

HENRY COUNTY, VIRGINIA

ENERGY ACTION PLAN

A Plan for Saving Energy Costs and Creating a Resilient Community

April 2024



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GLOSSARY

Terms	Definition
Co-benefits	Additional benefits to emission mitigation efforts. Co-benefits include, but are not limited to enhanced economy, public health, water and air quality.
Emissions	Production of gases which are harmful to the environment and human health
Energy audit	An assessment of the energy requirements and loss for buildings
Energy consumption	Total amount of energy utilized within a time period.
Mitigation Strategies	Reducing emissions and the severity of greenhouse gases in the atmosphere.
Resiliency	The ability to recover and cope from severe climate events and maintain function.
Task force	A group of key community stakeholders engaged in dialogue and guiding the creation of an Energy Action Plan.

ACRONYMS

Acronym	Definition
ADUs	Accessory Dwelling Units
AEE	Association of Energy Engineers
AFOLU	Agriculture, Forestry, and Other Land Use
BEV	Battery Electric Vehicle
CH4	Methane
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
C-PACE	Commercial Property Assessed Clean Energy
C-SITE	Communities Sparking Investment in Transformative Energy
DERs	Distributed Energy Resources
DOE	Department of Energy
EAP	Energy Action Plan
EPA	Environmental Protection Agency
ESCOs	Energy Service Companies
EV	Electric Vehicle
GHG	Greenhouse Gas
HOA	Homeowners Association
HUD	Housing and Urban Development
ICLEI	International Council for Local Environmental Initiatives
IRA	Inflation Reduction Act
kWh	Kilowatt Hours
LSS	Large Scale Solar
MSW	Mixed Waste
MT	Metric Tons
N2O	Nitrous Oxide
PHEV	Plug-in Electric Vehicle
PV	Photovoltaic
RECs	Renewable Energy Credits
SBT	Science-Based Target
USDA	US Department of Agriculture
VDOE	Virginia Department of Energy
VDOT	Virginia Department of Transportation
VMT	Vehicle Miles Travelled

EXECUTIVE SUMMARY

Henry County presents this Energy Action Plan as a pathway for the community to conserve energy, save money, increase energy security and independence, and ensure a more sustainable and resilient community.

In the summer of 2023, George Mason University and Henry County agreed to work together to develop an Energy Action Plan. Over the course of the next twelve months, university faculty and students worked with municipality employees to (1) measure and model the municipalities' energy consumption and greenhouse gas emissions, (2) identify and invite key community stakeholders to join a task force, and (3) conduct a series of meetings with the task force to identify Energy Action Plan goals, strategies, and actions.

The municipality seeks to develop and implement this Plan for several reasons. First, residents face higher energy costs and increasing economic burdens when purchasing essentials, such as gasoline, diesel, heating oil, and electricity. Second, residents confront the realities of a changing environment with increased flooding, precipitation, and heat conditions, which have imposed hardships on human health, livelihood, and property damages—and these conditions will continue to increase and worsen in the future. Third, our region has been reliant on external energy resources—from power plants to oil companies—but the means to increase our energy self-resilience and independence exist with local energy technologies and energy efficient practices. And finally, the federal government has created opportunities that will convey significant amounts of funding to shift from costly energy sources to more efficient and clean energy sources, practices, and technologies. This funding is available to local governments. To date, larger urban areas have taken advantage of these funds, but more rural areas in Virginia must also avail themselves of the benefits of these funds.

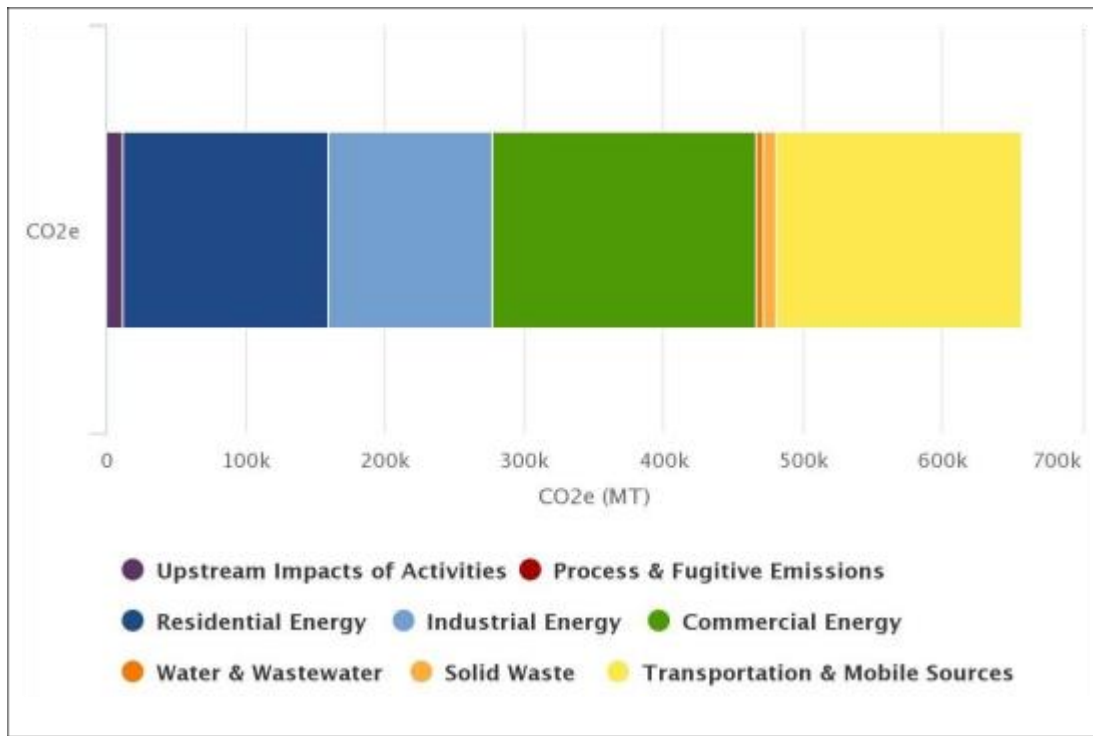
To access these funds and opportunities, many of the federal and state grant opportunities for local governments require developing and implementing energy and climate action plans. By creating this Plan, Henry County best positions itself to receive these benefits. The Energy Action Plan represents a community-driven, transparent, and equitable examination of the municipalities' energy consumption and emissions profile and the means to reduce, conserve, and protect its energy future. This plan represents our goals, strategies, and actions that we hope will assist our community in achieving greater energy savings, independence, and resiliency.

GOALS

Henry County's community task force selected an intermediate goal to reduce our community's greenhouse gas emissions by 50 percent by 2030 (from the base year of 2005). The community task force also selected a long-term goal to reach carbon neutrality by 2050. We use greenhouse gas emissions as a proxy to understand and set goals for energy savings and resilience. For every unit of greenhouse gas emissions that we reduce, we conserve energy, reduce costs, and make our community more resilient.

When we examine our community's highest sectors for energy consumption, our modeling reveals that the top energy sectors are:

- (1) Residential & Commercial Energy, and
- (2) Transportation.



We must address these two sectors if we want to meet our goals. Note, electricity is used by end-use sectors such as homes, businesses, and factories. We must examine consumption and emissions by end-use sector to assist with our understanding of energy demand and changes in energy use over time. Therefore, our Plan will focus on six end-use sectors:

- Buildings
- Electricity
- Transportation
- Water & Wastewater
- Solid Waste
- Land Use

We will also touch upon these two additional sector considerations because both are needed to meet our goals.

- Partnerships
- Organizational Structure

STRATEGIES

The community task force selected a set of strategies that will assist with achieving the overall goals of the Plan. The strategies identified below are considered higher level, qualitative descriptions that address the goals of conserving energy, reducing emissions, and enhancing community sustainability and resilience.

STRATEGY: BUILDINGS	
Increase energy efficiency and deploy clean energy technology in existing buildings (residential and commercial).	
STRATEGY: TRANSPORTATION	
Increase alternative forms of transportation.	Increase transition to electric vehicles.
STRATEGY: ELECTRICITY	
Increase transition to clean and renewable energy sources.	
STRATEGY: LAND USE	
Improve management of lands and native trees.	
STRATEGY: WASTE & WASTEWATER	
Improve the quality of waterways.	
STRATEGY: SOLID WASTE	
Reduce the amount of solid waste going into landfills.	
STRATEGY: PARTNERSHIPS	
Develop partnerships with key stakeholders to advance energy efficiency and clean energy projects.	
STRATEGY: ORGANIZATIONAL STRUCTURE	
Create a structure and invest in human resources that assist implementing energy and sustainability initiatives.	

SUB-SECTOR STRATEGIES

The community task force identified strategies for each of the six core sectors that will assist with achieving the intermediate and long-term goals. The sub-sector strategies identified below represent quantitative measures for each core sector.

BUILDINGS	
(1) Retrofit at least 100 residential housing units with cumulative energy efficiency improvements of 25% (existing buildings) by 2030.	(3) Retrofit at least 50 commercial buildings with cumulative energy efficiency improvements of 30% (existing buildings) by 2030.
(2) Convert 30% of fossil fuel residential building systems (e.g., space or water heaters) to highly efficient electric options (e.g., heat pumps).	(4) Convert 30% fossil fuel commercial building systems (e.g., space or water heaters) to highly efficient electric options (e.g., heat pumps) by 2035.
TRANSPORTATION	
(1) By 2030, the municipality should convert 30% of its publicly owned light-duty internal combustion engine vehicles to plug-in electric vehicles (PHEVs) and battery electric vehicles (BEVs) vehicles.	(3) Community: Increase PHEVs/BEVs to at least 12% of all light-duty vehicle registrations by 2030.
(2) By 2030, the municipality should convert 30% of its publicly owned medium and heavy-duty vehicles to PHEV/BEV or other clean vehicle technology (e.g., propane, natural gas).	(4) Community: Reduce 15% of passenger vehicle miles traveled by shifting to active or public transport (e.g., biking, walking, or taking the bus) by 2030.
ELECTRICITY SECTOR	
Transition 40% of the electricity used in the municipality to clean energy sources (e.g., solar, wind, hydropower, nuclear, and geothermal) ahead of Virginia’s Renewable Portfolio (state law requires 45% renewable in 2035).	
SOLID WASTE	
Divert 40% of solid waste produced in the county (e.g., recycled, composted, reused) by 2030.	

ACTIONS

The community task force identified the following high-priority actions for the core sectors, which will assist with achieving the overall and sub-sector goals (medium and low priority actions are included in Chapter 3). In selecting actions, the community task force was guided by six principles: effectiveness, cost savings, feasibility, equity, co-benefits, and consistency with government plans.

BUILDINGS	
1. In concert with utility companies, municipality should evaluate new communication strategies [marketing] for disseminating energy efficiency and clean energy technology information and identify recommendations to increase effectiveness of communication and engagement with citizens for both existing and new programs. As part of promoting this effort, encourage actual building owners (residential and commercial) to share their stories with the public.	2. Develop basic energy efficiency education programs to targeted communities. This could include workshops and one-on-one out-briefs on building energy audits. These programs would provide guidance not just on replacement technologies, but also focus on priority areas (e.g. weatherization, space heating/cooling) that enhance better building performance (for example, a building with an inefficient envelope should prioritize weatherization over a higher efficiency heat pump).
3. Pursue state and federal grants to establish a rebate program for transitioning to energy efficient and clean energy technology (for example, electric heat pumps, weatherization, solar water heaters or panels). As a prerequisite for participation in rebate program, require the completion of a comprehensive energy audit. This rebate program should have a carve-out for low-income residents.	4. Pursue opportunities to form and create community solar projects for low-income residents.
5. Continue to identify and re-zone areas that have abandoned/underutilized buildings into multi-dwelling use and mixed-use retail. Create or expand incentives to attract building developers to re-purpose abandoned/underutilized buildings with energy efficient and clean technology applications.	6. Continue to streamline permitting for buildings that install energy efficiency or clean energy technology.
7. Encourage and incentivize building developers to incorporate energy-efficient and all-electric systems technologies.	8. Implement benchmarking requirements for public buildings and encourage this for local commercial buildings.
TRANSPORTATION	
1. Evaluate the feasibility of providing more routes within the Piedmont Area Regional Transit (PART) system and provide recommendations for implementation.	2. Encourage and promote the availability of car-ride services (e.g. Dial-a-ride, volunteer driver program, carpool, community shuttles) to work with hospitals, health care providers, and other businesses to encourage alternative forms of transportation. Seek city-county partnership efforts on this action.

3. County government purchases more electric vehicles (replaces its existing fleet vehicles with EVs) for both light-duty and heavy-duty applications (e.g., non-road and on-road diesel vehicles)	
ELECTRICITY	
1. County should help streamline appropriate solar facility permitting.	2. Identify suitable locations for installing large scale solar projects in abandoned locations, large, flat-roofed buildings (warehouses/distribution centers), closed landfills, and brownfields, and on public parking garages and buildings.
3. Convert remaining streetlights and public lighting (e.g. parking lots at parks) to LEDs	4. Work with Appalachian Power to promote utility-managed electricity demand reduction programs (e.g. tiered pricing throughout day, reduced consumption during high peak days, smart meters that reduce energy usage during peak times coupled with pay-back).
LAND USE	
1. Develop a long-term plan for more sustainable development (green zoning plans for energy and water-efficient buildings, multi-family and mixed use, and transit-oriented development). Include multi-family housing through development, zoning, and land use policies.	2. On public lands, plant more native trees and food forest tree plantings, create more green landscapes, and manage non-native plants.
3. Expand public parkland and establish natural green space guidelines in community planning.	4. Increase multi-family housing through development, zoning, and land use policies.
5. Provide incentives for property owners to increase and maintain tree canopy and expand tree planting initiatives.	
WASTE & WASTEWATER	
1. Educate and inform residents about green infrastructure and other types of solutions for water conservation (natural or nature-based approaches such as constructed wetlands, rain gardens, and vegetation buffers).	2. Promote and educate on best management practices to reduce agricultural run-off.
SOLID WASTE	
1. Evaluate feasibility of both biowaste and food waste composting program(s).	
ORGANIZATIONAL STRUCTURE	
1. Designate/Hire a county government sustainability manager or specialist responsible for implementing Energy Action Plan.	2. Establish an Energy Transition Committee (name: TBD) to ensure County officials are advised/updated on the status of the Energy Action Plan.

CONSISTENCY WITH COMPREHENSIVE PLAN

The Henry County Comprehensive Plan (1995-2010) provides the foundation and framework to help guide and base decisions on its future. The Comprehensive Plan is an opportunity to anticipate future events, plan for future changes, and address the challenges before us. At a high level, the Comprehensive Plan includes seven goals. Each goal intersects with energy and environment, thereby elevating the value of an Energy Action Plan.

Comprehensive Plan Goals	Nexus with Energy & Environment
Preserve and protect the county's natural resources and historic heritage.	Air and water quality are linked with our energy systems (utilities, transportation).
Promote economic development efforts to diversify and expand the county's economic base.	Emerging trends in energy use and generation, supported by state and federal funds, provide opportunities for economic savings for citizens and economic growth by attracting new businesses.
Provide opportunities for decent, affordable, and accessible housing.	Clean energy technologies and energy efficiencies in buildings are opportunities for economic savings, thereby reducing cost burden.
Provide public services and facilities necessary to meet the needs of its citizens.	Government plays a role in providing clean and efficient services in utilities and transportation for its citizens.
Provide utilities means to improve quality of life and protect public health.	Electricity, water, wastewater, and solid waste all rely on energy which can be sourced from clean energy technologies which produce less harmful emissions.
Provide an efficient and safe transportation system.	Clean vehicle technologies and alternative forms of transportation offer more efficient, less costly opportunities for both citizens and government.
Guide development of land use to protect the land and enhance quality of life.	Land use decisions in housing, siting of electric generation facilities, and transportation all have implications for energy use.

The Energy Action Plan is consistent with the objectives and strategies of the Henry County Comprehensive Plan in the following areas:

Comprehensive Plan Objectives/Strategies		Energy Action Plan
Objective: Encourage the use of residential, commercial, and utility-scale renewable energy projects while also minimizing the impact on Henry County's view shed, natural resources, and rural character.	Strategy: Reduce the impact of solar and wind facilities through fair planning practices: such as proper siting, buffering, screening, density limits, and setbacks	See Chapter 3, Electric Sector (Actions 1,2,5,7,8,10).
Objective: Protect the County's surface and groundwater supplies.	Strategy: Inform both public officials and the public about water pollution, particularly nonpoint source pollution from agriculture; minimize runoff associated with agriculture; encourage property owners to conserve	See Chapter 3, Water & Wastewater (Actions 1,2,3).
Objective: Preserve open space to improve quality of life. Establish mixed-use buildings.	Strategy: Promote cluster development. Encourage re-use of vacant buildings.	See Chapter 3, Buildings (Action 7), Land Use (Action 4,6).
Objective: Attract new business and industry.	Strategy: Pursue state and federal sources of capital to promote economic development.	See Chapter 3, Buildings (Actions 3,5).
Objective: Develop a comprehensive solid waste management strategy.	Strategy: Increase public awareness of solid waste issues through education and participatory programs.	See Chapter 3, Solid Waste (Actions 1,2).
Objective: Encourage alternative modes of transportation.	Strategy: Promote ridesharing, flextime, more pedestrian and bicycle trails	See Chapter 3, Transportation (Actions 2,7,11).

MEETING GOALS

If Henry County takes no additional concrete actions to reduce emissions (“Business as Usual”), it will emit over 690,000 metric tons of CO₂ equivalent annually by 2030. The graphic below depicts emission reductions based on Henry County implementing the *measurable* actions recommended by its task force. In this scenario, Henry County will reduce almost 74,000 metric tons of CO₂ equivalent by 2030, but this is short of its 50% reduction target which would require an additional 92,000 metric tons of CO₂e (618,752 – 526,283) in 2030 for the current actions that can be modeled. It is important to note that this graphic only depicts the results of actions that can be measured by models. There are many actions, such as education, that can result in more emission reductions but simply cannot be modeled. If Henry County implements all its recommended actions, it may meet both the intermediate and long-term goals.

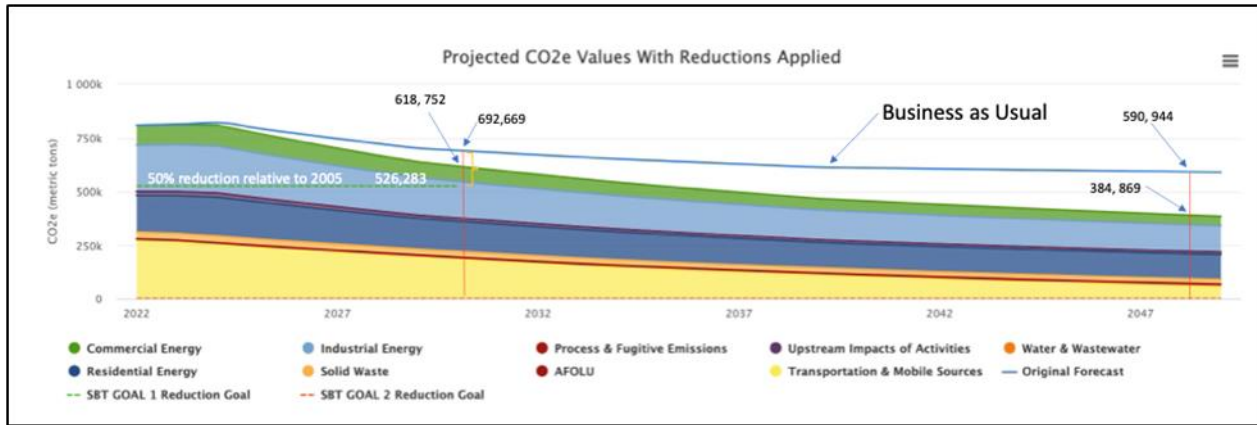


Figure I- Projected GHG emission reductions based on sub-sector goal achievement.

CHAPTER I – INTRODUCTION

An energy action plan examines the sources of a municipalities' energy consumption and seeks to reduce this consumption, and in turn, reduce emissions of greenhouse gases. Within a municipality, energy is consumed from various end-use sectors, such as buildings, electricity sector, transportation, land use, water and wastewater, and solid waste. Each has its own means of consuming energy, and therefore each presents unique opportunities to reduce this consumption and emissions.

The first step in building an energy action plan involves understanding the current energy consumption levels in the municipality for each of the sectors identified above. For every unit of energy consumed, a unit of greenhouse gases is emitted. The use of greenhouse gases serves as a metric to understand the communities' energy and sustainability profile. This is accomplished by obtaining and analyzing data on energy use throughout the community. This data provides an inventory of past and current consumption, and most importantly, allows for projecting future scenarios involving reduction (mitigation) techniques and practices. This data is translated into a community profile to illustrate the main areas of energy consumption, which are important when prioritizing energy strategies and actions. For example, if the model finds that the transportation sector produces 10 tons per year of energy-related greenhouse gas emissions and the municipalities' goal is a 50% reduction, then the municipality will want to implement actions that reduce these emissions by half, or 5 tons per year. Thus, the municipality models greenhouse gas emissions to understand its current baseline, develop goals and strategies based on this baseline, and ensure and evaluate progress by reevaluating emissions.

Reducing energy consumption, and by extension greenhouse gas emissions, are important to ensure that Henry County has a sustainable and resilient community. We want our citizens to save money on energy, and we also want our community to live in a more sustainable and resilient place. This requires reducing energy consumption. We are aware of the changes in our environment, from increased precipitation, flooding, and extreme heat days. By reducing our energy consumption, we are saving money and making our community a more comfortable and livable place.

Energy Action Plan: Development Process

GHG Modeling

To accurately calculate emissions Henry County, Virginia, George Mason University utilized the ICLEI Local Governments for Sustainability, USA ClearPath model and followed the protocol for a Community-Wide Greenhouse Gas Inventory. Energy consumption, solid waste and water treatment characteristics are attributed to greenhouse gas emissions and were included in emission calculations. Utility providers supplied energy consumption data for buildings within Henry County, Virginia. Non-utility energy consumption was retrieved from state and federal databases. This data was entered into the ICLEI ClearPath calculators to quantify emissions. The [U.S. Community Protocol](#) and the [Henry County GHG Community Inventory](#) provide general and specified information regarding the 2022 Henry County Community-Wide Greenhouse Gas Inventory.

Community Meetings

George Mason University worked with Henry County government officials to identify community members to serve on a task force. The community task force members were selected based on their ability to represent diverse community needs, backgrounds, and professional experience. George Mason University approached each prospective member and reviewed the project goals and task force obligations.

The community task force met over four weeks in February 2024, meeting on consecutive Fridays for two hours per meeting. Each meeting was in-person, with some task force members appearing via video. The first two meetings focused on educating and exchanging information on key terminology, greenhouse gas models, energy mitigation strategies, and the results of the municipality greenhouse gas inventory. The community task force was provided with a binder of information that consisted of the goals and process, examples of guiding principles, examples of other municipality energy actions plans, and case studies on energy mitigation actions. The mitigation case studies and greenhouse gas modeling were developed by university students under faculty supervision. The mitigation case studies provided detailed information on potential energy reduction actions, strategies, and policies in each of the core sectors. The case studies also provided objective information on the action's effectiveness, cost, feasibility, equity, and co-benefits. The greenhouse gas modeling is discussed in detail in Chapter 2.

The latter two meetings were designed to facilitate community task force discussion on selecting actions that would assist the municipality in achieving its goals. Community task force members reviewed case studies and engaged in structured analytic techniques and dialogue to identify the recommended action items, priority status (high, medium, low, not a priority), and time frame for implementation (1 year, 2-3 years, 4+ years, continuous). Community task force members engaged in dialogue amongst themselves and interacted with local government officials. The meetings were recorded, and draft reports of the recommended action items were approved by both community task force members and local government officials.

Guiding Principles

Community task force members were given an opportunity to identify which principles should guide their decision making on their recommended actions. The guiding principles were then used to evaluate each potential action item. The guiding principles selected are:

Effectiveness

- The recommended action meets the goals of energy savings and efficiency and reducing greenhouse gas emissions.

Costs, Economic Benefits, & Savings

- The recommended action has a positive impact on the local economy and employment. State or federal funds and financing are available to implement this action. Citizens, businesses, and/or the government will likely save money.

Feasibility

- The recommended action can be implemented by the municipal government (currently or soon). The municipal government has control over this action or can advocate for policies that support the action. Consider availability of financing and return on investment.

Equity

- The recommended action ensures (or can be designed to ensure) equitable distribution of benefits to all parts of the community (e.g., for low and middle-income citizens).

Co-Benefits

- The recommended action provides benefits beyond energy savings and emissions reductions to the community, such as public health, quality of life, economic gains, social benefits, or other environmental benefits.

Consistency

- The recommended action is well integrated with established community plans and policies or should be included in such plans and policies.

CHAPTER 2 – MUNICIPALITY GREENHOUSE GAS EMISSIONS

A community greenhouse gas (GHG) inventory is a systematic and comprehensive assessment of all GHG emissions produced within a specific community or geographic area. This inventory provides a detailed account of the sources and amounts of greenhouse gases released into the atmosphere because of human activities within the community of Henry County.

Key elements of a Community GHG inventory include:

1. **Emission Sources:** Electricity, Transportation, Solid Waste, Water and Wastewater, AFOLU (Agriculture, Forestry, and Other Land Use), Fugitive Emissions, and Grid Loss.
2. **Greenhouse Gases:** Measurement of different types of greenhouse gases, such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and refrigerants. The reduction of each gas contributes to resiliency and sustainability.
3. **Data Collection:** Where the data comes from, such as vehicle miles traveled, reports from utility companies, and other relevant factors.
4. **Inventory Period:** The time frame in which the inventory is taking place.

Total Emissions

Henry County's total GHG emissions in 2022 are estimated to be 809,659 MtCO₂e. This is 16.2 MtCO₂e per resident, which is 3.2 MtCO₂e higher than the national average. Transportation and mobile sources comprised one-third of total emissions, and transportation, industrial, and residential energy use were responsible for over 80% of total community emissions (Figure 1). Aggregated emissions are useful for setting community reduction targets against a determined baseline to allow for high-level tracking of reduction progress.

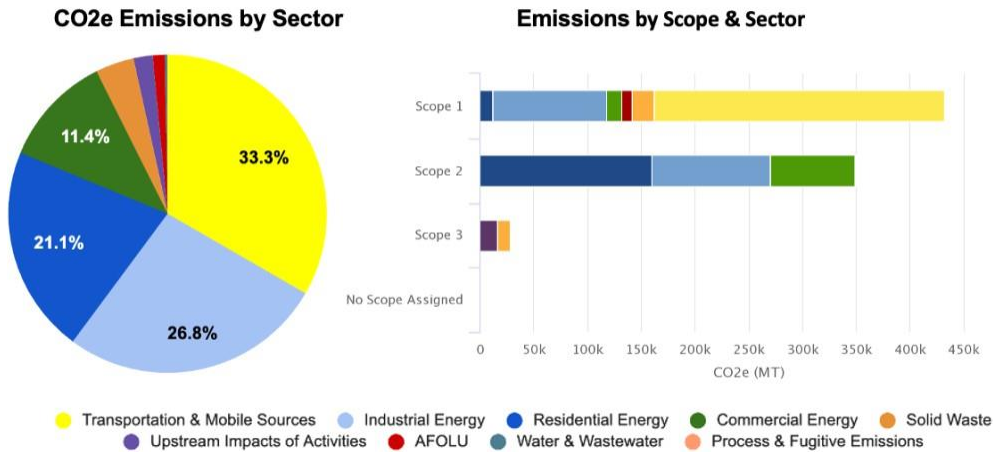
Figure 1: Sector Emissions

Sector	CO ₂ e	Percentage
Transportation & Mobile Sources	269,951	33.3%
Industrial Energy	217,056	26.8%
Residential Energy	170,859	21.1%
Commercial Energy	92,216	11.4%
Solid Waste	31,615	3.9%
Upstream Impacts of Activities	15,738	1.9%
Agriculture, Forestry, & Land Use (AFOLU)	9,984	1.2%
Water & Wastewater	2,012	0.2%
Process & Fugitive Emissions	228	0.0%
Total CO₂e	809,659	

To provide further insight into jurisdictional control over the emissions and subsequent reduction targets, the GPC distinguishes emissions by scope to identify where specifically emissions are produced. Scope I refers to

emissions from sources located within the county’s jurisdictional boundaries. Scope 2 are indirect emissions from the use of grid-supplied electricity within the jurisdictional boundaries. Scope 3 emissions are all other emissions that occur outside the jurisdictional boundaries as a result of activities taking place within the county. These scopes, depicted by Figure 2, are helpful for planning emissions mitigation according to emissions produced directly or indirectly by the county.

Figure 2



Emissions by Sector

Transportation and Mobile Sources (33.3%)

Transportation and other mobile source activity was the largest sector of emissions in the county, resulting in 269,951 MtCO₂e. As a rural county, passenger vehicle use is the primary driver of these emissions at 68.5% (Figure 3). This includes all standard gasoline motorcycles, cars, vans, SUVs, and pick-up trucks. The next largest source is freight (i.e. semi-trucks and tractor trailers) at just under 18.2%. The final 10% of transit emissions are from several sources, including off-road equipment (agriculture, construction machinery, logging equipment, landscaping engines, etc.), passenger buses, trains, and two recreational sources - the Philpott Lake Marina and the Henry County Speedway.

Figure 3

Transportation Sector	CO2e	Percentage
Passenger Vehicles (Gasoline)	184,637	68.40%
Freight (Diesel)	49,012	18.16%
Off-road equipment (Diesel)	13,858	5.13%
Off-road equipment (LNG)	7,226	2.68%
Off-road equipment (Gasoline)	7,086	2.62%
Passenger Buses (Diesel)	4,391	1.63%
Locomotives	2,770	1.03%
Off-road equipment (CNG)	590	0.22%
Martinsville Speedway	273.51	0.10%
Philpott Marina (Gasoline)	107	0.04%
Total CO2e	269,951	

The data was collected from a variety of sources. The primary road emissions were calculated using the annual report by the Virginia Department of Transportation (VDOT) of vehicle miles traveled on county roads. The off-road data was provided by the EPA's 2020 National Emissions Inventory and aggregated at the county level, greatly improving its reliability. Lastly, data for recreational activities and events were provided through direct reports from the Henry County Department of Recreation and the Henry County Speedway. Assumptions were record-specific but included categorizing fuel types for different classes of on-road vehicles and specific conditions that impacted fuel use in recreational transit. Additionally, the VDOT data collection does not distinguish buses by services, which includes Piedmont Area Regional Transit, Henry County Public Schools, regional bus companies (e.g. Greyhound), or other miscellaneous bus activity within the county. It does not capture annual passenger data, route vehicle use, nor non-active service mileage, which can fluctuate.

Industrial Energy (26.8%)

The industrial sector emitted 217,056 MtCO₂e or around 26.8% of Henry County's total emissions. Consumption of electricity from Appalachian Power was the largest contributor to the industrial sector, with 51.0% (110,595 MtCO₂e) of the industrial sector coming from these scope-2 emissions. Emissions were calculated using the EPA's Emissions and Generation Resource Integrated Database (eGRID), which provides the output emissions rate (lb/MWh) of the electricity generation in the RFC-West subregion, which services Henry County. Stationary combustion made up the rest of the emissions for the industrial sector, comprising 59.5% natural gas, 27.0% coal, and 8.9% distillate fuel.

Natural gas data was directly received from Southwestern Virginia Gas Company. Other liquid and combustible fuel data was collected from the Energy Information Agency (EIA)'s industrial energy consumption estimates for Virginia. The data taken from the EIA was for Virginia as a whole, so using U.S. Census Bureau job data, a ratio was created to estimate Henry County's consumption of each fuel type present in the data (coal, kerosene, propane/HGL, etc.). Since this data was calculated creating a ratio, it might not map perfectly to Henry County's real consumption.

Residential Energy (21.1%)

The residential sector includes all emissions from electricity and combustible fuel consumption, which resulted in 170,860 MtCO₂e. Appalachian Power provided the total electricity consumption of all household accounts, which was classified as scope 2 emissions and calculated using the eGRID output emissions rate. The Southern Virginia Gas Company provided household natural gas consumption, which was classified as scope 1 emissions. Other stationary fuel sources included coal, liquid natural gas, wood, and kerosene, which was calculated using the household ratio from the 2021 American Community Survey House Heating Fuel.

Commercial Energy (11.4%)

The commercial sector emitted 92,216 MtCO₂e or 11.4% of Henry County's emissions. Eighty-five (85%) (78,558 MtCO₂e) of the commercial sector's emissions comes from consumption of utility electricity from American Electric Power. All public sector electricity customers (government accounts) were recorded under commercial electricity. Electricity consumption associated with water and wastewater were subtracted from the total amount and recorded under that section (see below). Stationary combustion made up the rest of the

emissions for the commercial sector, with natural gas being the largest fuel type at 53.68%, motor gasoline (19.83%) being the second largest, then distillate fuel (15%), and other fuels making up the rest.

The non-natural gas data was collected from the U.S. Energy Information Agency (EIA)'s industrial and commercial energy consumption estimates for Virginia. The data taken from the EIA was for Virginia as a whole, so using Census Bureau job data, a ratio was created to estimate Henry County's consumption of each fuel type present in the data (coal, kerosene, propane/HGL). Since this data was calculated creating a ratio, it might not map perfectly to Henry County's real consumption. Natural gas data was directly received from Southwestern Virginia Gas Company. Finally, some emissions from the water and wastewater sector were included within the commercial sector's emissions.

Solid Waste (3.9%)

Solid waste generation and landfill-associated emissions were 31,619 MtCO₂e, which accounted for 3.9% of the county's total emissions. Emissions are calculated by the weight of waste that is generated by the locality, the composition of that waste (municipal solid waste, compost, recycling, etc.), and where that waste ultimately decomposes. This can be situationally complex, depending on interjurisdictional arrangements and regional services. There are two significant sources of solid waste emissions in Henry County. The retired Henry County Sanitary Landfill accounts for roughly two-thirds of solid waste emissions (19,971 MtCO₂e) and the other third is from annual waste generation (11,645 MtCO₂e). This annual waste is collected at the First Piedmont Transfer Station, where it is sorted and disposed of beyond the county's boundaries. The total volume of solid waste at the transfer station in 2022 was provided by the Virginia Department of Environmental Quality (VDEQ). The total waste reported from the City of Henry County's Refuse Department was subtracted from the VDEQ report to isolate the solid waste generated within the county. This is a primary scope 3 emissions source.

Agriculture, Forestry, and Other Land Use (1.2%)

Agriculture made up 1% of emissions for the County, well below the national average of 11%, excluding forestry and land-use.

Headcounts on livestock and crops were taken from the U.S. and multiplied by emissions factors from the International Panel on Climate Change (IPCC) to estimate methane emissions enteric fermentation and manure management for livestock and nitrous oxide emissions for crops.

Livestock included dairy and beef cattle, sheep, poultry, and swine. Wheat was the only crop. Nearly all emissions in agriculture (99%) came from cattle, though beef cattle had a noticeably larger impact on methane emissions than dairy cattle.

Other land use refers to the emissions of land-use changes across forestland, cropland, grassland, wetlands, settlements, and other uses. Per the GCP guidelines, forestry and other land change emissions were excluded (recorded as "information only"). If forestry and other land use change emissions were included, the AFOLU sector emission would increase to 11%. However, it would also require accounting for natural carbon sequestration and flux of forestland and greenspace, which is roughly a net 392,000 MtCO₂e fluctuation. Land conservation can be a valuable way to offset emissions, as forestry and land use in the County creates a larger

net sink than the national net sink from forestry and land use of 12%. The largest emitter within forestry and land use comes from deforestation of forest land to grasslands. Exact numbers are not included due to the tool used using outdated or not high enough quality data for their calculations.

Water & Wastewater (0.2%)

The water and wastewater sector consists of emissions produced from water extraction, treatment, and wastewater treatment for residents and businesses within the County. Estimates of emissions were based on electricity consumption data provided by the Henry Public Service Authority (PSA) for drinking water and from the Piedmont Lagoon Sewage Treatment Plant and the City of Henry County for wastewater treatment. There was a total of 2,013 MtCO₂e from the sector, in which electricity used to extract, treat, and distribute drinking water was responsible for 64% of the sector's emissions. Emissions from wastewater treated at the Piedmont location are Scope 1 emissions since the plant is located within the county, while emissions from wastewater treated in and imported from Henry County are Scope 3 emissions. Henry County wastewater treatment contributed to 35% of the sector's emissions.

Emissions from this sector are underestimated because data was not distinguished from electricity consumption in other categories. Electricity demand of private wells and septic systems are assumed to be captured in residential, commercial, or industrial electricity use. However, non-electric private septic emissions were not calculated, which contributes to a conservative estimation.

Upstream Impact of Activities and Fugitive Emissions (1.9%)

Upstream and fugitive emissions are calculations of the energy systems' inefficiencies; essentially the extra energy that is expended in grid electricity and natural gas infrastructure when those sources of energy are consumed. At a grid loss factor of 4.5%, an additional 15,700 MtCO₂e were emitted from the County's grid electricity consumption. Due to the typical loss through transmission, this is classified as scope 3 emissions. Similarly, fugitive emissions focus on the county's total natural gas consumption. Using a standard 0.3% leakage rate, an additional 228 MtCO₂e were emitted. Given that natural gas loss takes place at point of consumption, this is classified as scope 1.

CHAPTER 3 – GOALS, STRATEGIES & ACTIONS

Henry County recommends an overall goal consistent with international, national, and regional goals—but influenced by local needs. Our goal is based on the best available science today which provides a pathway to conserve energy, reduce greenhouse gas emissions, and improve the resilience and sustainability of our community.

Our goal is to reduce our community’s greenhouse gas emissions in the short-term by 50% by 2030 (from the base year of 2005). Since the U.S. has reduced emissions by approximately 15% in 2022, we can adjust our goal so that we only need to reduce emissions by 35% by 2030 relative to current levels. Our long-term goal would be to achieve carbon neutrality by 2050, which means the amount of greenhouse gases released into the atmosphere is equal to the amount removed.

The sections below outline the community task force recommended strategies and actions. Each section represents the core categories (buildings, transportation, electricity sector, land use, waste and wastewater, and solid waste). Within each section, there are four sub-parts: action, priority level, timeframe for implementation, lead government official, and comments.

GOAL: reduce emissions by 35% by 2030; achieve carbon neutrality by 2050.

All actions have been assessed by the community task force to comply with the guiding principles of effectiveness, feasibility, equity, and co-benefits.

Sector: BUILDINGS
Strategy: (1) Increase energy efficiency, improve conservation and integrate clean energy technology in existing buildings (residential and commercial) through rebates and incentives. (2) Optimize existing building infrastructure and encourage benchmarking of commercial buildings.
Sub-Sector Goals: (1) Retrofit at least 100 <i>residential</i> housing units with cumulative energy efficiency improvements of 25% (existing buildings) by 2030; (2) convert 30% of fossil fuel <i>residential</i> building systems (e.g., space or water heaters) to highly efficient electric options (e.g., heat pumps); (3) Retrofit at least 50 <i>commercial</i> building with cumulative energy efficiency improvements of 30% (existing buildings) by 2030; and (4) convert 30% fossil fuel

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<p><i>commercial</i> building systems (e.g., space or water heaters) to highly efficient electric options (e.g., heat pumps) by 2035.</p>			
Actions	Priority	Timeframe	Gov't Dept
<p>1. In concert with utility companies, municipality should evaluate new communication strategies [marketing] for disseminating energy efficiency and clean energy technology information and identify recommendations to increase effectiveness of communication and engagement with citizens for both existing and new programs. As part of promoting this effort, encourage actual building owners (residential and commercial) to share their stories with the public.</p>	High	Continuous	Public Information
<p>2. Develop basic energy efficiency education programs to targeted communities. This could include workshops and one-on-one outbriefs of building energy audits. These programs would provide guidance not just on replacement technologies, but also focus on priority areas (e.g. weatherization, space heating/cooling) that enhance better building performance (for example, a building with an inefficient envelope should prioritize weatherization over a higher efficiency heat pump).</p>	High	Short (1 year)	Public Information/ Building Inspections
<p>3. Pursue state and federal grants to establish a rebate program for transitioning to energy efficient and clean energy technology (for example, electric heat pumps, weatherization, solar water heaters or panels). As a prerequisite for participation in rebate program, require the completion of a comprehensive energy</p>	High	Long (4-5 years)	Planning/Zoning

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audit. This rebate program should have a carve-out for low-income residents.			
4. Pursue opportunities to form and create community solar projects for low-income residents.	High	Medium (2-3 years)	Planning/Zoning
5. Evaluate potential financing program that allows property owners to pay for energy efficiency and electrification projects through their property tax bill (Commercial Property Assessed Clean Energy - PACE). Identify and address any challenges to participation in this program.	Medium	Medium (2-3 years)	Commissioner of the Revenue
6. Encourage “green leases” in rental agreements in which tenants commit to or gain incentives by participating in water/energy conservation, waste reduction and recycling, use of nonhazardous cleaning products, or other sustainable actions.	Medium	Medium (2-3 years)	Public Information, Community Development
7. Continue to identify and re-zone areas that have abandoned/underutilized buildings into multi-dwelling use and mixed-use retail. Create or expand incentives to attract building developers to re-purpose abandoned/underutilized buildings with energy efficient and clean technology applications.	High	Continuous	Planning/Zoning
8. Continue to streamline permitting for buildings that install energy efficiency or clean energy technology.	High	Continuous	Building Inspections
9. Encourage and incentivize building developers to incorporate energy-efficient and all-electric systems technologies.	High	Medium (2-3 years)	Building Inspections

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<p>10. Implement benchmarking requirements for public buildings and encourage this for local commercial buildings.</p>	<p>High</p>	<p>Long (4-5 years)</p>	<p>Planning/Zoning</p>
<p>Comments:</p> <ul style="list-style-type: none"> • <i>For #1, need to move beyond passive website and social media communications and consider partnering with schools, businesses, organizations, and utilities to engage with public more actively. Appalachian Power’s “Take Charge” energy efficiency program is an example of a program that could help citizens reduce their energy usage.</i> • <i>Information and education are critical, so the more the municipality can do the better.</i> • <i>For a rebate program to work optimally there should be an energy audit done first. This allows the homeowner to make an informed decision based on the audit. Appalachian Power offers qualifying residential customers a free energy audit.</i> • <i>Need to find creative ways for county government to incentivize landlords to make energy efficiency improvements, particularly building owners of multi-family housing units. Many low-income households do not own their building or major energy loads (e.g. HVAC/water heater/appliances) and do not have the ability to make improvements.</i> • <i>Some concern that PACE program could impact the county’s budget. This largely depends on how the project works. If the additional amount paid in property taxes goes 100% to repayment of the loan, then the county would not be able to collect what is owed from the improvement in the home’s value. This also carries an expense for administrative costs.</i> • <i>Skepticism about Power Purchase Agreements (PPAs). Are there ways to filter/screen potential rooftop solar companies who offer PPAs? Some – certainly not all – solar installers can inflate customer savings. A record number of solar installers have also gone out of business leaving customers with nowhere to turn. Powerhome Solar advertised heavily in our area and then went out of business.</i> • <i>County codes and ordinances need to ensure new building and building redevelopment projects include adequate low-income housing options.</i> • <i>Municipality Feedback: The primary housing need in the county is currently workforce housing. There is already an abundant amount of low-income housing options. Limiting developers in a way that requires a certain amount of low-income housing could jeopardize their interest in projects in our area and prevent the county from addressing its broader housing shortage.</i> 			

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- *The County has streamlined the permitting for buildings that install energy efficiency or electrification technology.*
- *Municipality Feedback: The County processes rezoning applications but they don't typically initiate a rezoning application.*

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Sector: TRANSPORTATION			
Strategy: (1) More convenient and accessible public transportation. (2) Increase transition to electric vehicles.			
Sub-Sector Goals: (1) By 2030, the municipality should convert 30% its publicly owned light-duty internal combustion engine vehicles to plug-in electric vehicles (PHEVs) and battery electric vehicles (BEVs) vehicles; (2) By 2030, the municipality should convert 30% its publicly owned medium and heavy-duty vehicles to PHEV/BEV or other clean vehicle technology (e.g., propane, natural gas); (3) Community: Increase PHEVs/BEVs to at least 12% of all light-duty vehicle registrations by 2030; (4) Community: Reduce 15% of passenger vehicle miles traveled by shifting to active or public transport (e.g., biking, walking, or taking the bus) by 2030.			
Actions	Priority	Timeframe	Gov't Dept
1. Evaluate the feasibility of providing more routes within the Piedmont Area Regional Transit (PART) system and provide recommendations for implementation.	High	Short (1 year)	Planning/Zoning
2. Encourage and promote the availability of car-ride services (e.g. Dial-a-ride, volunteer driver program, carpool, community shuttles) to work with hospitals, health care providers, and other businesses to encourage alternative forms of transportation. Seek city-county partnership efforts on this action.	High	Medium (2-3 years)	Public Information
3. County government purchases more electric vehicles (replaces its existing fleet vehicles with EVs) for both light-duty and heavy-duty applications (e.g., non-road and on-road diesel vehicles)	High	Continuous	Administration

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4. County should conduct a cost-benefit analysis to evaluate impact of updating ordinances to require EV charging infrastructure (proper EV charging outlets, at a minimum) for new/renovated commercial buildings	Medium	Short (1 year)	Planning/Zoning
5. Disseminate information about EVs and charging infrastructure financing, rebates, & tax incentives.	Medium	Continuous	Public Information
6. Install more EV charging stations in public spaces	Low	Medium (2-3 years)	Planning/Zoning
7. Create or expand bike lanes and pathways connecting homes to businesses.	Low	Medium (2-3 years)	Planning/Zoning/Engineering
8. Streamline permitting and inspection procedures for EV charging infrastructure.	Low	Medium (2-3 years)	Planning/Zoning
9. Fee reductions,waivers, or parking privileges (free parking) for EV/hybrid vehicles and charging infrastructure.	Low	Medium (2-3 years)	Planning/Zoning
10. Implement bi-directional charging stations to help build distributed energy resource (DERs) capabilities	Low	Long (4-5 years)	Planning/Zoning
11. Information dissemination about telework benefits.	Low	Continuous	Public Information
<p><i>Comments:</i></p> <ul style="list-style-type: none"> • <i>Employers should be included in any study on public transportation.</i> • <i>The healthcare sector faces serious challenges with transportation options.</i> 			

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- *For item #9, the County commented that this action takes a punitive approach (for those who do not own EVs or charging infrastructure), and the county prefers positive reinforcement over negative reinforcement.*
- *Parks are the most logical place for public EV charging stations now.*
- *Appalachian Power has lower overnight EV charging rates, but residents may not be aware of this.*
- *Practicality of improving on-road bike lanes that connect homes to businesses is very limited. There is more interest in increasing biking/walking capacity on trails and recreation areas.*
- *Look at how Henry County's long-term trails plan can complement these goals.*
- *Some discussion on encouraging EV charging stations in remote areas w/ public demand (e.g. wineries and breweries). Dispersing the limited number of EV charging stations across the county could help ensure visitors are not range constrained.*
- *Transition to EV's should be approached methodically instead of all at once to account for advances in technology.*

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Sector: ELECTRIC SECTOR			
Strategy: Increase transition to clean and renewable energy sources.			
Sub-Sector Goal: Transition 40% of the electricity used in the municipality to clean energy sources. (e.g., solar, wind, hydropower, nuclear, and geothermal) ahead of Virginia's Renewable Portfolio (state law requires 45% renewable in 2035)			
Actions	Priority	Timeframe	Gov't Dept
1. County should help streamline appropriate solar facility permitting.	High	Short (1 year)	Planning/Zoning
2. Identify suitable locations for installing large scale solar projects in abandoned locations, large, flat-roofed buildings (warehouses/distribution centers), closed landfills, and brownfields, and on public parking garages and buildings.	High	Medium (2-3 years)	Planning/Zoning
3. Convert remaining streetlights and public lighting (e.g. parking lots at parks) to LEDs	High	Medium (2-3 years)	Planning/Zoning
4. Model Light Ordinance (designed to help municipalities develop outdoor lighting standards that reduce glare, light trespass, and sky glow).	Medium	Medium (2-3 years)	County Attorney/Planning/Zoning
5. Create/refine solar-ready design standards for use in permits and ordinances (e.g., uniform set-back standards).	Medium	Medium (2-3 years)	Planning/Zoning
6. Permit fee and property tax reductions for solar PV installations.	Low	Medium (2-3 years)	Planning/Zoning

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7. Survey/inventory all public buildings for solar PV potential (roof measurements, shade analysis).	Low	Medium (2-3 years)	Building Inspections
8. Pursue opportunities to form and create community solar projects for low-income residents.	Low	Medium (2-3 years)	Planning/Zoning
9. Work with Appalachian Power to promote utility-managed electricity demand reduction programs (e.g. tiered pricing throughout day, reduced consumption during high peak days, smart meters that reduce energy usage during peak times coupled with pay-back).	High	Continuous	Public Information
10. Utility purchase of solar renewable energy credits from households and businesses (offsets resident's costs)	Medium	Medium (2-3 years)	Utility
11. Ratepayer-funded utility program to install energy-efficiency upgrades for low-income customers.	Low	Continuous	Utility
<p><i>Comments</i></p> <ul style="list-style-type: none"> • <i>On action #1, the county commented that the process is already streamlined. The applicant either receives a permit or they don't. To the degree that streamline is a synonym for "amend ordinance to be less restrictive," that is simply not something the current iteration of the Board is in favor of doing. The plan will not be approved with this recommendation in it.</i> • <i>On action #5, the county commented that this is already done for large scale solar projects. Currently, the only standard required for a building permit for rooftop solar is that it complies with manufacturer specifications. No interest from the department in limiting the ability of homeowners more.</i> • <i>On action #6, the county commented that this is a public subsidy for a private gain. Increased home values and decreased electricity bills already provide adequate incentives without also decreasing county revenues.</i> 			

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- County restrictions (e.g. percentage of lot size that can be allocated for solar (density)/setbacks) on utility scale solar (USS) facilities in the County is a current constraint on the ceiling for installed power capacity for solar projects.
- County staff mentioned that public rights-of-way (e.g. sides/middle of roadways) could be desirable locations.
- Appalachian Power (County electricity supplier) indicated that restrictions on USS were a challenge for them in complying with the Virginia Clean Economy Act requirements to be 100% carbon-free by 2050.
- Municipality Feedback: An abundance of USS prevents the county from using valuable real estate for other purposes such as the creation of an industrial park. Without the necessary available land to pursue these goals, the county would be deprived of one of its only resources to address economic inequality and the material conditions of its residents would continue to diminish.
- Allowing large swaths of rural land to be overtaken by USS disproportionately shifts the burden of reaching the state's climate goals onto the southwestern portion of the state. Given that elevated levels of climate emissions are linked to rampant development, the portions of the state who have engaged in such activity should at least have an equal stake in providing the necessary infrastructure to tackle climate change. The county should commit to its fair share of this infrastructure, but it should not be expected to carry more of this burden than more developed parts of the state.
- There are several other options available to Appalachian Power that would allow it to meet its climate goals which qualify as "carbon-free" but do not require as much land to achieve the goal.
- Appalachian Power offers two voluntary programs for residential customers with smart meters. With these programs, customers are charged different amounts for electricity depending on when they use it throughout the day and/or time of year. The webpage to view information about this smart time of day program options can be found at: <https://www.appalachianpower.com/company/about/rates/val/rate-plans#smartdemand>
- Demand Response program options discussed incl. smart thermostats for use during hot summer peak-demand load. Appalachian Power's Take Charge energy efficiency program offers a Bring Your Own Thermostat program that provides households the opportunity to earn money and promote energy efficiency and reliability for all customers.

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- *Rate funded actions for any programs viewed unfavorably. Term “rate fatigue” was mentioned. Currently “Take Charge” energy efficiency program is rate-payer funded.*
- *Appalachian Power offers an energy efficiency program called Take Charge. This program includes a low-income weatherization program. Take Charge program can be found at the following link: <https://takechargeva.com/>*

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Sector: LAND USE				
Strategy: Improve management of lands/native trees				
Sub-Sector Goal:				
Actions		Priority	Timeframe	Gov't Dept
1. Develop a long-term plan for more sustainable development (green zoning plans for energy and water-efficient buildings, multi-family and mixed use, and transit-oriented development). Include multi-family housing through development, zoning, and land use policies.	Convene a task force to provide recommendations for integration in County Comprehensive Plan	High	Short (1 year)	Planning/Zoning
2. On public lands, plant more native trees and food forest tree plantings, create more green landscapes, and manage non-native plants.	Contact local schools to join efforts	High	Continuous	Planning/Zoning
3. Expand public parkland and establish natural green space guidelines in community planning.		High	Continuous	Planning/Zoning
4. Increase multi-family housing through development, zoning, and land use policies		High	Medium (2-3 years)	Planning/Zoning
5. Provide Incentives for property owners to increase and maintain tree canopy and expand tree planting initiatives.		High	Medium (2-3 years)	Planning/Zoning

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6. Evaluate allowance of Accessory Dwelling Units (ADUs) in existing primary residences to increase housing density.	Medium	Long (4-5 years)	Planning/Zoning
7. Implement/revise minimum and maximum parking ordinances.	Medium	Medium (2-3 years)	Planning/Zoning
<p><i>Comments:</i></p> <ul style="list-style-type: none"> • <i>Lots of interest in improving riparian areas around public trails. Some discussion on feasibility of using incarcerated personnel to assist in this.</i> • <i>Specific action discussed – Increasing access to farmers’ markets.</i> • <i>Strategy discussed in context with a specific goal of reducing vehicle-miles-traveled (VMT)</i> • <i>Include information sessions on property/lawn maintenance to reduce unnecessary “over-mowing” of natural spaces.</i> • <i>Municipality Feedback: County recommends making the two medium actions low actions instead.</i> 			

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Sector: WASTE & WASTEWATER				
Strategy: Improve water conservation				
Sub-Sector Goal: None				
Actions		Priority	Timeframe	Gov't Dept
1. Educate and inform residents about green infrastructure and other types of solutions for water conservation (natural or nature-based approaches such as constructed wetlands, rain gardens, and vegetation buffers).	Subsidize rain barrel purchases (ideally via a grant).	High	Medium (2-3 years)	Public Information
2. Promote and educate on best management practices to reduce agricultural run-off.		High	Continuous	Public Information
3. Enhance natural landscapes by investigating riparian buffers and other best practices.		Low	Medium (2-3 years)	Planning/Zoning
<p><i>Comments:</i></p> <ul style="list-style-type: none"> • <i>Dan River Basin Assc. (DRBA) has a rain barrel workshop.</i> • <i>Since City of Henry County provides almost all county wastewater management, there are fewer direct options.</i> • <i>Most of county is on well water – ground water quality is important.</i> • <i>Noted that livestock contamination of waterways was a major issue (need more barriers)</i> 				

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Sector: SOLID WASTE			
Strategy: Reduce the amount of municipal solid waste that is diverted to Landfill			
Sub-Sector Goal: Divert 40% of solid waste produced in the city (e.g., recycled, composted, reused) by 2030.			
Actions	Priority	Timeframe	Gov't Dept
1. Evaluate feasibility of both biowaste and food waste composting program(s).	High	Medium (2-3 years)	Refuse Department
2. Evaluate implementation of a "Pay-as-you-Throw" MSW program.	Medium	Short (1 year)	Refuse Department
<p><i>Comments</i></p> <ul style="list-style-type: none"> • <i>Regarding action #2, the County commented that its residents currently pay for this through an additional fee on personal property taxes. This method was studied and deemed to not be cost effective. There is no interest from the local government.</i> • <i>City of Henry County collects yard waste for composting (possible collaboration for sharing composting site).</i> 			

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Sector: ORGANIZATIONAL STRUCTURE			
Strategy: (1) Develop partnerships with key stakeholders to advance workforce education. (2) Develop a monitoring and accountability mechanism for Energy Action Plan success.			
Sub-Sector Goal: None			
Actions	Priority	Timeframe	Gov't Dept
1. Designate/Hire a county government sustainability manager or specialist responsible for implementing Energy Action Plan.	High	Short (1 year)	Administration
2. Establish an Energy Transition Committee (name: TBD) to ensure County officials are advised/updated on the status of the Energy Action Plan.	High	Short (1 year)	Administration
<p><i>Comments:</i></p> <ul style="list-style-type: none"> • <i>Explore how to leverage prominent commercial partners (e.g. Racetrack Manager) to help with forming/maintaining an energy transition committee.</i> • <i>Some concern whether Henry County would have enough volunteer expertise/support to stand up a committee.</i> • <i>Consider possibly forming collaboration with West Piedmont Planning District Commission.</i> 			

CHAPTER 4 – IMPLEMENTATION

Henry County’s overall goal is to reduce community greenhouse gas emissions in the short-term by 50% by 2030 relative to 2005 levels (or 35% relative to 2022 levels). In Chapter 3, both sub-sector goals and actions were identified to achieve these overall goals. In many cases, the community task force recommended actions will contribute to meeting the sub-sector goals. For example, one of the sub-sector goals for buildings is to retrofit at least 100 residential housing units with energy efficiency improvements. An action that will support achieving this goal includes “Identify and evaluate how existing incentive programs (for example, Enterprise Zones) can incorporate energy efficiency and clean energy requirements or targets.” In this chapter, we will discuss how the recommended actions contribute to the overall goal and how the municipality can implement the action. We will also discuss how best to monitor progress towards meeting the goals.

Sub-Sector Goals

The sub-sector goals defined in Chapter 3 were approximated, as described below, to forecast potential emission reduction scenarios.

Buildings

- For non-electric households – Fuel Switching
 - 3.0% of housing stock retrofitted per year [Total of 30% over next 10 years]
 - 25% energy savings
 - Coefficient of Performance for Heat Pumps 2.7
 - Furnace efficiency = 80%
- For electric households – No Fuel Switching
 - 2.5% of housing stock retrofitted per year [Total of 25% over next 10 years]
 - 20% energy savings
 - Coefficient of Performance for Heat Pumps 2.7
 - Furnace efficiency = 80%
- For non-electric commercial buildings – Fuel Switching
 - 5% of building stock retrofitted per year [Total of 30% over next 6 years]
 - 30% energy savings

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- Coefficient of Performance for Heat Pumps 2.7
- Furnace efficiency = 80%

- For electric commercial buildings – No Fuel Switching
 - 5% of building stock retrofitted per year [Total of 30% over next 6 years]
 - 20% energy savings
 - Coefficient of Performance for Heat Pumps 2.7
 - Furnace efficiency = 80%

- Industrial Building – 1% reduction in electricity/natural gas per year

Transportation

- 20% reduction in Vehicle Miles Traveled (VMT) by 2035
- 40% EV's (on the road) by 2050 – Gasoline engines
- 20% EV's (on the road) by 2050 – Diesel engines

Electric Sector

- Transition 25% of the electricity used in the municipality to clean energy sources. (e.g., solar, wind, hydropower, nuclear, and geothermal) ahead of Virginia's Renewable Portfolio
- VCEA requires 45% renewable in 2035 [Modeled]

Solid Waste

- Divert 90% of solid waste produced in the city (e.g., recycled, composted, reused) by 2030

Henry County's 2030 target – a science-based target—seeks to reduce greenhouse gas emissions (GHG) by 50% relative to 2005 levels by 2030. However, in 2022, the U.S. had reduced by ~15% of its GHG emissions, thus Henry County only needs to reduce **35% of its GHG emissions relative to 2022**, as depicted here.

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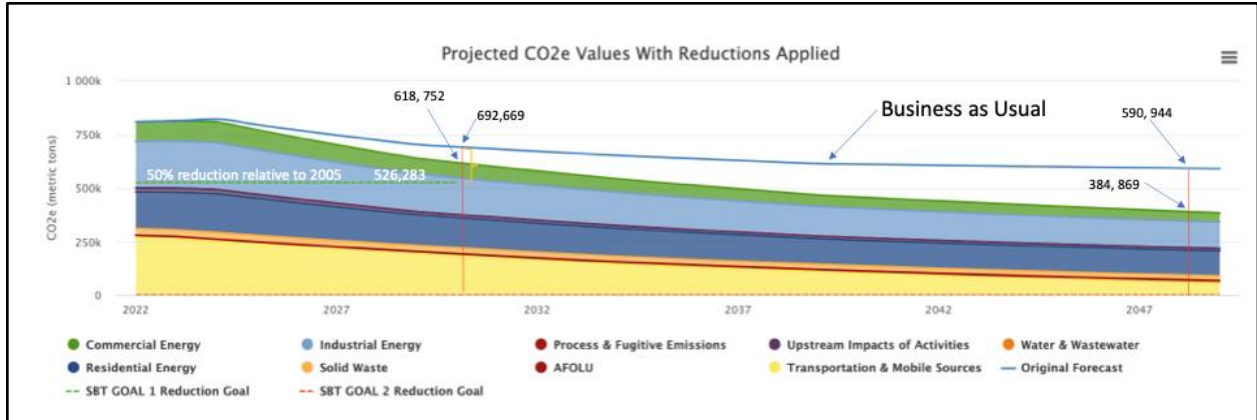


Figure 1- Projected GHG emission reductions based on sub-sector goal achievement.

If the recommended actions items are successfully implemented, Henry County may make progress towards meeting its goals. As Figure 1 depicts, Henry County falls short of meeting its science-based targets by almost 92,000 metric tons of CO₂e (618,752 – 526,283) in 2030 for the current actions that can be modeled. However, as mentioned above, several important items cannot be modeled and will likely contribute toward the county meeting its target.

Next Steps

To implement the recommended actions, Henry County must consider the steps necessary for successful implementation. Below, an implementation methodology is provided for some of the recommended actions. This provides guidance on preliminary steps towards implementing the action.

Buildings

Action Item B1 & B2: Create an information clearinghouse for residents and businesses about tools, technology, and incentives for installing and using energy efficiency and clean energy technologies and practices. Clearinghouse should focus on conveying actual experiences from residents and businesses. See comments section below about contents of the information clearinghouse.

Implementation Method:

1. Establish baseline understanding of communities' awareness and attitudes towards energy efficiency and clean energy technology. For example, conduct in-depth interviews with community members, conduct public focus groups, or issue surveys or polls.
2. Based on research results, develop a targeted communication strategy which seeks to disseminate objective information about energy efficiency practices and renewable energy resources.

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3. Identify and work with key partners that will effectively convey the communication strategy. For example, partner with schools, associations, and businesses.

For more information: consult the Virginia Department of Energy website [here](#). For information on energy efficiency, consult VDOE's page [here](#). For information on clean energy, consult VDOE's page [here](#).

Action Item B3: Pursue state and federal grants to establish a rebate program for transitioning to energy efficient and clean energy technology (for example, electric heat pumps, weatherization, solar water heaters or panels). As a prerequisite for participation in the rebate program, require the completion of a comprehensive energy audit. This rebate program should have a carve-out for low-income residents.

Implementation Method:

1. Weatherization Assistance Program

The U.S. Department of Energy (DOE) Weatherization Assistance Program (WAP) reduces energy costs for low-income households by increasing the energy efficiency of their homes, while ensuring their health and safety.

Steps to Apply:

1. Determine eligibility for weatherization services.
2. Identify local weatherization provider.
3. Complete the weatherization application process.
4. Prepare for weatherization services.

For more information: Consult DOE's website [here](#).

2. The Green and Resilient Retrofit Program

The U.S. Housing and Urban Development Green and Resilient Retrofit Program is available for assisted multifamily housing. Direct loans and grants are available to fund projects that improve energy or water efficiency, enhance indoor air quality or sustainability, implement the use of zero emission electricity generation, low emission building materials or processes, energy storage, or building electrification strategies or address climate resilience.

For more information: Consult HUD's website [here](#).

Action Item B7: Continue to identify and re-zone areas that have abandoned/underutilized buildings into multi-dwelling use and mixed-use retail. Create or expand incentives to attract building developers to re-purpose abandoned/underutilized buildings with energy efficient and clean technology applications.

Implementation Method:

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1. Market and promote the community’s available vacant and underutilized buildings.
2. Create a community task force of key business stakeholders to assist with business-to-business outreach, local financing and marketing efforts, and understanding prospective new owner’s needs.
3. Seek out experienced developers with specialization in repurposing historic buildings. These developers are familiar with tax incentives and economic tools and may be willing to engage with the municipality on this action.
4. Advertise on “historic buildings for sale” websites. Because of the unique nature of historic properties, there are many national websites that specialize in marketing historic buildings that may be worth utilizing to appeal to historic property buyers. Consult this [website](#) for more information, including grant opportunities.
5. Consult with real estate professionals who specialize in commercial properties, are experienced with the local real estate market, and have knowledge of historic buildings. For more information: This community [guide](#) provides further information on repurposing vacant and underutilized buildings.

Transportation

Action Item T3: County government purchases more electric vehicles (replaces its existing fleet vehicles with EVs) for both light-duty and heavy-duty applications (e.g., non-road and on-road diesel vehicles)

Implementation Method:

Municipality should consider the following grants to apply and aid in the implementation of this action.

<p><i>Congestion Mitigation and Air Quality Improvement Program.</i></p> <ul style="list-style-type: none"> • Funds for local governments for transportation projects and programs to help meet the requirements of the Clean Air Act • Available funding: \$10,000,000 – \$505,000,000 • Available annually <p>Link</p>	<p><i>Charging and Fueling Infrastructure Discretionary Grant Program.</i></p> <ul style="list-style-type: none"> • Funds for implementing publicly accessible electric vehicle charging infrastructure • Corridor Program: \$1,000,000 – no maximum. • Community Program: \$500,000 - \$15,000,000. • Available annually <p>Link</p>
<p><i>Grants for Buses and Bus Facilities Programs.</i></p>	<p><i>Clean School Bus Program.</i></p>

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<ul style="list-style-type: none"> • Funding to replace, rehabilitate, and purchase buses and related equipment, including vehicles that produce low or no emissions (Low-No) for public transportation services. • Grants for Buses and Bus Facilities: \$115,000-\$54,000,000 • Low-No Bus: \$167,257-\$116,000,000 • Available annually <p>Link</p>	<ul style="list-style-type: none"> • Funds for local governments to replace existing school buses with clean and zero-emission models • Serving high-priority school districts: Maximum of \$285,000 – \$375,000 per bus • Serving other eligible school districts: Maximum of \$190,000 – \$250,000 per bus • Funding available through 2026 <p>Link</p>
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Action Item T4: County should conduct a cost-benefit analysis to evaluate impact of updating ordinances to require EV charging infrastructure (proper EV charging outlets, at a minimum) for new/renovated commercial buildings.

Implementation Method:

1. Start by electrifying government-owned vehicles and build the infrastructure needed for these vehicles. In parallel, begin to plan community locations to install EV charging spaces.
2. Create a plan for numbers and types of chargers by assessing local factors including electric vehicle numbers, access to home charging, and future targets.
3. Seek government funding and investments from developers, energy companies and local businesses. Deploying at scale can drive down charging infrastructure costs.
4. Collaborate with landowners, electricity companies and others to gain permissions, build support and get the technical details right.

For more information, consult C40's guidance on "Deploying Charging Infrastructure [here](#) and DOT's funding opportunities [here](#).

Action Item T8: Streamline permitting and inspection procedures for EV charging infrastructure.

Implementation Method:

1. Prioritize site selection in lower-income and underserved communities.
2. Incorporate community input into investment decisions including site selection, mode preference, amenities, and design.
3. Ensure that priority communities where charging infrastructure will be deployed are also provided with targeted EV incentives and awareness campaigns.

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4. Enhance mobility through strategies such as car share, mobility hubs, and EV infrastructure co-location with other transportation services.

For more information, read more on equitable distribution of EV parking infrastructure [here](#). For information on zoning requirements see DOE's guidance [here](#). For examples of parking ordinances see this [website](#).

Action Item T7: Evaluate and produce a plan to create more bikeable and walkable pathways with an emphasis on connecting homes to businesses.

Implementation Method:

1. Conduct a survey on desirability for walkable and bikeable pathways and potential locations.
2. Develop the plan and seek public review and comment.
3. Secure funding for the plan.

For more information, funding for bicycle and pedestrian can come from a variety of sources, such as from this biking [organization](#). Information on incorporating bikeable and walkable communities into municipality comprehensive plan can be found [here](#).

Electric Sector

Action Item E2: Identify suitable locations for installing large scale solar projects in abandoned locations, large, flat-roofed buildings (warehouses/distribution centers), closed landfills, and brownfields, and on public parking garages and buildings.

Implementation Method

1. Research and select a reputable solar company developer with experience in conducting solar assessments for public buildings. The Solar Energy Industries Association maintains a list of Virginia solar developers [here](#).
2. Draft a partnership agreement outlining the municipalities' needs.
3. Work closely with the solar company developer to conduct a preliminary assessment of public buildings to identify potential candidates for solar PV installations.
4. Engage relevant stakeholders, such as building owners, facility managers, and local government officials, to obtain necessary permissions and access to public buildings for conducting surveys and assessments.

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Land Use

Action Item L1: Support the adoption of a long-term plan for more sustainable development. This includes expanding public parkland and establishing natural green space guidelines in community planning.

Implementation Method:

Consider using the [EPA's Green Streets, Green Jobs, Green Towns](#) (G3) approach to implement more sustainable development. To implement a G3 approach a municipality should consider:

1. Repairing, resurfacing or replacing roadways and parking lots.
2. Repairing or replacing damaged sidewalks and curbs.
3. Upgrading or replacing utilities in the public right-of-way (e.g., sanitary sewer systems, storm sewer systems, drinking water supply lines).
4. Redeveloping vacant or abandoned properties.

For More information, consult EPA's Green Infrastructure Design and Implementation program [here](#).

Action Item L2: Streamline and clarify the process to achieve planting of native trees, food forest tree plantings, green landscapes, and managing non-native plants. Identify clear lines of government authority and processing. Identify challenges or obstacles and provide recommendations to overcome these.

Implementation Method:

Applicable grants:

1. *Virginia Trees for Clean Water Grant Program*

- *Funds tree planting efforts that raise public awareness of the benefits of trees and impact on water quality*
- *Available funding: \$1,000- \$50,000*

[Link](#)

2. *Urban and Community Forestry Grant*

- *Funds projects that promote protection and enhancement of urban and community forest ecosystems, tree planting, the care of trees, and education*
- *Available funding: for matching grants, up to \$50,000 on a 50% of total project basis. For non-matching grants under the Inflation Reduction Act, \$250,000*

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<ul style="list-style-type: none">• This is a reimbursement grant <p>Link</p>
<p>3. Community Forest Revitalization Program</p> <ul style="list-style-type: none">• A technical assistance program that encourages local government and citizen involvement in creating and supporting long-term and sustained community forestry projects and programs in underserved and disadvantaged communities.• Funds are administered through direct technical assistance instead of a typical dollar amount. <p>Link</p>

Waste and Wastewater

Action Item W1: Educate and inform residents about green infrastructure solutions for water conservation (natural or nature-based approaches such as constructed wetlands, rain gardens, and vegetation buffers).

Implementation Method:

1. Look to federal resources that provide education and information, such as EPA's Green Infrastructure [webpage](#). This site contains several case studies from other municipalities.

Action Item W2: Identify and promote best management practices to reduce harmful run-off of pesticides and chemicals into waterways.

Implementation Method:

1. The EPA provides resources on the best practices to reduce pesticide run-off from agriculture [here](#).
2. Utah State University provides best management practices to manage land and mitigate pollution of surface and groundwater [here](#). The best practices include agriculture, urban, and forest run-off.

Solid Waste

Action Item SW1: Conduct a feasibility study on food composting program (residents and businesses; drop off or curbside pick-up).

Implementation Method:

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1. One example of a food composting feasibility study can be found at the Washington DC Department of Public Works website [here](#). Per this study, the municipality contracted with Resource Recycling Systems to ascertain the feasibility and costs. The College Park, MD implemented a food scrap collection [program](#) that includes both collection and drop-off.

Organizational Structure

Action Item OSI: Create an energy and climate committee comprised of residents who are appointed and empowered to provide advice and recommendations to the City's leaders.

Implementation Method:

1. Determine the scope, objectives, and potential structure of an energy and climate committee. For example, see the charter for the Montgomery County, MD Energy and Air Quality Committee [here](#). The committee is comprised of about a dozen county residents who serve 2-year terms. The committee meets once a month with an assigned county employee, and its members discuss energy-related issues of importance to residents and provide recommendations to the county executive and council.
2. Present the proposal to the city/county council or relevant governing body for approval. Advocate for the establishment of the energy and climate committee by highlighting its potential benefits for the community, such as promoting sustainability, reducing greenhouse gas emissions, and enhancing resilience.
3. Advertise the opportunity for residents to apply or nominate candidates for the energy and climate committee. Utilize various outreach channels, including social media, local newspapers, community newsletters, and neighborhood associations. Ensure outreach efforts are inclusive and accessible to all residents.

Communication and Outreach

The Energy Action Plan will be posted on the municipality's website. The municipality will engage in efforts to inform residents about the plan, including annual updates. The municipality will also utilize various channels such as social media, workshops, and community events to raise awareness and foster engagement.

The greenhouse gas emissions modeling and inventory will be updated every five years. The Energy Action Plan should be evaluated, and amended as appropriate, in this same five-year period.

Monitoring and Verification

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Henry County will seek to implement two action items that will be important to ensure effective monitoring and verification.

1. Create an energy and climate committee comprised of residents who are appointed and empowered to provide advice and recommendations to the City's leaders.

2. Hire a Sustainability Specialist who will serve as the point person on all energy, climate, and resilience issues.

The energy and climate committee will consist of residents who volunteer to serve on the committee for a period, such as a two-year term, and meet monthly to discuss issues related to energy and the climate. A government employee serves as the liaison between the committee and the government. The committee has the potential to monitor and verify progress on the energy action plan and provide advice and guidance.

The sustainability specialist should be a new hire with responsibility for coordinating various parts of the energy action plan with the appropriate government offices. This person acts as the lead person to assist with implementation of the energy action plan.

CONCLUSION

The Energy Action Plan seeks to reduce the energy burden (costs) on Henry County residents, as well as ensuring equitable distribution of the benefits of energy savings. The plan also seeks to ensure energy independence, security, community-wide sustainability, and resilience.

This Plan represents a joint community-government effort at addressing mutual concerns about Henry County's energy and climate future. The Plan's success will depend on continued engagement with community members, both inside Henry County, throughout Virginia, and throughout the country.