all residents;
- protect the local natural environment;
- stimulate the creation of green jobs to support a thriving local economy;
- promote education on climate action for youth and adults; and
- contribute to a more equitable community, with the benefits of climate action programs easily accessible and affordable for every resident regardless of socio-economic status.

Albemarle County envisions a community with...

Abundant natural, rural, historic, and scenic resources

Healthy ecosystems

Active and vibrant Development Areas

A physical environment that supports healthy lifestyles

A thriving economy, and

Exceptional educational opportunity

...for present and future generations

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# Key Terms & Abbreviations

<b>afforestation</b>	Establishing a forest or stand of trees in areas without recent historical tree cover
<b>Board of Supervisors (Board)</b>	The elected governing body of Albemarle County
<b>carbon dioxide (CO<sub>2</sub>)</b>	A greenhouse gas having the most influence on global climate change
<b>carbon footprint</b>	The total greenhouse gases emitted due to the activities of a person or other entity, typically expressed as carbon dioxide equivalent
<b>climate action plan (CAP)</b>	A plan describing how a local government, or any other body, will reduce their contribution to global climate change
<b>equivalent carbon dioxide (CO<sub>2</sub>(e))</b>	The amount or concentration of CO <sub>2</sub> that would cause the same level of global warming as that from an amount of all greenhouse gases
<b>greenhouse effect</b>	The trapping of the sun's energy in the atmosphere
<b>greenhouse gas (GHG)</b>	A gas that contribute to the greenhouse effect by absorbing infrared radiation (e.g., carbon dioxide, methane, and nitrous oxide)
<b>ICLEI – Local Governments for Sustainability</b>	A global network of local governments dedicated to sustainability, resilience, and climate action
<b>ICLEI-USA</b>	US chapter of ICLEI; national network of local governments dedicated to sustainability, resilience, and climate action
<b>Intergovernmental Panel on Climate Change (IPCC)</b>	A United Nations body that assesses the science related to climate change
<b>Local Climate Action Planning Process (LCAPP)</b>	A previous community-wide climate planning process among Albemarle County, Charlottesville City, and University of Virginia, culminating in a 2011 report
<b>mitigation</b>	Lessening the contribution to climate change by reducing the amount of greenhouse gas emissions
<b>net emissions</b>	The balance of greenhouse gas emissions considering both the generation and sequestration of greenhouse gases
<b>net zero</b>	The amount of greenhouse gases emitted is balanced by an equivalent amount of greenhouse gases sequestered
<b>Paris Climate Agreement</b>	An international agreement by which participating countries endeavor to limit global warming to well below 2°C, ideally to 1.5°C
<b>reforestation</b>	Natural or intentional replenishing of forests or tree coverage in places depleted by deforestation
<b>resiliency</b>	The ability to cope with impacts and to change in order to be better prepared in the future
<b>sequestration</b>	The capture and long-term storage of GHGs, for instance by vegetation and soils

# Introduction

Climate change is profoundly affecting Virginia—from sea level rise and increased flooding in coastal regions to longer wildfire seasons in the Appalachian Mountains. In Virginia's interior, extreme rainfall and extended heat-waves not only present public safety and health challenges, but also increase the likelihood of property damage, drought, and invasive species harming agriculture<sup>1</sup>, the state's largest industry.<sup>2</sup> This has the potential for direct impacts on Albemarle County's economy and rural character, whose agricultural products include a variety of crops and livestock.<sup>3</sup>

Global warming, caused by human activities that have dramatically increased heat-trapping greenhouse gases in the earth's atmosphere, is spurring drastic changes in global climate and weather patterns. The American public is increasingly aware of and concerned about global climate change—72% recognize the truth that global warming is happening and 59% understand that global warming is mostly caused by humans.<sup>4</sup> World leaders have collaborated to address climate change since the early 1990s—meeting most recently for the [25th United Nations Climate Change Conference](#)—but struggle to agree to a collective response appropriate to the seriousness of the issue.

Just as there is a critical role for nations and international bodies in addressing climate change, there is a similarly important role for local governments. Local governments are uniquely situated in their relationship to the communities they serve—their knowledge is more rooted in their locale and they will be the first to respond to community needs in the face of a changing climate. In this way, local governments have both a responsibility and an opportunity for leadership in reducing their communities' contribution to climate change and charting a sustainable future. Albemarle County recognizes the importance of this role and embraces its responsibility to take bold steps to mitigate climate change as part of its policies, programs, and practices in service of a healthy and vibrant community.

This Climate Action Plan describes Albemarle County's commitment to mitigating climate change by reducing the net amount of greenhouse gasses (GHGs) generated throughout the county. It will serve to guide staff initiatives, such as the development of programs and policies, and inform County capital investments. While it's important for the County government to lead by example, County operations account for only about 5% of community-wide emissions. Therefore, it is crucial for the County to also inspire and facilitate action by organizations and individuals throughout the community.

The County anticipates climate action planning to be a long-term endeavor—occurring in two initial phases but with continued iterative updating as time passes and progress is measured. Phase 1, culminating with the adoption of this plan, is meant to be relatively broad. However, to not delay meaningful action, this plan includes immediately actionable steps that we can take now. Phase 2 will build on this plan by including more evaluation of and specificity to the strategies and actions as well as deeper investments in assuring equitable implementation and realizing additional community benefits associated with reduced emissions.

<sup>1</sup> "Understanding Virginia's Vulnerability to Climate Change," Georgetown Climate Center, accessed February 11, 2020, <https://www.georgetownclimate.org/files/report/understanding-virginias-vulnerability-to-climate-change.pdf>.

<sup>2</sup> "Agriculture Facts & Figures," Virginia Department of Agriculture and Consumer Services, accessed February 11, 2020, <https://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml>.

<sup>3</sup> "Albemarle County Virginia," 2017 Census of Agriculture: County Profile, National Agriculture Statistics Service, United States Department of Agriculture, accessed February 11, 2020, [https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/County\\_Profiles/Virginia/cp51003.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Virginia/cp51003.pdf).

<sup>4</sup> "Climate Change and the American Mind," Yale Program on Climate Change Communication, accessed February 12, 2020, <https://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-november-2019/>

## Hierarchy of CAP components



The strategies in this plan are categorized into the major sectors of the community by which GHG emissions can be reduced:

### TRANSPORTATION AND LAND USE

### BUILDINGS

### RENEWABLE ENERGY SOURCING

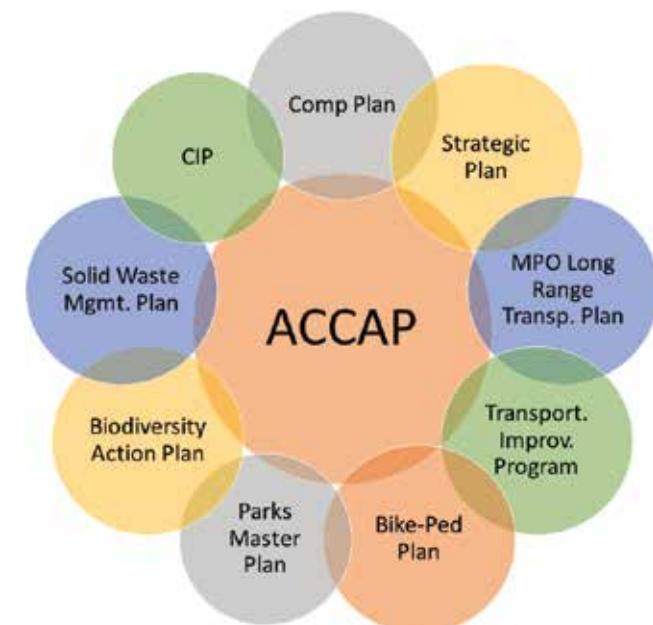
### SUSTAINABLE MATERIALS MANAGEMENT

### LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE

While many of the actions described in this plan are unique to specific emission sectors, some types of actions are applicable to all sectors. For example, community outreach and involvement will be essential in building capacity and achieving meaningful emission reductions in each of the sectors. Further, each sector contains actions that focus on Albemarle County's ability to lead by example through changes to policies and procedures in County operations.

We can successfully mitigate our community's contribution to climate change only if we adopt new practices throughout the County government and community. As such, this plan was developed through the collective effort of many County staff in collaboration with community partners, local experts, various stakeholder groups, and the interested public. In addition, the plan is linked to and complements numerous existing County plans (see insert). Finally, it supports Albemarle County's overall guiding vision to contribute to a healthier, more prosperous, and more equitable community for all residents.

*The Climate Action Plan is informed by, and informs, existing Albemarle County plans*



# At a Glance

## STRATEGIES BY SECTOR

*Albemarle County will mitigate climate change through implementation of the following major strategies:*

### TRANSPORTATION & LAND USE

- Increase opportunities for bicycling, walking, and other alternative forms of personal transportation for daily travel
- Through land use planning, provide an urban form more conducive to sustainable local travel
- Increase electric vehicle charging infrastructure available to the public
- Incentivize the purchase of more efficient vehicles by area residents
- Work with local transit partners to increase the use of alternatives to single-occupancy vehicles
- Partner with regional employers to encourage and incentivize reductions in single-occupancy vehicle commuting
- Increase the overall fuel efficiency of the County vehicle fleet
- Improve County Government policies and procedures pertaining to employee work travel and commuting
- Increase community awareness about alternative, clean modes of transportation and infrastructure projects in the county designed to facilitate ease of clean transport for residents

### BUILDINGS

- Enable and incentivize private energy efficiency and renewable energy projects in the County Code and during the community development regulatory process
- Expand upon and develop partnerships with local companies and non-profit agencies to improve energy efficiency in existing homes and businesses
- Promote private energy efficiency and renewable energy investments by the private sector
- Increase community awareness about energy conservation and renewable energy
- Partner with utility companies to expand energy efficiency and renewable energy options for property owners and tenants
- Establish formal policies to further GHG emissions reduction efforts at local government and school buildings
- Make targeted investments in energy efficiency and renewable energy projects at existing local government and school buildings
- Advocate for Virginia legislative actions to support energy efficiency and renewable energy

## RENEWABLE ENERGY SOURCING

Enable and incentivize utility-scale renewable energy projects in the County Code and during the community development regulatory process

Partner with utilities and renewable energy companies to increase local renewable energy initiatives

Invest in utility-scale renewable energy to meet energy needs of local government operations as allowed under Virginia code

Promote and facilitate investment in utility-scale renewable energy by the private sector

Increase community awareness about utility-scale renewable energy

Advocate for Virginia legislative actions to support utility-scale renewable energy

## SUSTAINABLE MATERIALS MANAGEMENT

Increase the availability, convenience, and efficiency of trash and recycling collection

Research economic and regulatory tools to improve waste metrics reporting and motivate residents to recycle

Increase the availability and convenience of organic material collection and composting

Use media outreach and public information campaigns and school programs to encourage behavioral changes towards waste

## LANDSCAPE, NATURAL RESOURCES, & AGRICULTURE

Incentivize the protection and restoration of natural areas on private land

Increase tree cover and native vegetation in urban areas, particularly adjacent to streets and parking areas

Promote carbon best management practices on agricultural land

Promote best carbon management practices on County-owned properties and as part of County projects and initiatives

Create opportunities for all residents to participate in initiatives that would contribute towards local carbon sequestration

# At a Glance

## IMMEDIATE ACTIONS

The actions summarized in this table are those that Albemarle County intends to initiate immediately. These actions involve setting goals, developing resources and internal policies, and initiating studies or projects.

### TRANSPORTATION & LAND USE

#### STRATEGIES

#### ID/ACTIONS

Increase opportunities for bicycling, walking, and other alternative forms of personal transportation for daily travel

- T.1.1 Improve data collection and reporting on bicycle and pedestrian facilities, usage, and deficiencies for data-sharing purposes
- T.1.2 Set targets for increasing the extent of sidewalks, bike lanes, and shared-use paths in the County's development areas, focusing on strategic, high-impact connections
- T.1.3 Improve the quality of bicycle and pedestrian infrastructure in the development areas to make it safer and more comfortable for users
- T.1.4 Increase public information about bicycle and pedestrian safety

Increase the use of public transit or other transportation demand management programs to provide alternatives to single-occupancy vehicles

- T.5.1 Continue to improve coordination between public transit providers (JAUNT, CAT, UTS)

Increase the overall fuel efficiency of the County vehicle fleet

- T.7.1 Modify vehicle replacement criteria to strongly weight vehicle efficiency
- T.7.2 When possible, purchase electric or hybrid vehicles
- T.7.3 Update the process to justify the need for new vehicles in order to maintain the "right-sized" fleet

Improve County Government policies and procedures pertaining to employee work travel and commuting

- T.8.1 Develop a non-idling policy for vehicles having internal combustion engines

## BUILDINGS

### STRATEGIES

### ID/ACTIONS

Expand upon and develop partnerships with local companies and non-profit agencies to improve energy efficiency in existing homes and businesses

B.2.1 Support organizations/programs like the Local Energy Alliance Program (LEAP) that educate, provide technical assistance, and facilitate third-party energy efficiency and renewable energy incentives

Establish formal policies to further GHG emissions reduction efforts at local government and school buildings

B.6.1 Establish formal goals for GHG emissions reductions for local government and school buildings

Make targeted investments in energy efficiency and renewable energy projects at existing local government and school buildings

B.7.2 Adopt a policy whereby operational savings associated with energy efficiency project are reinvested into future renewable energy projects

## SUSTAINABLE MATERIALS MANAGEMENT

Increase the availability, convenience, and efficiency of trash and recycling collection

S.1.1 Establish a model trash and recycling center at the Ivy Material Utilization Center

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S.1.2 Explore the feasibility of curbside recycling by the County

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S.1.3 Identify if there is a need to locate additional paper/cardboard balers in Albemarle County

Increase the availability and convenience of organic material collection and composting

S.3.1 Study the feasibility of residential curbside yard waste and food scraps composting

## LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE

Incentivize the protection and restoration of natural areas on private land

L.1.5 Provide general educational resources for landowners regarding the benefits of protecting natural areas

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L.1.10 Promote small forests ("Victory Forests") instead of lawns on large lot subdivision parcels

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L.1.11 Join national and international campaigns for planting trees

Promote best carbon management practices on County-owned properties and as part of County projects and initiatives

L.4.1 Locate priority sites for evaluating the carbon trapping potential of the landscape on County properties

# The Importance of Climate Action Planning

This document is the culmination of the first phase of Albemarle County's climate action planning process. It will provide initial guidance on the development of County policies, programs, and projects to respond to the growing threat of global climate change by reducing the community's net greenhouse gas emissions. As this is the first phase of a multi-phase process, its aim is to present a framework of goals, strategies, and actions that will be developed in greater detail in subsequent iterations of climate action planning.

Many elements of this plan—from broad goals to specific actions—are not new to the County; rather, they complement existing plans and programs, such as the Comprehensive Plan and energy conservation initiatives.

The City of Charlottesville and the University of Virginia are simultaneously developing their own plans to mitigate climate change as a component of their respective sustainability programs. The County, City, and University have worked together by sharing information, providing mutual support, and collaboratively developing an outreach website—[Climate Action Together](#). The County will continue to work with its local partners as it begins implementing solutions.

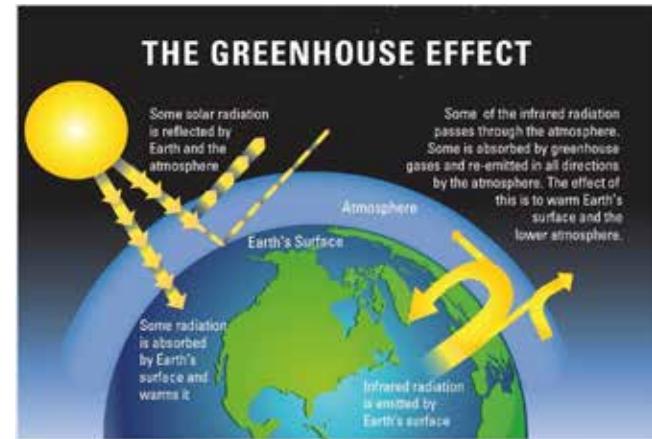


Figure 1 Source: Photo courtesy of The Royal Society;  
<https://royalsociety.org/topics-policy/projects/climate-change-evidence-causes/basics-of-climate-change/>

## CLIMATE SCIENCE AND UNDERSTANDING

Albemarle County has developed this Climate Action Plan in accord with robust climate science. Scientists began laying the foundation for modern climate science as early as the nineteenth century by demonstrating that carbon dioxide (CO<sub>2</sub>) amplified the earth's natural greenhouse effect. By the mid-1900s, scientists had confidently linked rising average global temperatures to increasing concentrations of CO<sub>2</sub> in the atmosphere and had accurately predicted that doubling CO<sub>2</sub> concentrations would increase temperatures by 3.6° Celsius (6.5° Fahrenheit).<sup>5</sup> Direct measurements, began in 1958, have confirmed the predicted rise of atmospheric concentrations of CO<sub>2</sub> and other GHGs.

Climate scientists now overwhelmingly agree that nearly all global warming since the industrial revolution has been caused by greenhouse gas emissions from human activities.<sup>6</sup> While climate science has become increasingly sophisticated in recent years, a 2019 study determined that the projections from even the earliest climate models – from the 1970s – are indistinguishable from what has occurred.<sup>7</sup>

Concern over the negative consequences of global climate change is not new. President Lyndon B. Johnson received a report from his Science Advisory Committee in 1965, which described the increase of atmospheric CO<sub>2</sub> concentrations due to burning fossil fuels and warned of possible "deleterious" effects of resulting climatic changes.<sup>8</sup> In 1977, James Black—a scientist working for Exxon—told the company's management committee that "the most likely manner in which mankind is influencing the global climate is through carbon dioxide release from the burning of fossil fuels."<sup>9</sup> In 1988, NASA sci-

entist James Hansen provided congressional testimony on climate change that helped raise broad public awareness.<sup>10</sup>

For decades, the global community has been attempting to address climate change through cooperative research and international agreements to reduce GHG emissions, such as the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 1997 Kyoto Protocol. Building on these earlier treaties, the Paris Agreement – adopted in 2015 – calls for participating countries to limit the increase in global average temperatures to well below 2°C above pre-industrial levels and to pursue efforts to limit warming to 1.5°C.<sup>11</sup>

In 1988, the United Nations created the Intergovernmental Panel on Climate Change (IPCC) to assess scientific research on global warming and climate change. The IPCC has produced five assessment reports and numerous special reports on the impacts of a changing climate and opportunities for mitigation and adaptation. In 2018, the IPCC published a widely circulated special report on the likely impacts to society of global warming of 1.5°C and 2°C, based on the Paris Agreement goals. The conclusions were clear: Global warming of 1.5°C will produce dire consequences to "health, livelihoods, food security, water supply, human security, and economic growth." In the case of a 2°C increase, the effects are likely to be far worse.<sup>12</sup>

<sup>5</sup> Gilbert N. Plass, "The Carbon Dioxide Theory of Climatic Change," *Tellus* 8, no. 2 (1956): 140-154.

<sup>6</sup> See Zeke Hausfather, "Analysis: Why scientists think 100% of global warming is due to humans," *Carbon Brief*, December 13, 2017; and IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

<sup>7</sup> Zeke Hausfather, Henri F. Drake, Tristan Abbott, and Gavin A. Schmidt, "Evaluating the Performance of Past Climate Model Projections," *Geophysical Research Letters* 47, no. 1 (2019): 1-10, <https://doi.org/10.1029/2019GL085378>.

<sup>8</sup> Dana Nuccitelli, "Scientists Warned the US President about Global Warming 50 Years Ago Today," *The Guardian*, November 5, 2015, <https://www.theguardian.com/environment/climate-consensus-97-per-cent/2015/nov/05/scientists-warned-the-president-about-global-warming-50-years-ago-today>.

<sup>9</sup> Shannon Hall, "Exxon Knew about Climate Change Almost 40 Years Ago," *Scientific American*, October 26, 2015, <https://www.scientificamerican.com/article/exxon-knew-about-climate-change-almost-40-years-ago/>.

<sup>10</sup> Elizabeth Kolbert, "Listening to James Hansen on Climate Change, Thirty Years Ago and Now," *The New Yorker*, June 20, 2018, <https://www.newyorker.com/news/daily-comment/listening-to-james-hansen-on-climate-change-thirty-years-ago-and-now>.

<sup>11</sup> United Nations Climate Change, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

<sup>12</sup> IPCC, 2018: Summary for Policymakers, in: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)], In Press, p. 9.

# The Importance of Climate Action Planning

## IMPACTS OF CLIMATE CHANGE

The effects of climate change are already here. The U.S. National Aeronautics and Space Association (NASA) puts it straightforwardly:

*"Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner. Effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise and longer, more intense heat waves."<sup>13</sup>*

Americans are experiencing these effects now—extreme heat waves in the summer,<sup>14</sup> increasingly intense inland flooding from heavy rainfall and superstorms,<sup>15</sup> wildfires at unprecedented frequency and scale.<sup>16</sup> Not only have wildfires in the states of California, Oregon, and Washington gripped national news, for example, but Virginia is also expected to see more fires in the Appalachian Mountains.<sup>17</sup>

Although various effects of climate change will be seen everywhere, the impacts and costs will not fall equally on all people. Reports from the Intergovernmental Panel on Climate Change (IPCC) predict that vulnerable populations and historically marginalized communities likely will be affected more severely by increased rainfall, flooding, heat waves, and more. Increasingly severe weather patterns resulting from climate change will exacerbate food insecurity, economic hardship, negative health outcomes, and lack of access to basic goods and services, among other challenges.<sup>18</sup>

For example, rural communities globally are likely to be among the most negatively impacted by climate change,<sup>19</sup> of local concern given the important rural character of Albemarle County. In the United States, people in poverty and people of color will experience harmful impacts of climate change most severely.<sup>20</sup> For instance, people in poverty are more vulnerable to heat islands during heat waves and housing burden from higher utility costs. Women, children, and the elderly will also experience comparatively greater harmful impacts to health and wellbeing.<sup>21</sup> For example, women and children are already being displaced at higher rates due to floods and droughts.<sup>22</sup>

Governments, businesses, universities, and other institutions around the world are coming to terms with the risks and costs of climate change. A 2019 US Defense Department report, for example, identified the vulnerabilities from climate change of 79 key military facilities and states that "the effects of a changing climate are a national security issue."<sup>23</sup> CDP Global, a nonprofit that discloses the environmental impacts of business and government operations, reported in 2019 that 215 of the world's biggest companies have valued the near-term climate risks to their businesses at almost one trillion US dollars.<sup>24</sup>

Albemarle County recognizes that climate change presents significant risks to public safety and health, economic wellbeing, and the natural environment close to home. For these reasons the County takes seriously its own responsibility to mitigate the impacts of climate change.

<sup>13</sup> "The Effects of Climate Change," NASA.gov, accessed February 13, 2020, <https://climate.nasa.gov/effects/>.

<sup>14</sup> Kendra Pierre-Louis, "Heat Waves in the Age of Climate Change: Longer, More Frequent and More Dangerous," The New York Times, July 18, 2019, <https://www.nytimes.com/2019/07/18/climate/heatwave-climate-change.html>.

<sup>15</sup> "Inland Flooding," US Climate Resilience Toolkit, Climate.gov, <https://toolkit.climate.gov/topics/coastal-flood-risk/inland-flooding>.

<sup>16</sup> Bruce Lieberman, "Wildfires and climate change: What's the connection?" Yale Climate Connections, July 2, 2019, <https://www.yaleclimateconnections.org/2019/07/wildfires-and-climate-change-whats-the-connection/>.

<sup>17</sup> John Boyer, "Floods, fires and rising seas: New Report Details How Virginia Will Feel Climate Change," Richmond Times-Dispatch, Nov 28, 2018, [https://www.richmond.com/weather/floods-fires-and-rising-seas-new-report-details-how-virginia/article\\_90a70d07-e988-5bde-837f-97053be61aae.html](https://www.richmond.com/weather/floods-fires-and-rising-seas-new-report-details-how-virginia/article_90a70d07-e988-5bde-837f-97053be61aae.html).

<sup>18</sup> IPCC, 2018: Summary for Policymakers, in: Global Warming of 1.5°C, p. 15.

<sup>19</sup> Elspeth Dehnert, "Global Warming Hurts Rural Communities Most," Scientific American, March 28, 2014, <https://www.scientificamerican.com/article/global-warming-hurts-rural-communities-most/>.

<sup>20</sup> See, for example: Seth Shonkoff, Rachel Morello-Frosch, Manuel Pastor, and James Sadd, "The climate gap: Environmental Health and Equity Implications of Climate Change and Mitigation Policies in California—A Review of the Literature," Climatic Change 109, no. 1 (2012): 485–503; and Douglas Fischer, "Climate Change Hits Poor Hardest in U.S.," Scientific American, May 29, 2009, <https://www.scientificamerican.com/article/climate-change-hits-poor-hardest/>.

<sup>21</sup> See, for example: Bruce A. Carnes, David Staats, and Bradley J. Willcox, "Impact of Climate Change on Elder Health," The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences 69, no. 9 (2014): 1087–1091, doi:10.1093/gerona/glt159; and "How Is Climate Change Affecting Women?" The Climate Reality Project, March 14, 2018, <https://www.climaterealityproject.org/blog/how-climate-change-affecting-women>.

<sup>22</sup> See, for example: Mary Halton "Climate Change 'Impacts Women More than Men,'" BBC News, March 8, 2018, <https://www.bbc.com/news/science-environment-43294221>.

<sup>23</sup> John Conger, "New Pentagon Report: 'The effects of a changing climate are a national security issue,'" The Center for Climate and Security, ClimateandSecurity.org, January 18, 2019, <https://climateandsecurity.org/2019/01/18/new-pentagon-report-the-effects-of-a-changing-climate-are-a-national-security-issue/>.

<sup>24</sup> "World's biggest companies face \$1 trillion in climate change risks," CDP, June 4, 2019, <https://www.cdp.net/en/articles/media/worlds-biggest-companies-face-1-trillion-in-climate-change-risks>.

# Our Commitment to Climate Action

The 2018 IPCC special report concluded that limiting global warming to 1.5°C above pre-industrial levels would require “far-reaching and unprecedented changes in all aspects of society”<sup>25</sup> and requires “deep emissions reductions” and “rapid and far-reaching transitions in energy, land, urban and infrastructure...and industrial systems.”<sup>26</sup>

This and other reports make it clear that addressing climate change requires action at all levels of society—by individuals, businesses, organizations, and all levels of government. As a local government, Albemarle County invests in transportation improvements, makes land use decisions, and has significant influence on building construction. The County can also create policies and programs that incentivize individuals, organizations, and businesses to adopt sustainable practices. Further, the County can serve as an example to others by adopting sustainable practices—such as investing in more sustainable buildings, a more efficient vehicle fleet, and on-site renewable energy projects.

Albemarle County has demonstrated a commitment to natural resource protection and environmental stewardship since the 1970s. Local awareness about the significance of climate change emerged in the Charlottesville-Albemarle community in the mid-2000s. The Charlottesville City Council passed a resolution on July 17, 2006 endorsing the U.S. Mayors Climate Protection

Agreement. On December 5, 2007, the County Board of Supervisors approved the Sierra Club’s Cool Counties Resolution, pledging to a voluntary goal of reducing carbon dioxide emissions by 80 percent by 2050.

In May 2009, the County and City begin working with the University of Virginia and other local partners on an initiative that became known as the Local Climate Action Planning Process (LCAPP). The resulting LCAPP report—finalized in August 2011—articulates the motivation for taking climate action, summarizes the planning process, provides examples of existing efforts and provides recommended Action Strategies from which the three major entities could then develop their own action plans. On September 7, 2011, the Board accepted the LCAPP Final Report. At the same meeting, the Board rescinded the Cool Counties community-wide GHG reduction pledge and approved a plan directing staff to improve the sustainability of County government operations and to promote sustainable practices throughout the community.

On September 6, 2017, the Board passed a resolution to “Reaffirm Commitment to Support Local Action to Reduce Climate Pollution” and on September 5, 2018 authorized signing on to an Open Letter – “We Are Still In” Declaration to support the Paris Agreement on climate change. During strategic planning sessions in the fall of 2018,

the Board determined that climate action planning was one of their most important priorities. Through the Prioritized FY20-22 Strategic Plan, the Board directed staff to develop and implement a climate action plan consisting of high-level goals and strategies and recommendations for near-term actions. This document serves to achieve that directive.

## Acting at All Levels of Society

To mitigate climate change, all levels of society need to participate. Governments can plan, incentivize, and build low-carbon infrastructure, as well as enact laws and policies that will accelerate the transition to more sustainable practices by individuals and businesses. Businesses and organizations can reduce process inefficiencies, lower the amount of energy used by buildings, install solar panels, and invest in new technologies specific to their industry. For example, Walmart announced its intent (“Project Gigaton”) to reduce 1 gigaton of GHG emissions from its supply chain by 2030—the equivalent of taking 211 million passenger cars off the road for a year. Finally, individuals can contribute to mitigating climate change in several ways: using more efficient forms of transportation, reducing their food waste, and purchasing energy-saving appliances.

<sup>25</sup> “Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments,” Press Release, IPCC, October 8, 2018, <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>.

<sup>26</sup> IPCC, 2018: Summary for Policymakers, in: Global Warming of 1.5°C.

*“...the County of Albemarle, based on IPCC guidance, adopts GHG emission reduction targets of 45% by 2030 and ‘net zero’ by 2050 using the County’s 2008 GHG inventory as a baseline.” –County of Albemarle Board of Supervisors*

## GREENHOUSE GAS EMISSION REDUCTION TARGETS

The intent of the proposed strategies and actions in this climate action plan is to reduce the amount of greenhouse gases (GHGs) emitted due to human activities within the County and to simultaneously offset GHG emissions through increasing the capture and storage (sequestration) of GHGs by vegetation and soil.

### **Net GHG emissions = GHGs generated – GHGs sequestered**

While any reduction of net GHG emissions within the County over time is a step in the right direction, a good plan requires quantitative targets by which to measure success.

Such targets are typically expressed as a percent reduction of net GHGs by a certain year, as measured against a given baseline—or starting point. Targets often include interim milestones in addition to an ultimate reduction target. **Albemarle County’s target is to reduce GHG emissions in the community by 45% from 2008 levels by 2030 and to achieve net zero emissions by 2050.**

Albemarle County has conducted several community-wide greenhouse gas inventories in the past to estimate the total amount of emissions within

the boundaries of the County.<sup>27</sup> The County performed inventories for the years 2000, 2006, and 2008 using the ICLEI-USA climate inventory software and various sources of information, including traffic data, energy usage, housing statistics, and information from solid waste haulers. 2008 was selected as Albemarle County’s baseline year because it is the closest inventory year to 2010, the baseline year used by the IPCC for modeling responses to global warming of 1.5°C and 2°C.

Based on the 2008 inventory, greenhouse gas emissions in Albemarle totaled over 1.6 million tons carbon dioxide equivalent (CO<sub>2</sub>(e)). Figure 2 shows how those emissions were distributed among different sources. Figure 3 depicts the same information as Figure 2, but with residential, commercial, and industrial sources aggregated into “buildings,” representing the Buildings sector in this plan.

Through a formal resolution passed on September 18, 2019, the Board of Supervisors set its GHG reduction target: By the year 2030, Albemarle County will reduce emissions of GHGs by 45% from the 2008 levels and ultimately achieve net-zero emissions by 2050 (Figure 4). This goal is consistent with the Paris Agreement goal to limit global warming to well below 2.0°C (3.6°F).

As part of Phase 2 of the climate action planning process, the County will once again calculate community-wide GHG emissions based on the latest available data and updated ICLEI software. This inventory will be repeated every several years to track progress towards reaching the County’s ultimate target.

## Adaptation and Resilience

Many communities, including Albemarle County, have begun to consider how they will adapt to a changing climate—for instance, whether their infrastructure and public safety services will be prepared to respond adequately to extreme storms. Climate resilience is both the ability to absorb stresses related to climate change and to adapt community systems to be more sustainable over time. While this Climate Action Plan focuses on climate change mitigation, Albemarle County recognizes the importance of adaptation and resilience. In its Comprehensive Plan, the County has committed to studying in greater detail the local impacts of climate change and to developing a Community Resilience Plan “to prevent harm to human and biologic health” (Natural Resources Strategy 8a).

<sup>27</sup> County of Albemarle, VA Emissions Baseline Report, Department of General Services, County of Albemarle, February 2009, [https://www.albemarle.org/upload/images/Forms\\_Center/Departments/Board\\_of\\_Supervisors/Forms/Agenda/2011Files/0608/8b\\_CoolCountiesAttG.pdf](https://www.albemarle.org/upload/images/Forms_Center/Departments/Board_of_Supervisors/Forms/Agenda/2011Files/0608/8b_CoolCountiesAttG.pdf).

2008 Albemarle County GHG Emissions Sources (CO<sub>2</sub>(e) Percent)

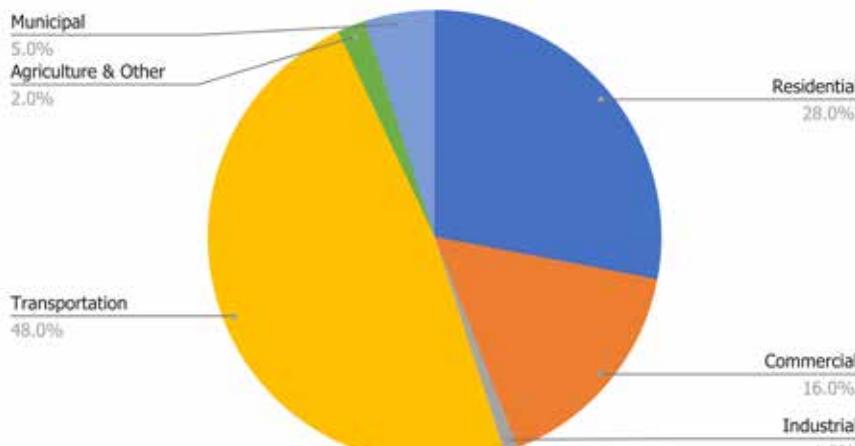


Figure 2

## How does a community measure GHG emissions?

GHG accounting for a locality includes the total amount of all GHGs (expressed as an equivalent amount of CO<sub>2</sub>) generated to produce the energy needs of the community – whether the energy use is derived from fossil fuel combustion directly (such as by driving a gas vehicle) or indirectly (such as by using electricity generated by a natural gas-fired power plant) – minus the amount of GHGs sequestered within the community due to new practices that draw down carbon out of the atmosphere, like planting new trees (afforestation) and regenerative agriculture.

Past GHG emissions inventories did not include an accounting of local GHG sequestration. Future inventories will incorporate GHG sequestration that is achieved through deliberate improvements to land management practices and land cover. Land use and cover are continually changing throughout the County, and these changes may result in GHGs either being sequestered or released. Although it would be impossible to track all these activities, the County intends to account for significant land use changes (for instance, new development) and take credit for any deliberate activities that sequester carbon (such as those covered in the section entitled "Landscape, Natural Resources, and Agriculture").

2008 Albemarle County GHG Emissions (CO<sub>2</sub>(e) Percent)

Buildings Grouped

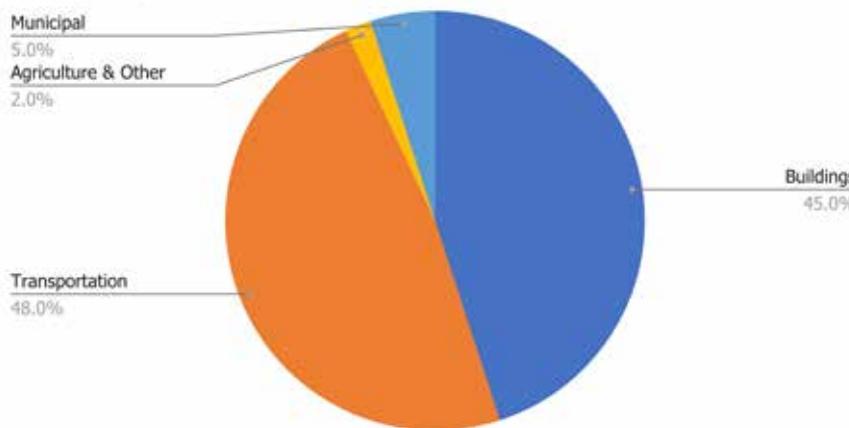


Figure 3: Albemarle County emissions grouped by Climate Action Plan sector

Albemarle County's Net GHG Emissions Targets (CO<sub>2</sub>(e) tons) by Year

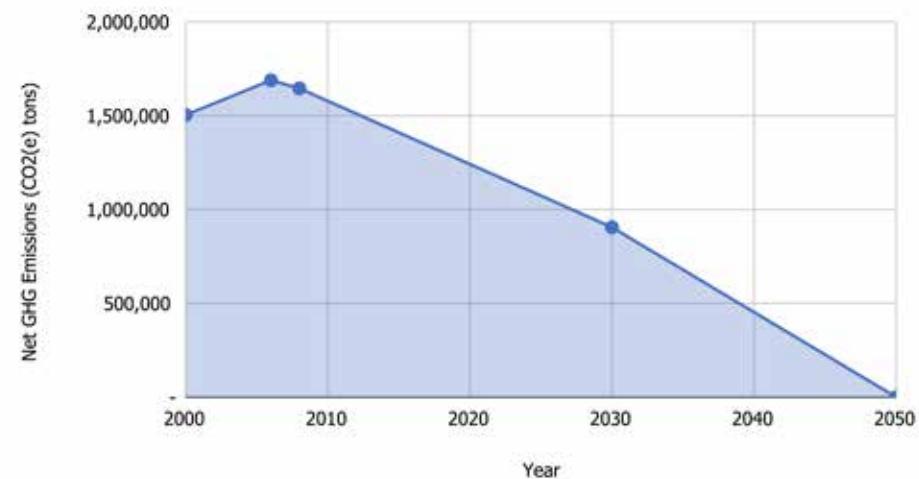


Figure 4: Albemarle County's Net Emissions Targets"

## PHASED APPROACH

The County is developing its Climate Action Plan (CAP) in multiple phases. This development process will serve the CAP in two ways: First, phased development has allowed the Board of Supervisors and community to participate in determining the general direction and overarching goals of the plan before a larger effort is invested in fully developing all strategies and actions. Second, staff can devote immediate attention to high-priority internal actions and projects that will result in assured results even as other actions require additional research and development.

### Phase 1

Phase 1 of the plan presents five sets of goals, strategies, and actions, organized into each of the following five sectors:

#### TRANSPORTATION AND LAND USE

#### BUILDINGS

#### RENEWABLE ENERGY SOURCING

#### SUSTAINABLE MATERIALS MANAGEMENT

#### LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE

As part of Phase 1, the County has begun to pursue funding for capital and operational improvements to County buildings that will reduce future energy use and costs. In addition, we have begun revising policies and practices that will help the County reduce its operational carbon footprint—such as shifting towards an electric vehicle fleet.

### Phase 2 and Recurring Updates

During Phase 2 of climate action planning, we will refine the strategies and more fully develop the actions presented in this document. We will assess how best to implement actions, prioritizing those that have the best return on

investment in terms of emissions reductions, co-benefits, and equity. We will continue to identify and implement sensible internal projects and programs. The second phase will also include developing a County-wide GHG emission inventory for the most recent year for which data is available, which we will use to track progress in reducing emissions.

Due to the nature of global issues and the scale of addressing climate change, climate action will very likely be a permanent County program. As with any complex and wide-ranging effort, the Climate Action Plan will be updated periodically to reflect new GHG inventories, changing conditions, and refined climate action priorities.

#### Phase 1

identify broad goals and strategies, with supporting actions  
identify and initiate high priority actions, especially related to County operations

#### Phase 2

develop more detailed plans to meet overall goals and strategies  
implement near-term actions  
develop GHG emission inventory for latest year

#### Recurring

GHG inventory updates  
track progress  
assess and update plan

## IMPROVING PROSPERITY, HEALTH, AND QUALITY OF LIFE IN ALBEMARLE COUNTY

The primary focus of this Climate Action Plan is to reduce greenhouse gas (GHG) emissions in Albemarle County, helping to mitigate the adverse effects of climate change. However, climate action planning is not just about reducing emissions. In fact, taking smart action to mitigate the effects of climate change brings a host of other benefits that will support Albemarle County's vision for a thriving, vibrant community. The strategies and actions in this Climate Action Plan will specifically support economic prosperity, community health, and the local natural environment.

### *Economic Prosperity*

Smart climate action planning presents numerous benefits to the local economy in Albemarle County. Job creation will be central: Projects to increase the energy efficiency of buildings, install onsite renewable energy generation, and build local renewable energy utilities will create well-paying, sustainable jobs in the growing clean energy industry. Production and consumption of locally made products—like food, furniture, and other goods—reduces greenhouse gas emissions and supports local job creation. Further, when we reduce wasteful costs from inefficient buildings or congested commutes by improving efficiency, we free up time and disposable income for more productive activities. On a broader scale, more

efficient buildings and transportation infrastructure can make a community more attractive to businesses. Managing our community's waste more sustainably—through repairing goods, recycling, and composting—also supports the local economy. For example, composting can provide affordable, natural fertilizer for local farmers to use in their operations while reducing landfill. Actions that protect and restore the local natural environment make Albemarle County a more attractive place to visit, supporting the local economy through tourism.

### *Community Health*

Climate action planning will also improve the health of people who live and work in Albemarle County. Local air quality will benefit from reduced vehicle and building emissions and from planting trees in areas with less canopy, which in turn can reduce rates of asthma and other chronic diseases. Planting trees and other vegetation also reduces noise, increases access to natural areas, and contributes to greater biodiversity, which can improve the physical and mental health of residents. Expanding access to active modes of transportation and fresh, locally grown food promote healthier lifestyles.

### *Local Natural Environment*

Actions to mitigate climate change will produce local benefits to environmental health, supporting broader ecosystem resilience. For example, preserving existing forest and planting new trees in strategic areas supports wildlife habitat, improves stormwater management, reduces flood risk, and improves air and water quality. Preserving and restoring biodiversity in turn makes Albemarle County a more enjoyable place to live, work, and visit. Increasing the health of the local natural environment also helps to preserve the character of rural and wild places in the county for generations to come.

*Throughout this document, these additional benefits that accrue as a result of actions to mitigate climate change will be referred to as co-benefits.*

*Specific co-benefits are named within each sector description in the Strategies and Actions section—identifying broader improvements to prosperity, health, and quality of life stemming from climate actions.*

*Although this CAP focuses on mitigating climate change, many of the implications for equity of climate change are relevant to communities' ability to adapt and remain resilient in the face of increasingly severe weather, food shortages, and other impacts. From an equity perspective, therefore, it is crucial that County staff focused on mitigation efforts collaborate closely with other County departments working on climate change adaptation and resilience.*

## COMMITMENT TO EQUITY

Albemarle County understands that the effects of climate change will not impact all community members in the same way or to the same degree. We are committed to creating a process of climate action planning now and in the future that will serve all residents while also addressing disparities created by historic and present policy. As an objective, equity in climate action planning means pursuing outcomes that benefit everyone in the community without leaving anyone behind or worsening disparities that already exist, as well as addressing disparities where possible.

Accounting for differences in the harmful impacts of climate change is crucial for climate action planning and for realizing the kind of community that Albemarle County envisions. Further, the need to plan for climate change presents a valuable opportunity to address existing inequity in the county and to foster a stronger, healthier community for everyone. Conversely, poor climate action planning can worsen existing inequity by, for example, failing to consider current differences in access to services like public transit or safe pedestrian crossings. Three aspects of equity pertinent to climate action planning are: (1) structural inequality in terms of who provides input on new programs, (2) who has access to the benefits of implementation, and (3) on whom financial burden of implementation falls.<sup>28</sup> A climate action plan that does not address these dimensions of equity will neither be sustainable nor just.

Forthrightly addressing equity in climate action planning benefits everyone. "Equity aims to equip everyone, especially those who have been left behind,

with the resources that allow them to contribute and prosper," observes the organization PolicyLink. "When smart, sustainable strategies are tailored to the needs of the most vulnerable communities, opportunities improve for all."<sup>29</sup> Put another way, "equity can mean looking at a system through the lens of its most disadvantaged members. Whatever is not working for them may well be impacting others in the system—just not as severely. The changes that improve their experience of the system will very likely feed up to others."<sup>30</sup> In other words, if Albemarle County's Climate Action Plan strategies and actions ensure that underserved members of the community have input on and benefit from new programs and services, the quality of such services will be higher for everyone.

In order to incorporate equity robustly into the County's Climate Action Plan, the Office of Equity and Inclusion commissioned the creation of an assessment rubric to aid addressing equity in the Phase 1 document, to guide integrating it into Phase 2 strategies and actions, and to assess progress throughout development and implementation.<sup>31</sup> The equity assessment rubric, *Creating an Equitable Climate Action Plan*,<sup>32</sup> will be employed along with other relevant equity tools to examine existing strategies and actions through the three dimensions of equity described above (structural inequality, accessibility to benefits, and financial burden). Where necessary, updates and modifications will be made to specific strategies and actions in order to maximize potential benefits to equity and minimize risks of worsening existing inequity.

<sup>28</sup> Department of Energy and Environment, Government of the District of Columbia, Clean Energy DC: The District of Columbia Climate and Energy Action Plan, August 2018, 47.

<sup>29</sup> Mission Statement, PolicyLink, <https://www.policylink.org/about-us/mission-statement>.

<sup>30</sup> Kelly Jones, "Why Focusing On Equity Is Good for Everyone," Eastside Pathways, <http://eastsidepathways.org/why-focusing-on-equity-is-good-for-everyone/>.

<sup>31</sup> Gabriel Dayley, Creating an Equitable Climate Action Plan, Office of Equity and Inclusion, County of Albemarle, February 2020.

<sup>32</sup> The rubric can be found on Albemarle County's website at [insert link].



## PUBLIC ENGAGEMENT

Each of the following sections that discusses a specific mitigation sector includes a brief discussion of potential benefits and risks to equity associated with that sector's strategies and actions. The equity assessment rubric (available on the County website) serves as a reference for more specific questions and considerations. As the County adds greater detail to strategies and actions in Phase 2 of the Climate Action Plan, more specificity will also be included about how equity can be addressed.

In developing Phase 2 of the Climate Action Plan, it will be especially important to include the voices of marginalized and underserved communities in Albemarle County in the process of designing more detailed strategies that will serve the community as a whole. Stakeholder representation should be equitable and inclusive so that the benefits or programs and services designed to mitigate climate change are accessible and affordable. In some cases, this may require outreach and engagement to build the capacity of communities to engage meaningfully on technical issues that relate to climate action planning, as well as communications that overcome the digital divide, language barriers, and other obstacles.

Phase 1 of the climate action planning process began in earnest in October 2018 with the formation of a steering team, coordination team, and emission sector teams. The steering and coordination team consisted mostly of County staff but included key partner representatives. The emission sector teams included County staff and community stakeholders.

The emission sector teams were responsible for developing the strategies and actions that comprise the Phase 1 plan. Sector team members derived the strategies and actions from their areas of expertise and from reviewing other localities' climate action plans.

Community input has been a key element of the Phase 1 process. All sector team meetings were publicized and open to the public. In March 2019, the County hosted an open house event to kick off the work by the sector teams. On almost every Monday evening during the months of May through July, the County held meetings focused on discrete emission sectors in order to gather

ideas directly from the community. We collected community feedback via verbal and written comments during public meetings, from emails sent to [climate@albemarle.org](mailto:climate@albemarle.org), and from an online form made available from August 14th-25th, 2019.



# The Community We Envision

## Strategies and Actions

The principal content of this Climate Action Plan are the strategies and actions that Albemarle County aims to implement over time in order to reduce net GHG emissions from the community. These strategies are organized by sectors, which represent major sources of emissions that can be reduced, opportunities to sequester carbon dioxide from the atmosphere, or a combination of both. The five sectors detailed in this Climate Action Plan are:

### TRANSPORTATION AND LAND USE BUILDINGS RENEWABLE ENERGY SOURCING SUSTAINABLE MATERIALS MANAGEMENT LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE

Each sector section begins with several overarching **goals** for the sector, a **description** of the sector, and a general overview of how taking action in that sector can mitigate climate change through reducing emissions or sequestering CO<sub>2</sub>.

Within each sector, a list of **co-benefits** identifies broader improvements to prosperity, communi-

ty health, environmental wellbeing, and overall quality of life that the sector's actions to mitigate climate change will also support. These co-benefits reflect enhancements to individual wellbeing and local community life beyond GHG emission reduction.

A discussion of **equity** addresses how strategies in each sector can contribute to equitable outcomes for the whole community, as well as potential risks to equity that may arise from poor planning or implementation.

The **strategies and actions** are presented in tables. **Strategies** identify initiatives that support one or more of the goals associated with a given sector, and **actions** identify specific activities that support a particular strategy. For each action, we identify the intended lead agency responsible for implementation—either a County department or partner organization—and the timeframe of the action with respect to Phase 1, with three labels. Some actions can be implemented immediately and are expected to produce a return on investment in a relatively short period; these are labeled *immediately actionable* in the table and represent the first steps the County will take to implement the Climate Action Plan. (We also highlight immediately actionable items in the second table of

the “At a Glance” section on page 4 of this plan.) Some actions have the label *initiate planning*, and these represent activities whose planning can begin now but whose implementation may take time or whose return on investment may be evident in the medium term. Finally, some actions are labeled *assess opportunities*; such actions, and in some cases the strategies they support, require further research in order to plan and implement. Conducting this research will form a central component of developing Phase 2 of the Climate Action Plan, and these actions will exhibit greater detail and specificity in Phase 2 documentation.

# Transportation and Land Use

## GOALS:

- Reduce overall vehicle miles traveled*
- Shift towards lower-emissions and zero-emissions vehicles*
- Reduce use of single-occupancy vehicles*
- Increase use of alternative modes of travel such as biking, walking and public transit*

Greenhouse gases from the transportation sector comprise the largest contribution from the County to global climate change, accounting for 48% of all emissions during the 2008 baseline year. This sector includes all trips by all people for all reasons that occur within the boundaries of the County. Examples include commutes by individuals from home to work, portions of local bus routes within the County, trips by local commercial fleets, and travelers passing through on Interstate 64.

The purpose of the strategies in this sector is to allow people to move more efficiently—in effect, reducing the amount of emissions produced while maintaining (or even enhancing) people's ability to get around. As reflected in the goals listed above, this can be achieved in three primary ways: First, employing more efficient transportation modes can mean walking or bicycling instead of driving a car. Second, reducing the number of single-occupancy vehicle trips means carpooling or taking a bus. Third, reducing overall miles travels means planning smarter trips, telecommuting, or taking a shorter route.

The term *land use* is included in the title of this section because land use has a significant effect on people's travel options. Smart land use planning can create opportunities for shorter, more efficient travel. For instance, a denser land use pattern with a broader variety of uses reduces the need for people to travel long distances for their

needs. Providing opportunities for multi-modal travel within developments allows for people to make different choices with how they move around.

### *Co-Benefits of Smart Transportation and Land Use*

Improving transportation infrastructure and land use patterns in order to reduce GHG emissions also supports a healthy community. For example, reducing vehicle emissions and increasing accessibility to active modes of transportation like biking and walking will improve local air quality and the health of residents. Cleaner air from fewer cars on the road can reduce rates of asthma, and improved cycling and pedestrian infrastructure can reduce rates of diabetes. In addition, improvements in public transit and infrastructure for active modes of transportation can reduce the costs of commuting and running errands for more people, while increasing travel options. Further, fewer single-occupancy vehicles on the road contributes to less traffic congestion and shorter commutes. Together, these improvements to transportation and land use can contribute to a more active, vibrant community.

### *Equity in Transportation and Land Use*

If well designed with awareness of historical inequities, transportation and land use initiatives have significant potential to advance equity in Albemarle County. Improved transportation in-

rastructure and smarter development can make employment, recreation, and basic goods and services more accessible to everyone, reducing commute times and the need to own a private vehicle. With intention, Albemarle County residents can experience positive health outcomes from increased opportunities to use active modes of transportation; residents in areas with poorer health outcomes due to historical inequities in the built environment's design have the potential to benefit in particular.

The risk of worsening existing inequities increases if careful attention is not given to how past transportation and land use decisions facilitate certain kinds of movement for some while inhibiting it for others. For instance, new bicycle, pedestrian, and transit infrastructure might expand and improve connectivity in affluent areas, leaving people in lower income areas that already lack connectivity further disconnected. If housing affordability is not considered when planning new developments with mixed-use zoning, these areas may be affordable only to affluent families. Or, if removal of infrastructure for polluting modes of transportation (e.g., parking lots) is not paired with expansion of pollution-free modes that serve the same commuter routes, it may become more difficult for lower income people to access places of employment. How increases in public transit service are financed should also be considered so as not to burden low income people unduly with ridership rate increases.

## TRANSPORTATION & LAND USE: STRATEGIES AND ACTIONS

STRATEGIES	ID	ACTIONS	TIMEFRAME
Increase opportunities for bicycling, walking, and other alternative forms of personal transportation for daily travel	T.1.1	Improve data collection and reporting on bicycle and pedestrian facilities, usage, and deficiencies for data-sharing purposes	immediately actionable
	T.1.2	Set targets for increasing the extent of sidewalks, bike lanes, and shared-use paths in the County's development areas, focusing on strategic, high-impact connections	immediately actionable
	T.1.3	Improve the quality of bicycle and pedestrian infrastructure in the development areas to make it safer and more comfortable for users	initiate planning
	T.1.4	Increase public information about bicycle and pedestrian safety	initiate planning
Through land use planning, provide an urban form more conducive to sustainable local travel	T.2.1	Reduce amount of land dedicated to parking by prioritizing alternative transportation modes over single-occupancy vehicles in commercial and residential developments	initiate planning
	T.2.2	Improve coordination between land use and public transit systems	assess opportunities
	T.2.3	Incentivize denser and more mixed-use development patterns within the development areas	assess opportunities
	T.2.4	Increase affordable housing options in areas served by a variety of transportation options	initiate planning
Increase electric vehicle charging infrastructure available to the public	T.3.1	Develop local ordinances and policies that encourage or require new developments to provide electric vehicle charging stations, as appropriate	initiate planning
	T.3.2	Pursue public/private partnerships and/or state and federal grants to support an increase in the availability of electric vehicle charging infrastructure	initiate planning
Incentivize the purchase of lower and zero-emissions vehicles by County residents	T.4.1	Assess a reduction of the personal property tax rate for electric vehicles	assess opportunities

## TRANSPORTATION & LAND USE: STRATEGIES AND ACTIONS (CONTINUED)

STRATEGIES	ID    ACTIONS	TIMEFRAME
Increase the use of public transit or other transportation demand management programs to provide alternatives to single-occupancy vehicles	T.5.1 Continue to improve coordination between public transit providers (JAUNT, CAT, UTS) T.5.2 Assess increasing the frequency of transit service along key routes T.5.3 Increase transit network coverage area for fixed route and flexible bus service T.5.4 Increase the usage of the TJPCT Rideshare program through improved marketing and by setting use targets	immediately actionable initiate planning initiate planning initiate planning
Partner with regional employers to encourage and incentivize reductions in single-occupancy vehicle commuting	T.6.1 Develop a more robust incentive program, perhaps as part of the Charlottesville Better Business Challenge	initiate planning
Increase the overall fuel efficiency of the County vehicle fleet	T.7.1 Modify vehicle replacement criteria to strongly weight vehicle efficiency T.7.2 When possible, purchase electric or hybrid vehicles T.7.3 Update the process to justify the need for new vehicles in order to maintain the "right-sized" fleet T.7.4 Increase availability of EV infrastructure (chargers) on government properties T.7.5 Assess the viability of acquiring electric school buses to replace diesel school buses.	immediately actionable initiate planning initiate planning initiate planning
Increase the use of public transit or other transportation demand management programs to provide alternatives to single-occupancy vehicles	T.8.1 Develop a non-idling policy for vehicles having internal combustion engines T.8.2 Provide access to charging stations for employees using personal electric vehicles T.8.3 Provide opportunities and incentives to employees to telecommute and to more efficiently commute to work (e.g., carpool, bike, transit passes for all County employees, etc.) T.8.4 Encourage and support teleconferencing and carpooling to meetings	immediately actionable initiate planning initiate planning initiate planning

**STRATEGIES****ID    ACTIONS****TIMEFRAME**

Increase community awareness about alternative, clean modes of transportation and infrastructure projects in the county designed to facilitate ease of clean transport for residents

- |       |  |                      |
|-------|--|----------------------|
| T.9.1 | Increase informational programs on transportation, land use, and climate change for local government and public school staff             | initiate planning    |
| T.9.2 | Increase access to information and resources on transportation, land use, and climate change for teachers and students in public schools | assess opportunities |

# Buildings

## GOALS:

- Reduce overall energy use in buildings*
- Increase on-site renewable energy production*

From heating to cooling, from cooking to lighting, our buildings perform many energy intensive tasks. It is no surprise, then, that the energy used by the buildings within the County accounted for approximately 45% of Albemarle's total GHG emissions in the baseline year of 2008. Emissions associated with this sector include the GHGs resulting from the production of electricity consumed by buildings and from the combustion of fossil fuels—like natural gas and heating oil—to power furnaces and water heaters.

The contribution to climate change from the County's building infrastructure can be decreased by reducing the amount of energy that buildings use and by generating renewable energy at the building site. Reducing building energy use can be achieved through simple measures, such as sealing air leaks and using more efficient light bulbs and appliances, or through more complex measures, such as upgrading a building's insulation and mechanical systems. Sustainable energy produced onsite – such as through a solar energy system – will reduce the amount of energy drawn from the local electric grid, which still gets most of its energy from the combustion of coal and natural gas.<sup>33</sup>

The County can help spur private investments in energy efficiency and renewable energy generation in existing and new buildings by increasing

community awareness, offering incentives such as rebates and financing, working with local partners to escalate assistance and services, and establishing performance measures. These actions can help building owners and tenants to make informed decisions regarding cost-effective energy upgrades, offsetting the upfront and total cost of those investments.

Albemarle County will also make direct economical investments in its local government and school buildings to reduce GHG emissions and to showcase innovations and technologies that can serve as models for the community.

### *Co-Benefits of Building Energy Efficiency and Renewable Energy*

Increasing the energy efficiency of residential and commercial buildings, as well as installing on-site renewable energy generation like solar panels, bring numerous co-benefits beyond reducing GHG emissions from buildings. Principally, updating buildings for energy efficiency and renewable energy generation creates well-paying, green jobs for people who live locally, creating employment opportunities and strengthening the local economy. Upgrades to buildings also lowers utility bills while increasing building comfort level, which can benefit residents and small businesses in particular. Reductions in utility bills mean

reduced energy costs in the long-term, thereby reducing the cost of living. When property owners install solar panels on homes or commercial buildings they own, they become less dependent on the regional electric utility and even contribute to the electricity generation capacity of the local electric grid. This can in turn help maintain power at times of peak energy demand and, in some cases, in the aftermath of storms that down power lines. Finally, energy efficiency and renewable energy upgrades are investments in the quality and value of buildings.

### *Equity in Building Energy Efficiency and Renewable Energy*

Improving building energy efficiency and supporting onsite renewable energy generation with equity in mind can provide important benefits for lower income populations. Studies show that households in the United States with lower income pay significantly more per square foot in home utility costs than median and higher income households, as do heads of household of color compared with white heads of household.<sup>34</sup> Energy efficiency and weatherization upgrades that target lower income households and support up-front investment costs have the potential to significantly reduce home energy costs for these families. Increasing affordable access to on-site renewable energy generation on residential

<sup>33</sup> eGRID Summary Table 2018, USEPA, accessed on February 20, 2020 at [https://www.epa.gov/sites/production/files/2020-01/documents/eGRID2018\\_summary\\_tables.pdf](https://www.epa.gov/sites/production/files/2020-01/documents/eGRID2018_summary_tables.pdf)

<sup>34</sup> Khalil Shahyd, "Study Highlights Energy Burden for Households and How Energy Efficiency Can Help," NRDC Expert Blog, April 20, 2016, <https://www.nrdc.org/experts/khalil-shahyd/study-highlights-energy-burden-households-and-how-energy-efficiency-can-help>. Diana Hernández and Stephen Bird, "Energy Burden and the Need for Integrated Low-Income Housing and Energy Policy," *Poverty & Public Policy* 2, no. 4 (2010): 5-25. doi:10.2202/1944-2858.1095

properties, as well as energy efficiency upgrades, can help reduce household energy burden for more people and contribute to fewer emissions. Further, such projects have the potential to create green job opportunities that employ people in these communities.

However, the potential equity benefits from energy efficiency and onsite renewable energy projects require intentional design and are not an inevitable

outcome. Risks of worsening inequities need to be taken into account. For example, energy efficiency and onsite renewable energy initiatives may contribute to unchecked increases in property value and rental rate increases, in turn leading to gentrification and displacement of lower income families. Alternatively, programs may not equitably target landlords, leaving renters unable to benefit from advances in energy efficiency and renewable energy that require property work. Outreach and educa-

tion about such programs are also crucial, and may fail to reach historically marginalized communities due to the digital divide, language barriers, or other communication obstacles. Efforts to advance building energy efficiency and onsite renewable energy generation throughout the community will be most successful and equitable if they account for these risks in the design phase, consulting both experts and community members.

## BUILDINGS: STRATEGIES & ACTIONS

### STRATEGIES

### ID    ACTIONS

### TIMEFRAME

Enable and incentivize private energy efficiency and renewable energy projects in the County Code and during the community development regulatory process

- B.1.1 Establish a County policy clarifying this strategy initiate planning
- B.1.2 Review the building, zoning, subdivision, land use, and tax sections of the County Code for opportunities to incentivize the construction of more efficient buildings initiate planning
- B.1.3 Develop regulatory processes that would incentivize “better-than-code” design and renewable investing assess opportunities
- B.1.4 Develop regulatory processes that would incentivize greater housing density and connectivity assess opportunities
- B.1.5 Support the adaptive reuse of existing buildings through flexible approaches to County Code compliance and identify additional ways to facilitate building reuse, where appropriate assess opportunities

Expand upon and develop partnerships with local companies and non-profit agencies to improve energy efficiency in existing homes and businesses

- B.2.1 Support organizations/programs like the Local Energy Alliance Program (LEAP) that educate, provide technical assistance, and facilitate third-party energy efficiency and renewable energy incentives immediately actionable
- B.2.2 Promote and support organizations like the Albemarle Housing Improvement Program and the Piedmont Housing Alliance that make energy efficiency and weatherization improvements in affordable housing stock initiate planning
- B.2.3 Research opportunities to support programs that improve workforce preparedness in fields related to clean energy and energy efficiency assess opportunities

## BUILDINGS: STRATEGIES & ACTIONS (CONTINUED)

STRATEGIES	ID	ACTIONS	TIMEFRAME
Promote private energy efficiency and renewable energy investments by the private sector	B.3.1	Develop energy efficiency and renewable energy standards for developer-constructed affordable housing units	assess opportunities
	B.3.2	Consider a property tax exemption to encourage owners of existing rental housing to make energy efficiency investments	assess opportunities
	B.3.3	Assess financing mechanisms such as the Property Assessed Clean Energy (C-PACE) program and a Clean Energy Loan Fund program and implement, if appropriate	assess opportunities
Increase community awareness about energy conservation and renewable energy	B.4.1	Develop a multi-media informational campaign; as appropriate, partner with other local government agencies, educational institutions, non-profits, and utilities	initiate planning
	B.4.2	Promote building design, construction, and performance rating and certification systems	initiate planning
	B.4.3	Support community efforts to share information about conservation, energy efficiency, and renewable energy topics	initiate planning
	B.4.4	Develop agreements with utility companies and other stakeholders to more effectively collect and share energy use data	assess opportunities
	B.4.5	Increase informational programs on building energy efficiency, renewable energy generation, and climate change for local government and public school staff	initiate planning
	B.4.6	Increase access to information and resources on building energy efficiency, renewable energy generation, and climate change for teachers and students in public schools	assess opportunities
Partner with utility companies to expand energy efficiency and renewable energy options for property owners and tenants	B.5.1	Support and promote utility demand response programs, which enables customers to use less energy during peak hours, thereby offsetting the need for utilities to satisfy peak energy demand using fossil fuels	assess opportunities
	B.5.2	Support the provision of "on-bill" financing whereby customers can pay for efficiency and renewable energy investments over time as part of their monthly bills	assess opportunities

<b>STRATEGIES</b>	<b>ID</b>	<b>ACTIONS</b>	<b>TIMEFRAME</b>
Establish formal policies to further GHG emissions reduction efforts at local government and school buildings	B.6.1	Establish formal goals for GHG emissions reductions for local government and school buildings	immediately actionable
	B.6.2	Establish a Green Buildings Policy to include operations, new construction, and major renovations	initiate planning
Make targeted investments in energy efficiency and renewable energy projects at existing local government and school buildings	B.7.1	When replacing roofs, include any penetrations necessary to accommodate solar arrays if a load analysis indicates the roofs can bear the weight of the arrays	initiate planning
	B.7.2	Adopt a policy whereby operational savings associated with energy efficiency project are reinvested into future renewable energy projects	immediately actionable
	B.7.3	Analyze the existing portfolio of buildings for opportunities to add on-site renewable energy	initiate planning
	B.7.4	Assess energy efficiency opportunities and invest in those projects with the best fiscal/GHG return on investment (ROI)	initiate planning
	B.7.5	Replace equipment at/beyond its expected useful life with high efficiency equipment, such as geothermal systems	initiate planning
	B.7.6	Develop a plan for routinely performing “tune-ups” of building mechanical systems (known as retro-commissioning)	assess opportunities
Advocate for Virginia legislative actions to support energy efficiency and renewable energy	B.8.1	Align County Board of Supervisor’s legislative priorities with those of other agencies influencing the state legislature, e.g. Virginia Association of Counties and Virginia Municipal League	initiate planning

# Renewable Energy Sourcing

## GOAL:

*Increase renewable energy generation capacity to the electrical grid system*

The electrical grid is an interconnected network for delivering electricity from producers to consumers across a region. The portion of the regional grid within Albemarle County is regulated by the Virginia State Corporation Commission and operated by two investor-owned companies—Dominion Power and Appalachian Power Company—and two member-owned cooperatives—Central Virginia Electric Cooperative and Rappahannock Electric Cooperative. While over half the energy produced in Virginia is derived from burning natural gas, less than 1% currently comes from solar and wind.

There are presently no utility-scale renewable energy systems located in Albemarle County. However, the Albemarle County Board of Supervisors has provided a path forward for utility-scale solar projects in the County via a Special Use Permit and has approved its first project.

The County will support the development of local renewable energy by improving local land use policies and practices, supporting Virginia legislation that facilitates expansion in the renewable energy sector, pursuing utility-scale investments to provide energy for County operations, and supporting the programs and initiatives of local utilities and renewable energy developers when there are public benefits.

### *Co-Benefits of Renewable Energy Sourcing*

Renewable energy sourcing on a utility scale brings a number of benefits, some of which are shared with the installation of onsite renewable energy generation (see Buildings). Renewable energy utility construction and maintenance creates jobs in the clean energy sector that are inherently based locally or regionally. Local community renewable generation (e.g., solar gardens) can increase the electricity-generation capacity of the regional grid and bolster the resilience of the electric grid when demand is high or when storms damage transmission lines. In some cases, renewable energy generation can provide a supplemental income source for large landowners who lease part of their property to a local utility to build and operate renewable energy equipment.

### *Equity in Renewable Energy Sourcing*

Potential benefits to equity from utility-scale renewable energy generation can include the creation of green jobs and, in the case of community solar, energy independence. As power generation transitions from polluting and emissions-producing fossil fuels to clean, renewable energy, many good jobs will be created. Policies can encourage and incentivize equity in project bids so that businesses owned by women and people of color are equitably represented. Where local communities can start community-scale renewable energy

generation, they may be able to gain greater energy independence and resilience in the face of power outages from weather events and demand spikes due to climate change.

Access to renewable energy among historically marginalized communities is key to realizing the benefits equitably. “Decisions regarding where renewable energy is built, who has access to it, and who is hired to construct it, affect whether the energy system is equitable.”<sup>35</sup> If support for renewable energy projects focuses on areas where affluent populations are likely to benefit first, existing inequities will be worsened. Consulting historically marginalized communities will be crucial to an equitable renewable energy transition, given a long history of siting pollution-heavy utilities close to low income communities and communities of color, adversely affecting health and quality of life.<sup>36</sup>

<sup>35</sup> Maria McCoy, “Community Solar With an Equity Lens: Generating Electricity and Jobs in North Minneapolis,” Local Energy Rules Podcast, Institute for Local Self-Reliance, <https://ilsr.org/community-solar-equity-ler-episode-57/>.

<sup>36</sup> Adrian Wilson et al., “Coal Blooded: Putting Profits Before People,” NAACP / Indigenous Environmental Network / Little Village Environmental Justice Association <https://www.naacp.org/wp-content/uploads/2016/04/CoalBlooded.pdf>.

## RENEWABLE ENERGY SOURCING: STRATEGIES & ACTIONS

STRATEGIES	ID    ACTIONS	TIMEFRAME
Enable and incentivize utility-scale renewable energy projects in the County Code and during the community development regulatory process	R.1.1 Establish a County policy clarifying this strategy R.1.2 Review the building, zoning, subdivision, land use, and tax sections of the County Code for opportunities to better facilitate renewable energy projects	initiate planning assess opportunities
Partner with utilities and renewable energy companies to increase local renewable energy initiatives	R.2.1 Develop a policy to support utility-scale renewable energy projects R.2.2 Support and promote power purchase agreements, whereby individuals can own solar arrays installed by a third-party on another person's property R.2.3 Conduct a study in cooperation with renewable energy companies to identify locations for utility scale projects in Albemarle County R.2.4 Provide financial incentives to promote private renewable energy investments	initiate planning assess opportunities assess opportunities assess opportunities
Invest in utility-scale renewable energy to meet energy needs of local government operations as allowed under Virginia code	R.3.1 Assess issuing a Request for Proposal (RFP) for a renewable Power Purchase Agreement (PPA)	initiate planning
Promote and facilitate investment in utility-scale renewable energy by the private sector	R.4.1 Assess financing mechanisms applicable to utility-scale renewable energy R.4.2 Assess funding opportunities to support a Clean Energy Loan Fund program applicable to utility-scale renewable energy	assess opportunities assess opportunities

STRATEGIES	ID    ACTIONS	TIMEFRAME
<p>Increase community awareness about utility-scale renewable energy</p>	<p>R.5.1 Develop a multi-media informational campaign; as appropriate, partner with other local government agencies, educational institutions, non-profits, and utilities</p> <p>R.5.2 Support community efforts to share information about utility-scale renewable energy</p> <p>R.5.3 Increase informational programs on renewable energy generation and climate change for local government and public school staff</p> <p>R.5.4 Increase access to information and resources on renewable energy generation and climate change for teachers and students in public schools</p>	<p>initiate planning</p> <p>initiate planning</p> <p>initiate planning</p> <p>assess opportunities</p>
<p>Advocate for Virginia legislative actions to support utility-scale renewable energy</p>	<p>R.6.1 Align County Board of Supervisor's legislative priorities with those of other agencies influencing the state legislature, e.g. Virginia Association of Counties and Virginia Municipal League</p>	<p>initiate planning</p>

# Sustainable Materials Management

## GOALS:

*Increase the amount of recyclable materials put to positive use and diverted from landfills  
Increase the amount of organic materials diverted from landfills and composted*

Sending “waste” to landfills or incinerators provides few benefits and much harm, and it wastes potentially valuable resources. In contrast, recycling, composting, and other forms of circular economy create value for people and markets, as well as reducing pollution and waste in all the word’s connotations. Recyclable materials that people send to landfills take up valuable space, produce pollution, and go unused when they might otherwise contribute to value in new products. Similarly, composting organic “waste”—food scraps, yard clippings—can take on a new life as organic fertilizer, rather than decomposing in landfill and producing methane gas—a greenhouse gas that is 100 times more powerful than CO<sub>2</sub> over a 20-year period.

Landfill gas—about half methane and half CO<sub>2</sub>—is a byproduct of the anaerobic decomposition of organic material in landfills—an entirely avoidable source of emissions. The US is the largest generator of landfill gas in the world<sup>37</sup>. Landfill gas currently contributes about 14% of all methane gas emissions nationally<sup>38</sup>. The County’s GHG emissions related to solid waste include those generated by its two decommissioned landfills and various solid waste management operations. In addition, the accounting of GHG emissions includes those associated with the trash generated by all County homes and businesses—even though this trash is transferred outside the County.

The strategies in this sector generally involve re-

ducing the amount of GHG-generating materials going into landfills, particularly organic materials such as food and yard waste. With some 40% of all food wasted in the US, reducing food waste offers big opportunities.

### *Co-Benefits of Sustainable Materials Management*

Enhancing the quantity and quality of recycling and composting provides important local benefits to community health and cleanliness, local ecosystem health, and the local economy. Recycling and composting are economies of scale, which means that they become more viable as more people participate. By shifting materials that can be recycled and composting away from landfill and toward recycling and composting facilities supports local businesses and increases the scale and quality of these operations, thereby contributing to a virtuous cycle. Diverting recyclable and compostable “waste” from landfills has the straightforward benefit of reducing the growth of landfills, as well as limiting dumping and litter. Properly managing landfill gas will also reduce smog, which contributes to health problems like asthma.

Encouraging a culture of reducing, reusing, and recycling in the local community can have the added benefit of boosting local thrift, repair, and reuse of household items, contributing to growth in the so-called “circular economy” and creating jobs in the process.

Composting encourages local food production by facilitating home gardening and by providing affordable, organic fertilizer to small farmers. As a fertilizer, composting can also support local ecosystem health by reducing the use of chemical fertilizers that contribute to toxic runoff.

### *Equity in Sustainable Materials Management*

Albemarle County can advance equity in materials management by improving the reach and quality of recyclables, compost, and landfill collection services, specifically targeting residents who currently lack convenient access to any such service. Secondary benefits of improved recycling, composting, and trash collection infrastructure are improved environmental health and cleanliness in neighborhoods, commercial areas, and recreational areas. Prioritizing locations where these services are most lacking is important for benefiting equity.

Risks of worsening current inequities primarily involve accessibility and financial burden. Expanded composting and recycling services should be easily accessible to all county residents, and program design must account for the risk of inaccessibility to residents of multi-family buildings. In addition, the County recognizes the importance of financing composting and recycling programs in ways that do not add undue financial burden on residents and businesses, particularly lower-income residents and small businesses.

<sup>37</sup> “Landfill Methane: Reducing Emissions, Advancing Recovery and Use Opportunities,” Global Methane Initiative, [https://www.globalmethane.org/documents/landfill\\_fs\\_eng.pdf](https://www.globalmethane.org/documents/landfill_fs_eng.pdf).

<sup>38</sup> “Basic Information about Landfill Gas,” Landfill Methane Outreach Program (LMOP), US Environmental Protection Agency, EPA.gov, accessed March 9, 2020, <https://www.epa.gov/lmop/basic-information-about-landfill-gas>.

## SUSTAINABLE MATERIALS MANAGEMENT: STRATEGIES & ACTIONS

STRATEGIES	ID    ACTIONS	TIMEFRAME
Increase the availability, convenience, and efficiency of trash and recycling collection	<p>S.1.1 Establish a model trash and recycling center at the Ivy Material Utilization Center</p> <p>S.1.2 Explore the feasibility of curbside recycling by the County</p> <p>S.1.3 Identify if there is a need to locate additional paper/cardboard balers in Albemarle County</p> <p>S.1.4 Establish a pilot residential recycling center in Scottsville</p> <p>S.1.5 Work with RSWA to explore improving the customer experience through operational changes</p> <p>S.1.6 Study the feasibility of locating residential trash, recycling, and composting centers within a particular distance or time limit to population centers</p>	immediately actionable immediately actionable immediately actionable assess opportunities initiate planning assess opportunities
Research economic and regulatory tools to improve waste metrics reporting and motivate residents to recycle	<p>S.2.1 Amend Chapter 13 of the County ordinance to require large trash haulers to report the weight or volume of trash and recycling and their vehicle-miles-traveled</p> <p>S.2.2 Assess a pay-as-you-throw model of trash pricing, in which fees are based on the amount of trash</p> <p>S.2.3 Assess requiring recycling at particular land uses—such as large multifamily developments and commercial/industrial properties</p> <p>S.2.4 Assess requiring recycling collection areas at new developments meeting particular criteria</p>	initiate planning assess opportunities assess opportunities assess opportunities

STRATEGIES	ID    ACTIONS	TIMEFRAME
Increase the availability and convenience of organic material collection and composting	S.3.1 Study the feasibility of residential curbside yard waste and food scraps composting	immediately actionable
	S.3.2 Make composting available in all public schools and County office buildings	initiate planning
	S.3.3 Make food scrap and yard waste composting available at residential trash and recycling centers	initiate planning
	S.3.4 Develop food waste reduction goals and incentivize compost at restaurants, grocery stores, and other large generators	assess opportunities
Use media outreach, public information campaigns, and school programs to encourage behavioral changes towards consumption and waste	S.4.1 Provide information about waste streams, recycling processes, and the benefits of recycling and composting	initiate planning
	S.4.2 Survey the public to gauge support for waste management initiatives or service changes	assess opportunities
	S.4.3 Encourage the donation or reuse of unneeded clothing; provide information on alternatives to sending fabric to landfill	assess opportunities
	S.4.4 Increase informational programs on sustainable materials management and climate change for local government and public school staff	initiate planning
	S.4.5 Increase access to information and resources on sustainable materials management and climate change for teachers and students in public schools	assess opportunities

# Landscape, Natural Resources, and Agriculture

## GOALS:

*Protect and restore natural carbon sinks*

*Promote practices on managed land that trap carbon and minimize carbon emissions*

While the other sections of this plan are focused on reducing future emissions of carbon, this section explores the potential to remove carbon from the atmosphere through changing the way we manage the land throughout the County. Carbon sequestration is the term for capturing and storing carbon from the atmosphere—carbon that would otherwise be trapping heat in the atmosphere as carbon dioxide. Carbon sequestration can supplement the reduction of new GHG emissions to reduce the overall level of GHGs in the atmosphere.

The County's role in sequestering carbon would be to change its own land management practices and to work with partners to encourage, enable, and incentivize individuals throughout the community to change their practices.

All plants—from agricultural crops to urban trees—grow by pulling CO<sub>2</sub> out of the atmosphere using photosynthesis. The carbon that is integrated into the plant matter may ultimately be consumed (crops or feed), bound up in a long-lived tree or forestry products, or assimilated into the soil as organic matter. Different land management practices—including farming, forestry, and landscaping—can result in very different amounts of on-property carbon capture and storage. Historic practices have resulted in a net reduction of carbon stored in the soil and landscape. But

changing farming, forestry, and backyard practices can lead to a net capture of carbon.

### *Co-Benefits of Smart Management of Land, Natural Resources, and Agriculture*

Sustainable land management and agricultural practices bring a host of benefits beyond sequestering carbon and preventing the unnecessary release of CO<sub>2</sub> and other greenhouse gas emissions. In Albemarle County, protecting local ecosystems will preserve the landscape and character of the rural areas. Further, practices like planting trees in areas without historical tree cover (afforestation), revitalizing deforested areas (reforestation), and restoring native grasslands can increase wildlife habitat and biodiversity, a crucial benefit as many species' habitats are shrinking as a result of climate change and the human activities causing it. Community gardening can contribute to local food production and consumption, encouraging healthy lifestyles and strengthening local communities. Regenerative agricultural practices on farms increase soil health and protect water quality from chemical fertilizers, which in turn promotes the long-term sustainability of agriculture in the area, as well as a rural tourism economy. Finally, planting trees in urban areas can improve local air quality and health of residents, in addition to sequestering carbon from the atmosphere.

### *Equity in Landscape, Natural Resources, and Agriculture*

Smart landscape management, protection of natural resources, and sustainable agricultural practices have the potential to allow all residents to enjoy a healthier environment and to have access to areas with local biodiversity. Equitable afforestation throughout the county, for example, can improve local air, water, and environmental quality for all residents, especially for people living in places with higher pollution (e.g., due to busy intersections, factories, or agricultural run-off). In addition to benefiting the natural environment, encouraging and supporting neighborhood community gardens can contribute to increased food security, lower food costs, and healthier diets in areas far from grocery stores.

For local environmental stewardship to advance equity, the location and prioritization of projects like afforestation are paramount. Urban tree canopies tend to be highly unequal, with canopy and income positively correlated.<sup>37</sup> If improvements to local environmental health, including afforestation and conservation, occur in more affluent areas but not in areas with lower income and historically marginalized populations, these inequities will persist. Attention to the effect on housing affordability of environmental improvements should also be monitored.

<sup>37</sup> Kirsten Schwarz et al., "Trees Grow on Money: Urban Tree Canopy Cover and Environmental Justice," PLoS ONE 10, no. 4 (2015): 22222. <https://doi.org/10.1371/journal.pone.0122051>. Emily Badger, "The Inequality of Urban Tree Cover," City Lab, May 15, 2013, <https://www.citylab.com/equity/2013/05/inequality-urban-tree-cover/5604/>.

## LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE: STRATEGIES AND ACTIONS

STRATEGIES	ID	ACTIONS	TIMEFRAME
Incentivize the protection and restoration of natural areas on private land	L.1.1	Connect landowners with existing funding and conservation assistance programs	initiate planning
	L.1.2	Use tax programs—such as the County's land use real estate tax deferral program—as incentives	assess opportunities
	L.1.3	Assess the carbon trapping potential of land as part of the ranking methodology for the County's Acquisition of Conservation Easements (ACE) program	assess opportunities
	L.1.4	Bolster the County's conservation land acquisition program and related efforts, including parkland acquisition	assess opportunities
	L.1.5	Provide general educational resources for landowners regarding the benefits of protecting natural areas	immediately actionable
	L.1.6	Assess the feasibility of new programs or ordinances to further incentivize natural resource protection	assess opportunities
	L.1.7	Study ways to incentivize the establishment of wetland mitigation banks and nutrient credit banks in the County	assess opportunities
	L.1.8	Consistently monitor land cover/land use patterns in County to assess progress	assess opportunities
	L.1.9	Work with partners and property owners to manage invasive species on private properties	assess opportunities
	L.1.10	Promote small forests ("Victory Forests") instead of lawns on large lot subdivision parcels	immediately actionable
	L.1.11	Join national and international campaigns for planting trees	immediately actionable

## LANDSCAPE, NATURAL RESOURCES, AND AGRICULTURE: STRATEGIES AND ACTIONS (CONTINUED)

STRATEGIES	ID    ACTIONS	TIMEFRAME
Increase tree cover and native vegetation in urban areas, particularly adjacent to streets and parking areas	<p>L.2.1 Promote the use of trees, shrubs, and native meadows in lieu of turf grass in landscape design and property management; encourage native species for additional benefits</p> <p>L.2.2 Evaluate a requirement that overall tree canopy is not reduced by development in the development areas</p> <p>L.2.3 Provide education, resources, and assistance to landowners</p> <p>L.2.4 Promote greater use of green roofs</p> <p>L.2.5 Encourage meadow growth along highway corridors</p> <p>L.2.6 Reduce paved/impervious surfaces to mitigate heat islands</p>	assess opportunities
Promote carbon best management practices on agricultural land	<p>L.3.1 Inform, encourage, and incentivize property owners and agricultural producers regarding rotational grazing methods, cropland management, agroforestry, and other carbon best management practices</p> <p>L.3.2 Provide education, resources, assistance to landowners regarding best management practices</p> <p>L.3.3 Encourage a transition towards sustainable farming and landscaping equipment</p>	initiate planning
Promote best carbon management practices on County-owned properties and as part of County projects and initiatives	<p>L.4.1 Locate priority sites for evaluating the carbon trapping potential of the landscape on County properties</p> <p>L.4.2 Evaluate the carbon trapping potential of the landscape when planning and managing County properties and projects</p> <p>L.4.3 On county-owned land, engage in native forest and grassland plantings for combined sequestration and habitat demonstration projects</p> <p>L.4.4 Reduce carbon emissions associated with maintaining County parks, building grounds, and other properties</p> <p>L.4.5 Manage invasive species on County properties</p>	immediately actionable
		initiate planning
		assess opportunities
		assess opportunities

<b>STRATEGIES</b>	<b>ID    ACTIONS</b>	<b>TIMEFRAME</b>
Create opportunities for all residents to participate in initiatives that would contribute towards local carbon sequestration	<p>L.5.1 Partner with local organizations to sponsor volunteer activities such as tree plantings and control of invasive species</p> <p>L.5.2 Enable and promote community gardens</p> <p>L.5.3 Increase informational programs on sustainable land management and regenerative agriculture for local government and public school staff</p> <p>L.5.4 Increase access to information and resources on sustainable land management and regenerative agriculture for teachers and students in public schools</p>	assess opportunities assess opportunities initiate planning assess opportunities