Westchester County

George Latimer
County Executive

June 12, 2024

Westchester County Board of Legislators
800 Michaelian Office Building
White Plains, NY 10601

Dear Members of the Board of Legislators:

Transmitted herewith for your review is the Westchester County Local Government Operations Climate Action Plan. This plan was developed by my office, with assistance from the Hudson Valley Regional Council and Local Governments for Sustainability USA.

Westchester County has worked to develop an inventory of greenhouse gas emissions generated by County government, funded by a grant from the NYS Department of Environmental Conservation. This Climate Action Plan was funded by that same grant. The Plan identifies a series of goals and objectives for reducing our carbon emissions in line with the goals of New York State's Climate Leadership and Community Protection Act.

One of the conditions of the grant we received from NYS DEC is that the Plan be reviewed at a public meeting of the Board of Legislators.

I ask that you review and discuss this plan. We will continue to keep you informed, as we move forward in our development of further initiatives to reduce carbon emissions and promote environmental sustainability throughout Westchester County.

Sincerely,

George Latimer
Westchester County Executive

Office of the County Executive,
Michaelian Office Building,
148 Martine White Plains, New York 10601

Telephone: (914) 995-2900

westchestercountyny.gov

Westchester County

Local Government Operations Climate Action Plan

JUNE 2024

Produced by the Westchester County Executive's Office
with Assistance from the Hudson Valley Regional Council and
ICLEI – Local Governments for Sustainability USA

ICLEI
Local Governments for Sustainability
USA

HUDSON VALLEY REGIONAL COUNCIL

Credits & Acknowledgements

Local Government Officials and Staff

George Latimer, Westchester County Executive
Ken Jenkins, Deputy County Executive, Westchester County

Joan McDonald, Director of Operations, Westchester County
Peter McCartt, Director of Energy Conservation and Sustainability, Westchester County
Elijah Reichlin-Melnick, Assistant Director of Energy Conservation and Sustainability, WC
Edward May, Director of Program Development, WC Department of Public Works
Nat Federici, Deputy Commissioner, WC Department of Environmental Facilities
Hernane De Almeida, Deputy Commissioner, WC Dept. of Public Works & Transportation
Gayle Katzman, Deputy Commissioner, WC Department of Public Works & Transportation
Peter Tartaglia, First Deputy Commissioner, WC Department of Parks & Recreation
Anthony Finateri, Director of Administrative Services, WC Department of Public Works & Transportation
Lou Vetrone, Deputy Commissioner, WC Department of Environmental Facilities
Melissa Rotini, Assistant Commissioner, WC Department of Environmental Facilities
Cesar Vargas, First Deputy Commissioner, WC Department of Finance
David Kvinge, Assistant Commissioner of Planning, Environmental
Millie Magraw, County Planning Department

External Agencies and Partners

Mary Lambert, Climate Action Planning Institute Coordinator, Hudson Valley Regional Council
Caroline Dickey, Program Officer, ICLEI USA

We also acknowledge the support of and extend thanks to the Hudson Valley Regional Council (HVRC), and the International Council for Local Environmental Initiatives (ICLEI), and the representatives of the nine other municipalities in the Westchester Climate Action Planning Institute (CAPI) cohort: the Cities of Peekskill and White Plains, the Town of Ossining, and the Villages of Hastings-on-Hudson, Irvington, Ossining, and Tarrytown. CAPI is a facilitated, collaborative working group through which local governments develop individual government operations greenhouse gas emissions inventories and climate action plans to help bring state funding to the region for important climate change mitigation and adaptation projects.

CAPI is a program of the HVRC funded in part through a grant to Westchester County as lead applicant through the Climate Smart Communities Grant Program, Title 15 of the Environmental Protection Fund through the New York State Department of Environmental Conservation.

This Climate Action Plan was developed using a template provided by ICLEI – Local Governments for Sustainability, USA. This template and its appendices were published in June 2020.

Table of Contents

Executive Summary

Overwhelming evidence has led to the scientific consensus that climate change is the greatest environmental challenge of the 21st century. Scientists forecast that with the current trends in greenhouse gas (GHG) emissions, Americans will experience more intense heat waves, droughts, rainstorms, floods, wildfires and landslides in the future. These impacts will have significant repercussions on our economy, stress our natural resources and worsen inequities facing many Americans and millions of people across the globe.

Westchester County is no exception.

In recent years, Westchester has already experienced some of the consequences of a changing climate. Winters often have almost no snow. Heat waves come more frequently and last longer. Smoke from wildfires chokes our air and poses acute health risks to seniors and children. Increased coastal flooding from hurricanes, tropical and winter storms, and even monthly high tides impact neighborhoods. Extreme "100 year" rain events trigger flooding along streams and rivers every few years. Invasive plants and animals are showing up in the County, causing damage to property, agriculture, and the environment. It is increasingly clear that the impacts of climate change are hitting home in Westchester. Without action from all levels of government, these impacts will only become more severe in the years ahead.

Anthropogenic (human-caused) climate change is caused by the accumulation of GHGs such as carbon dioxide (CO2) and methane (CH4) in the atmosphere, primarily resulting from burning fossil fuels and land use changes. Although the natural greenhouse effect is needed to keep the earth warm, human activities have created an enhanced greenhouse effect due to the rapid accumulation of GHGs in the atmosphere. Unprecedented concentrations of these gases in the atmosphere has led to too much heat and radiation being trapped on Earth. Carbon emissions from human activities have soared in recent decades and are currently at the highest rates in human history. About half of all carbon dioxide emitted between 1750 and 2020 occurred in the last 50 years. The energy, industry and transportation sectors have dominated these emissions increases. With the current trajectory of population growth, urbanization, and reliance on personal vehicles, global transportation emissions are expected to double by 2050. Given the serious impacts of climate change on humanity, the time to act to reduce GHG and our carbon footprint is now.

Climate change is a global problem, and no one nation, let alone a single community acting alone, can mitigate or solve the issues it presents. To achieve globally significant reductions in GHG

emissions, international cooperation will undoubtedly be required. Yet with so much at stake, local communities cannot afford to wait on the actions of world leaders, and if many individual communities work to reduce their own GHG emissions, the collective impact on international GHG emissions can be substantial.

While climate change poses tremendous challenges, efforts to reduce GHG emissions also present opportunities for creating a healthier, safer, and more equitable world. By making changes to its government operations in ways that will benefit the planet and create long-term financial savings, Westchester County has the unparalleled opportunity to be a model for other local governments within the County and beyond its borders.

Since he began his term in office, County Executive George Latimer has prioritized making Westchester County a leader in climate issues and ensuring that the County takes meaningful steps to reduce emissions of greenhouse gases. To further this commitment, Westchester has produced this Government Operations Climate Action Plan which, it is hoped, will serve as a model for other local governments throughout New York State and beyond. As a guiding vision for this effort, Westchester County is committed to leading by example through sustainability improvements to all buildings, operations, municipal and community assets that both mitigate greenhouse gases and increase the County's capacity to withstand and adapt to climate change.

This Plan builds on the Inventory of Government Operations Greenhouse Gas Emissions for Westchester County, which was completed and released in the fourth quarter of 2023. That inventory, which is included in full as an appendix to this report, found that approximately 139,370 metric tons[1] of carbon dioxide equivalent emissions[2] were generated either directly or indirectly as a result of the actions of Westchester County's government and employees. The largest source of emissions were the operation of buildings and facilities, particularly the natural gas used to heat County facilities. Other major sources of emissions were the County's transit fleet, the closed Croton Point Landfill, employee commutes, wastewater treatment facilities, and the County's vehicle fleet.

Building on the inventory, this report examines how emissions generated by Westchester County government could be expected to change between 2019 and 2030 in the absence of new actions by

[1] It is customary to measure carbon emissions in metric tons. A metric ton = 1,000 kilograms or 2,205 pounds. A metric ton is approximately the same weight as 2-3 grand pianos, 32 golden retrievers, 98 bicycles, or 256 gallons of milk.

[2] Carbon dioxide (CO_2) is the most common greenhouse gas, by far. However, some other gases, including methane and nitrous oxide, also contribute to the greenhouse effect and add to the climate crisis. Because CO_2 accounts for such a large share of total greenhouse gas emissions, it is customary to equate other gases to CO_2 when discussing overall emissions. This is typically abbreviated as CO_2e for Carbon dioxide equivalent.

County government. The report finds that if no changes are made, emissions from County government are likely to drop approximately 6% from 2019 levels by 2030. Because that small reduction would not meaningfully impact the County's contribution to climate change, the report proposes a series of policy actions that, if enacted, are estimated to lead to a reduction in County government emissions of at least 33% below 2019 levels and an estimated reduction of at least 40% below 1990 levels, in line with the goals of New York State's Climate Leadership and Community Protection Act (CLCPA). This report also makes further recommendations for policy actions to be completed by 2050 in order to greatly reduce the County's emissions over the next quarter century. Because of the difficulty of modeling GHG reductions so far in the future, the ClearPath tool was not used to generate estimates of GHG reductions for the 2050 action steps. The years 2030 and 2050 were selected as target dates in order to align the County with the goals of the CLCPA which calls for reductions in GHG emissions of 40% below 1990 levels by 2030 and 85% below 1990 levels by 2050.

The proposed actions by the County fall broadly into three categories: Buildings & Facilities, Vehicle Fleet & Employee Commute, and Natural Resources. Recommended strategies for the County's buildings and facilities center on finding ways to decrease energy use through conversion of natural gas-powered HVAC systems to energy efficient electric systems, replacing incandescent and fluorescent lights with LEDs, reducing energy usage at wastewater treatment plants, and installing solar panels on County property where appropriate. Recommended strategies for reducing emissions generated by the vehicle fleet and employee commutes include continued conversion of gas and diesel powered County vehicles to EVs or hybrids, and encouraging commutes via bus and carpool. Recommended strategies for improving the County's management of its natural resources and managing emissions include planting trees, conserving additional land, converting landscaping equipment from gas powered to electric models, and reducing water used for landscaping and reducing mowing, where possible.

Because the baseline year for the County's GHG Inventory was 2019, some of these proposed actions are already well underway, while others will need to be completed between 2024 and 2030. It should be emphasized that this plan is meant to be a guide to the County's future climate actions, but is not a legally binding document. Westchester County will continue to exercise discretion to modify priorities and make decisions based on evolving circumstances and the progress of ongoing efforts. The non-binding nature of this document will allow the County to remain adaptable and responsive to future developments in the fight against climate change.

Purpose, Scope, Process, and Ongoing Actions

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5), comprised of hundreds of climate experts and scientists and has stated unambiguously that anthropogenic or "human-generated" GHG emissions are causing global climate change. For this reason, Westchester County is joining an increasing number of local governments committed to addressing climate change at the local level through reducing emissions in their own government operations and by supporting programs. A few of the programs pursued by the County in recent years to reduce its environmental impact are described below.

Electric Vehicle Fleet Expansion

The County is constantly expanding its fleet of electric vehicles including the Bee Line Bus system, with all buses either electric-hybrid or all electric. There are also two important pieces of local legislation that have been enacted; 20% of all parking spaces must have EV charging on them whenever work is done on a garage or lot, and an electric vehicle must be purchased for any vehicle being taken out of service as long as there is an available EV model for that class.

Westchester Compost and Education Center

CompostED is a municipal-scale food scrap composting demonstration and education site. The site provides educational opportunities for County residents, students, and particularly municipal officials on the environmental benefits of composting, the process of composting, and explore the ability of local entities to incorporate food scraps into existing organic yard waste composting sites. In addition, the County instituted a Residential Food Scrap Transportation & Disposal program, aggregating collected food scraps from the participating municipalities and hauling them to Sustainable Materials Management in Cortland Manor.

Westchester Action Plan for Climate and Sustainable Development

The Westchester Action Plan 2010 laid out a comprehensive, integrated, community-wide plan to translate leadership and vision on climate change and sustainable development into workable strategies that can generate practical actions for all sectors; County and municipal governments, educational institutions, businesses, and households. These actions, when implemented, ultimately did lead to reductions in GHG emissions and further promoted Westchester's future as a livable and

prosperous community. The reductions were both measurable and meaningful. The compact plan provided general policy guidelines for what changes could be made within Westchester County. These included enhancing public transportation, providing more green spaces, and protecting natural landscapes.

Energy Efficiency Capital Projects

Beginning in 2018 the County undertook an $85 million series of capital projects that would increase energy efficiency around buildings, operations, and our facilities. A cornerstone of this undertaking was the overhaul of the steam heating system on the Grasslands campus in Valhalla.

Demand Response Programs

Beginning in 2019 that County enrolled in several demand response programs wherein during extreme heat events the County would draw down our vast use of electricity at our facilities and buildings to decrease the load on the electric grid, thereby minimizing the need to use older coal and gas power plants that only operate at times of peak demand ("peaker plants") as well as eliminate the construction of new fossil fuel electricity generation facilities.

As these initiatives show, Westchester County recognizes the risk that climate change poses to its constituents, and is acting now to reduce the GHG emissions, or "carbon footprint," of its government operations. These actions will now be supplemented by the policies and programs laid out in this Climate Action Plan (CAP). Westchester's CAP takes advantage of common sense approaches and cutting-edge policies that our local government is uniquely positioned to implement – actions that can reduce energy use, waste, and fuel use for the County's vehicle fleet and employee commutes.

Purpose

The Westchester County Climate Action Plan drives and coordinates efforts toward a 40% reduction in local government GHG emissions of 1990 levels by 2030 and 85% below 1990 levels by 2050.

The Climate Action Plan is a framework for the development and implementation of actions that reduce Westchester County's government operations GHG emissions. The Plan provides guiding objectives and strategies to realize Westchester's government operations GHG reduction goals.

Scope

This Plan covers objectives and strategies for reducing GHG emissions resulting from local government operations within Westchester County. It addresses the major sources of emissions in Westchester's

infrastructure and operations and sets forth objectives and strategies in three focus areas that Westchester can implement to achieve greenhouse gas reductions: Buildings & Facilities, Vehicle Fleet & Employee Commute, and Natural Resources. The Plan creates a framework to document, coordinate, measure, and adapt efforts moving forward. Note that because this plan is focused on government operations, it does not evaluate emissions generated by private sources or other local governments within Westchester County or make recommendations to reduce those emissions.

Process

The development of this CAP involved many employees of Westchester County Government working together with other organizations and members of the public. The initial Greenhouse Gas Inventory that was conducted by Westchester was developed over the course of 2023 and this CAP builds off that inventory. This process was led by the County's Energy Conservation & Sustainability team, directed by Peter McCartt and assisted by Elijah Reichlin-Melnick. Many departments participated in this process including the Department of Public Works, Department of Environmental Facilities, Planning Department, and Parks & Recreation Department.

The Energy Conservation & Sustainability team met regularly with members of these departments to seek input and guide the development of this plan. The ECS team also met frequently with the Hudson Valley Regional Council and ICLEI-Local Governments for Sustainability. Westchester County's Climate Crisis Taskforce was also engaged to provide input and guidance during the process.

The CAPI Planning Team consisted of Director of Energy Conservation & Sustainability Peter McCartt, Assistant Director of Energy Conservation & Sustainability Millie Magraw, Assistant Commissioner of Planning for Environmental Issues David Kvinge, Deputy Commissioner at the Department of Public Works Gayle Katzman, County Planner Millie Magraw, Assistant Director of Energy Conservation & Sustainability Elijah Reichlin-Melnick and the County's Climate Crisis Taskforce, composed of volunteers.[3]

Vision Statements and Objectives

Westchester County is committed to serving as a model local government and leading by example in the fight against climate change, by improving the sustainability of County buildings and facilities, vehicle fleets, and government operations so as to mitigate greenhouse gases and increase the County's capacity to withstand and adapt to climate change. Specifically, the County's vision is to:

1. Make Westchester County a leader in clean and local energy that comes from the sun, wind, or other innovative renewable technologies.
2. Transform Westchester County facilities into high-performing and energy efficient places to work.

[3] As of 2024, the members of the Climate Crisis Taskforce are: Jason Baker, Lisa Copeland, Janet Harckham, Gwen Jones, Andrew Ratzkin, Suzie Ross, Leo Weigman, and Ellen Weininger

3. Preserve additional natural areas and improving the sustainability of management practices at existing County parks.
4. Promote less carbon-intense methods of commuting for county employees including via carpool, bus, train, biking, or walking.
5. Rapidly transition toward a clean, carbon-free transit system that improves health and livability for Westchester County residents
6. Become a leader in sustainable municipal vehicle fleets, transitioning away from gas and diesel powered vehicles as soon as possible.
7. Mitigate potential climate-related risks while preparing Westchester County's infrastructure for chronic and extreme weather events.

The Climate Action Plan offers a robust set of objectives and strategies that will address the climate hazard vulnerabilities and aim for a 40% reduction in local government GHG emissions from 1990 levels by 2030 and an 85% reduction from 1990 levels by 2050 both of which are aligned with New York State's Climate Leadership Community Protection Act (CLCPA) goals. Each strategy and objective was created and reviewed through an internal engagement and input process where participants considered technology limitations, the feasibility of implementation, environmental justice considerations, and other barriers.

The following targets were set to maintain and support safe, efficient, and sustainable facilities and operations. The County aims to complete all goals as soon as is practicable. In many cases this may mean that a goal to be completed "by 2030" or "by 2050" may actually be completed sooner; those years are the latest a goal will be achieved, not the earliest.

By 2030 Westchester County Will...

- Upgrade 15% of HVAC systems at County-owned buildings
- Convert 80% of County-owned facilities to 100% LED lighting
- Convert 100% of County-owned street lights to LED lighting
- Conduct energy audits of 50% of County-owned buildings
- Expand real-time energy metering to 35% of County-owned buildings
- Reduce energy used at County wastewater treatment facilities by 15%
- Increase the amount of solar panels on County-owned property by 20%
- Create a revolving loan fund for efficiency projects
- Ensure that all project bid requests include additional language reflecting the County's sustainability goals

- Convert 85% of the County's gas-powered vehicles and light trucks to EVs or plug-in hybrids
- Convert 5% of the County's heavy duty vehicles to EVs or plug-in hybrids
- Convert 100% of the Bee-Line & ParaTransit buses to EVs or plug-in hybrids
- Increase the number of employees commuting by bus by 5%
- Increase the number of employees using carpooling 5%
- Reduce water used for landscaping of County properties by 5%
- Reduce mowing on 5% of County-owned acreage currently mowed
- Conserve an additional 250 acres as part of the County Parks system
- Plant 10,000 trees on County-owned property
- Convert 50% of lawn and landscaping equipment to electric models

By 2050 Westchester County Will...

- Upgrade 60% of HVAC systems at County-owned buildings
- Convert 100% of County-owned facilities to 100% LED lighting
- Conduct energy audits of 100% of County-owned buildings
- Expand real-time energy metering to 100% of County-owned buildings
- Reduce energy used at County wastewater treatment facilities by 30%
- Increase the amount of solar panels on County-owned property by 50%
- Expand revolving loan fund for efficiency projects
- Ensure that all project bid requests include additional language reflecting the County's sustainability goals
- Convert 100% of the County's gas-powered vehicles and light trucks to EVs or plug-in hybrids
- Convert 35% of the County's heavy duty vehicles to EVs or plug-in hybrids
- Convert 100% of the Bee-Line & ParaTransit buses to EVs or plug-in hybrids
- Increase the number of employees commuting by bus by 15%
- Increase the number of employees using carpooling 10%
- Reduce water used for landscaping of County properties by 15%

- Reduce mowing on 15% of County-owned acreage currently mowed
- Conserve an additional 1,250 acres as part of the County Parks system
- Plant 20,000 trees on County-owned property
- Convert 100% of lawn and landscaping equipment to electric models

Background

Climate Change Basics

The Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report affirms that "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."[4] Researchers have made progress in their understanding of how the Earth's climate is changing in space and time through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties and a wider variety of measurements.[5] These refinements expand upon the findings of previous IPCC Assessments – today, observational evidence from all continents and most oceans shows that "regional changes in temperature have had discernible impacts on physical and biological systems."

[4]. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland, 151 pp

[5]. IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

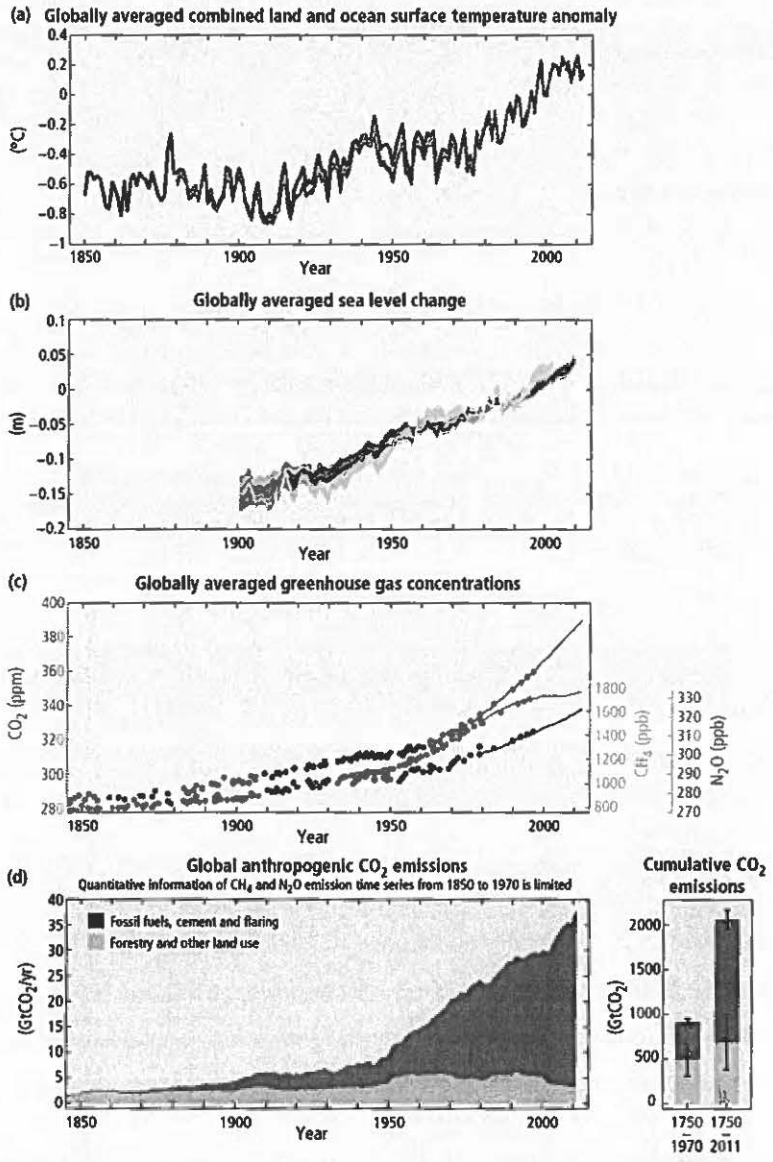


Figure 1: Observations and other indicators of a changing global climate system[6]

The Fifth Assessment asserts that "it is *extremely likely* that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in GHG concentrations and other anthropogenic forces. Globally, economic and population growth continue to be the most important drivers of increases in CO_2 emissions from fossil fuel combustion. Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to

---

[6]. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland, 151 pp

human influences, including a decrease in cold temperature extremes, an increase in warm temperature extremes, an increase in extreme high sea levels and an increase in the number of heavy precipitation events in a number of regions".

In short, the Earth is already responding to climate change drivers introduced by human actions.

Globally Increasing Temperatures and Extreme Weather Events

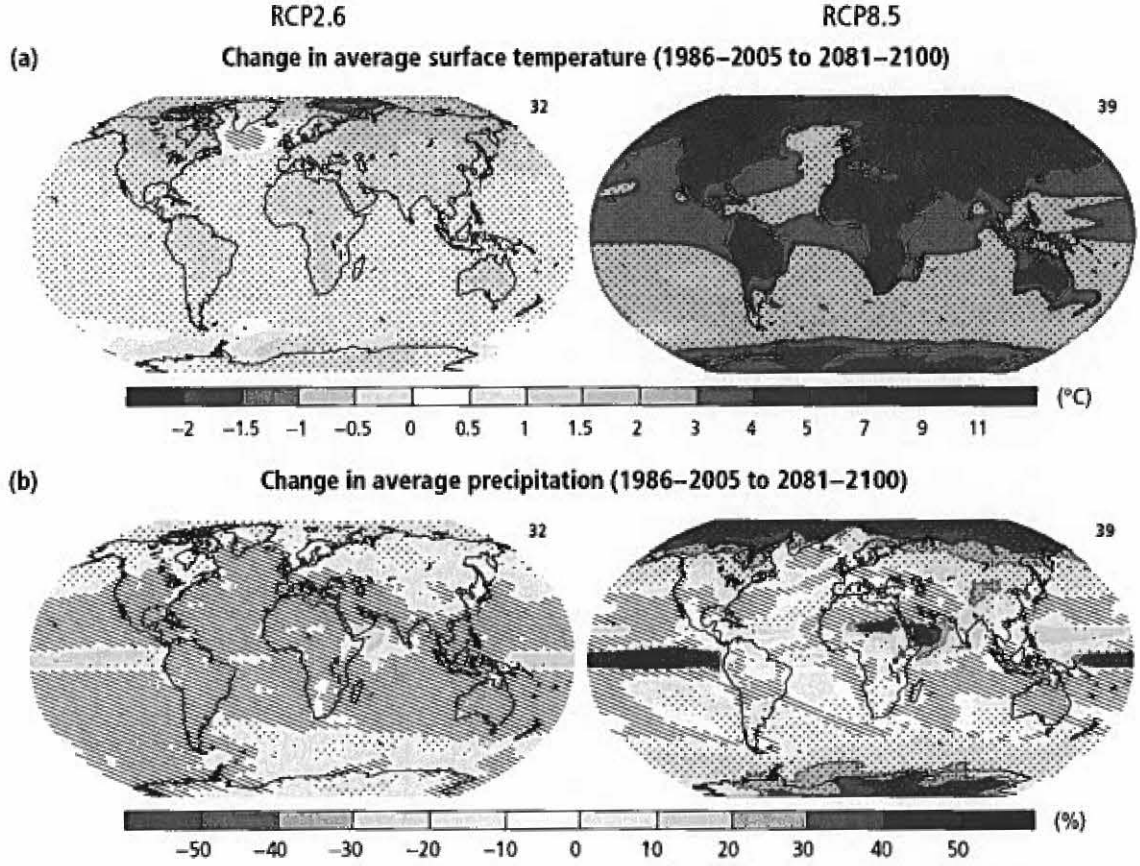


Figure 2: Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios.

Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level to rise. Changes in many extreme weather and climate events have been observed since about 1950. Some of these changes have been linked to human influences, including a decrease in cold temperature extremes, an

increase in warm temperature extremes, an increase in extreme high sea levels, and an increase in the number of heavy precipitation events in a number of regions.[7]

Climate Risks

Climate change is expected to cause significant negative effects on food security. Due to projected climate change by the mid-21st century and beyond, global marine species redistribution and marine biodiversity reduction in sensitive regions will challenge the sustained provision of fisheries productivity and other ecosystem services. For wheat, rice and maize in tropical and temperate regions, climate change is projected to negatively impact production under local temperature increases of 2°C or more above late 20th century levels, although in some cases individual locations may benefit. Global temperature increases of ~4°C or more above late 20th century levels, combined with increasing food demand, would pose drastic risks to food security globally. Climate change is projected to reduce renewable surface water and groundwater resources in most dry subtropical regions, intensifying competition for water among sectors.

Until mid-century, projected climate change will impact human health mainly by exacerbating health problems that already exist. Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions, particularly in developing countries. Health impacts include greater likelihood of injury and death due to more intense heat waves and fires, increased risks from foodborne and waterborne diseases and loss of work capacity and reduced labor productivity in vulnerable populations. Risks of undernutrition in poor regions will increase. Risks from vector-borne diseases are projected to generally increase with warming, due to the extension of the infection area and season, despite reductions in some areas that become too hot for disease vectors.

In urban areas, climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges. These risks are amplified for those lacking essential infrastructure and services or living in exposed areas. Rural areas are expected to experience major impacts on water availability and supply, food security, infrastructure and agricultural incomes, including shifts in the production areas of food and non-food crops around the world.

Climate change is projected to increase displacement of people. Populations that lack the resources for planned migration experience higher exposure to extreme weather events, particularly in developing countries with low income. Climate change can indirectly increase risks of violent conflicts by amplifying well-documented drivers of these conflicts such as poverty and economic shocks.[8]

---

[7] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland

[8] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K Pachauri, and L.A. Meyer (eds.)]. Geneva, Switzerland

Local and Regional Climate Context

Climate Impacts

In Westchester County, the impacts of climate change are likely to be felt in multiple ways.

Sea Level Rise & Storm Surge

Westchester has dozens of miles of coastline along the Hudson River and Long Island Sound which makes the county highly vulnerable to the effects of rising sea levels. Countless properties used for commercial, industrial, residential and recreational purposes are located near the coast only a few feet above sea level. These assets are highly vulnerable to the impacts of storm surge during major flood events. The tracks of Metro-North's Hudson Line (which is also used by Amtrak trains) are particularly vulnerable since they run adjacent to the Hudson River, nearly at the water level, for miles. Westchester County maintains seven wastewater treatment facilities which are all located very close to sea level and are vulnerable to storm surges and rising sea levels. Other County-owned facilities, especially recreational assets such as Rye Playland are particularly vulnerable to the impacts of rising sea level and storm surge flooding.

Rainfall & Flooding

While coastal flooding is a major concern, Westchester is also vulnerable to freshwater flooding caused by increasingly severe and frequent storms generated by a warming climate. Already, major storms routinely cause serious flooding along the Saw Mill River, Bronx River, and other inland waterways. With climate change leading to more frequent heavy rain events, this type of stormwater flooding is anticipated to increase in frequency and severity. Impacts will be felt in damage to homes, businesses, and public infrastructure, disruptions to travel, and greater costs for county and local governments.

Rising Temperatures & Heat

As the climate warms, scientists forecast that heat waves will increase in frequency and severity. Hotter days and warmer nights will leave people, especially vulnerable populations like seniors and people without access to air-conditioning at serious risk of illness or death. Westchester contains many buildings built before the invention of central air cooling systems and not all of them have been retrofitted with air-conditioning. The residents of these older structures may struggle to deal with rising temperatures. Increased need for air-conditioning will also lead to increased energy use, straining power systems. Westchester already participates in a demand response program with Con-Edison that has been effective at incentivizing county government to reduce energy use at periods of peak demand.

Comparison of Local to Statewide Goals

Westchester County has chosen to align its reduction goals with statewide goals. The Climate Leadership and Community Protection Act (CLCPA), signed into law on July 18, 2019, sets goals to reduce emissions to 40% below 1990 levels by 2030 and then to 85% below 1990 levels by 2050. According to the 2022 Statewide GHG

Emissions Report[9], NY has already reduced emissions by 7% from 1990 levels, and this report assumes a similar reduction in Westchester. Therefore, the County is setting its 2030 goal at a further 33% reduction from 2019 levels and its 2050 goal at a 78% reduction from 2019 levels.

Table 1: Comparison of Local and Statewide Goals

Year	State Legislation	Percent Reduction	Local Targets	Percent Reduction
Baseline				
2030	CLCPA	40%	CLCPA	40%
2050	CLCPA	85%	CLCPA	85%

[9] https://www.dec.ny.gov/docs/administration_pdf/ghgsumrpt22.pdf

Co-Benefits of Climate Protection Measures

1. Saving Money

In addition to addressing climate change, measures taken to reduce GHG emissions have other important benefits, such as the potential for significant cost savings. The transition from gas-powered to electric vehicles, for instances, is expected to save millions of dollars a year in fuel costs. Shifting to LED lights from traditional incandescent or fluorescent bulbs saves money on energy costs. Many of the measures in this plan pay for themselves quickly by reducing direct costs, such as fuel or energy used, as well as indirect costs such as maintenance.

Improving energy efficiency, encouraging public transit use, installing on-site renewables, and other measures will also result in lower energy and water bills for Westchester County. Acting now will also save on runaway costs on climate change, especially in the longer term, such as from infrastructure damage from more frequent and intense extreme storms.

2. Enhancing Resource Security

A key strategic side benefit of climate change mitigation activities is enhanced energy security through reduction in total demand. This will put less strain on the energy system as a whole as we transition to clean renewable energy. Many of the actions identified here to mitigate GHG emissions will also help Westchester County's government adapt to a changing climate. For example, extreme and prolonged heat waves can put considerable strain on the reliability of energy delivery in peak periods, possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across Westchester County facilities, such service disruptions are less likely and the County will be able to better cope with those situations.

3. Creating Jobs

The renewable energy industry has become a leading sector in job growth. The U.S. Bureau of Labor Statistics expects solar installers and wind technicians to be the two fastest-growing jobs through 2026. Energy efficiency jobs are also growing rapidly. These climate protection measures in this plan can spur business and job growth during the design, manufacture, and installation of energy efficient technologies and other green sectors. This presents a particular opportunity to reinvest in the local economy and generate green jobs within Westchester.

4. Improving Public Health

Climate change mitigation activities, particularly those related to transportation, help to clean the air by reducing vehicle emissions and therefore improve public health throughout the community. Transportation mitigation strategies often focus on encouraging the use active transportation, such as biking and walking, to get to work. Westchester County employees who increase their use of active transportation will benefit from a healthier lifestyle.

5. Delivering Benefits to Disadvantaged Communities

Social equity is a major concern for addressing climate change. Research shows that vulnerable populations such as the elderly or chronically ill, low income families and people of color are more at risk when it comes to experiencing impacts of climate change. These communities already experience institutional and systematic disadvantages that result in less access to resources, capital, and services. Climate change exacerbates these gaps. By targeting programs and making changes to services or infrastructure before extreme events happen, we can mitigate the most devastating impacts to already vulnerable populations.

6. Protecting the Environment

Climate change will pose increasing risks to the sustainability of many ecosystems, as animals and plants struggle to adapt to higher temperatures, and new invasive species cause havoc for native plants and animals. Several of the strategies and goals outlined in the Natural Resources section have important co-benefits that will benefit local environments by protecting natural areas and maintaining other properties in a more natural state. Doing so will create and preserve wildlife habitat and improve biodiversity.

Climate Equity Within Westchester County

Equity is when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential. Low income populations, communities of color, people with disabilities, seniors, refugees and immigrants, and other vulnerable communities often bear the brunt of climate impacts without the necessary infrastructure and support systems, and without gaining the benefits of a clean and sustainable future. Inequity correlates with greater vulnerability to physical challenges, making many in Westchester County disproportionately at risk from natural disasters and the impacts of climate change.

Creating a resilient community means addressing the social inequities that cause disparities in health outcomes, income, educational attainment, and more. Communities of color and low-income populations have historically been under-served by programs and investments and under-represented in decision making on climate policy. Lack of low-carbon, safe transportation options and inefficient housing are examples of disparities experienced by these communities that result in fewer benefits from climate action opportunities. These inequities often result from historical discriminatory practices that have resulted in the inequitable distribution of resources and access to opportunities persisting into the present day. Climate change is likely to amplify the impacts of these existing inequities.

Climate equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. This requires intentional policies and projects that simultaneously address the effects of and the systems that perpetuate both climate change and inequity.

Climate equity is integrated into this plan in several ways including:

- Climate equity is included in the overall Climate Action Plan vision and objectives.
- Each of the strategies in this plan was evaluated on whether they help to promote climate equity and reduce disparities.
- Westchester County will determine climate equity specific metrics to help track the progress made on these actions and allow Westchester to report on the targets.

Westchester County's Local Government Operations Emissions

Inventory Basics

Since the early 1990s, U.S. cities have developed community-wide and local government operations greenhouse gas inventories based on accounting protocols created by ICLEI. Known as the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and the Local Government Operations Protocol, these standards created a credible and defensible methodology which accelerated the number of inventories created and provides consistency within and across U.S. communities. In 2014, ICLEI partnered with the World Resources Institute and C40 Climate Leadership Group to create the Global Protocol for Community Scale GHG Emissions, which allows communities around the world to compare their emissions footprint. Westchester County used the Local Government Operations Protocol for the inventory described in this report. The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

The following activities are included in the LGO inventory:

- Energy and natural gas consumption from buildings & facilities
- Wastewater treatment processes
- On-road transportation from employee commute and vehicle fleet including public transit
- Emissions from closed landfills
- Energy from streetlights and traffic signals
- Operation of heavy duty refrigerating equipment

In accordance with these protocols, an inventory of government operations emissions only examines emissions that are directly attributable to sources that are owned and under the operational control of local governments. The reason for this limitation is to ensure that when sources of emissions are identified, the local government has the ability to implement plans to reduce those emissions. If the emissions are being generated from a source that is outside the control of a local government, that local government would lack the authority to bring about reductions in emissions from that source.

So, for example, emissions generated by electricity use at the County Emergency Management Center were included because the County owns and operates the facility, while emissions generated by the factory that produces communications equipment for the County's Emergency Services Department were not included (even though there might theoretically be a factory that produces communications equipment while generating lower emissions) because Westchester does not own or operate the facility.

Due to this protocol, the County's inventory did not include emissions generated by Wheelabrator Westchester in this inventory. The County does not own the land on which the facility is located and the operations of the facility are not under the operational control of County government. Therefore, it is outside the authority of the County Executive and Board of Legislators to implement reductions in emissions at this facility. If the County pursues a community-wide inventory of GHG emissions, the emissions from Wheelabrator Westchester, and all other facilities operated by parties outside of County government would be included. A long term plan that minimizes the material sent to this facility would be in the best interests of county residents and the County is already a leader in initiatives that are reducing waste that goes to this facility.

Summary of Inventory Results

For this Climate Action Plan, Westchester County completed a Local Government Operations Inventory Report in 2023 that used 2019 as a baseline. 2019 was chosen because it was the last full year prior to the COVID pandemic that disrupted society and rendered the years 2020-2022 far out of the ordinary. This inventory was conducted using the Local Government Operations Inventory and ICLEI's ClearPath tool. Through this inventory, Westchester County determined its overall emissions in 2019 to be 139,370 metric tons of carbon dioxide equivalent ($MTCO_2e$). The Buildings & Facilities sector was the largest source of emissions, with 49,624 $MTCO_2e$ which was 35.6% of the total emissions (Figure 1). The second highest source of emissions was the Transit Fleet (the Bee Line and paratransit buses) which accounted for 30,038 MT (21.6%), followed closely by emissions generated by off-gassing from the long-closed Croton Point landfill, 29,554 MT (21.2%). County employees on their commute to and from work generated approximately 12,288 metric tons of emissions (8.8%). The operation of water and wastewater treatment facilities generated 9,331 metric tons of emissions (7.1%) and the operation of the County's fleet of vehicles, including police cars, dump trucks, snow plows, etc. generated an additional 7,386 metric tons of emissions (5.3%). The full Inventory Report can be found in the Appendix.

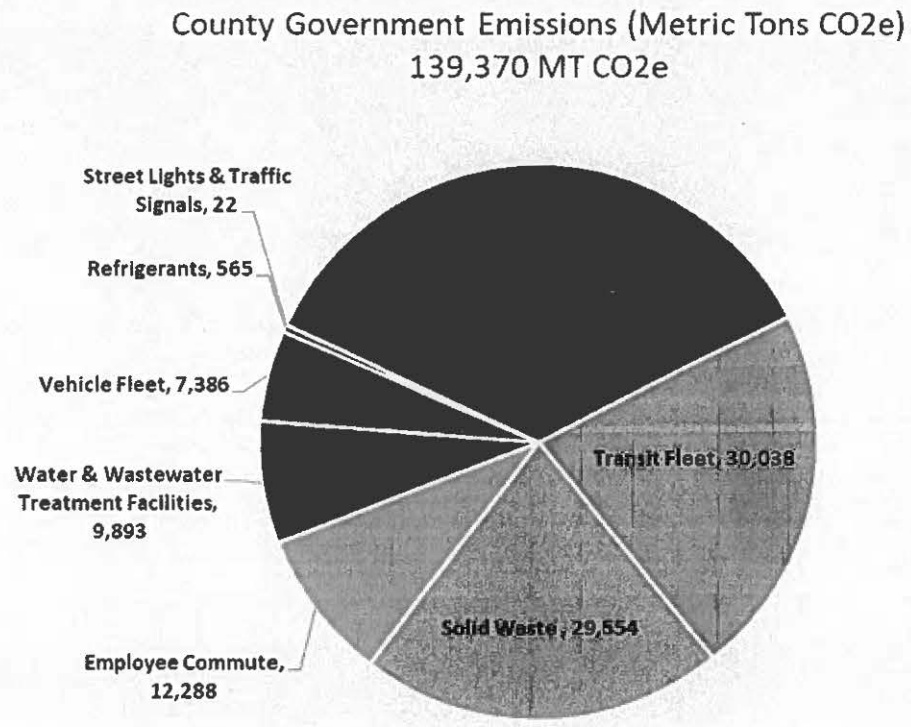


Figure 3: Westchester County 2019 Local Government GHG Emissions Inventory

Westchester County's Projected Change in Local Government Operations GHG Emissions

Westchester County has also completed an emissions forecast based on projections of current data and expected future trends. The emissions forecast is a "Business-As-Usual" (BAU) forecast, a scenario estimating future emissions levels if no further local action (i.e. projects within this Climate Action Plan) were to take place. As the chart below illustrates, the forecast indicates that, if the County does not take action, GHG emissions generated by the operations of county government would fall less than 6% from 2019 levels by 2030. The CLCPA's goal, which the County is aligned with, is a 40% emissions reduction by 2030, so a reduction of only 5-6% is clearly insufficient. To achieve a greater reduction and meet the CLCPA targets, the County plans to implement a series of steps which will be explained in the following section of this report.

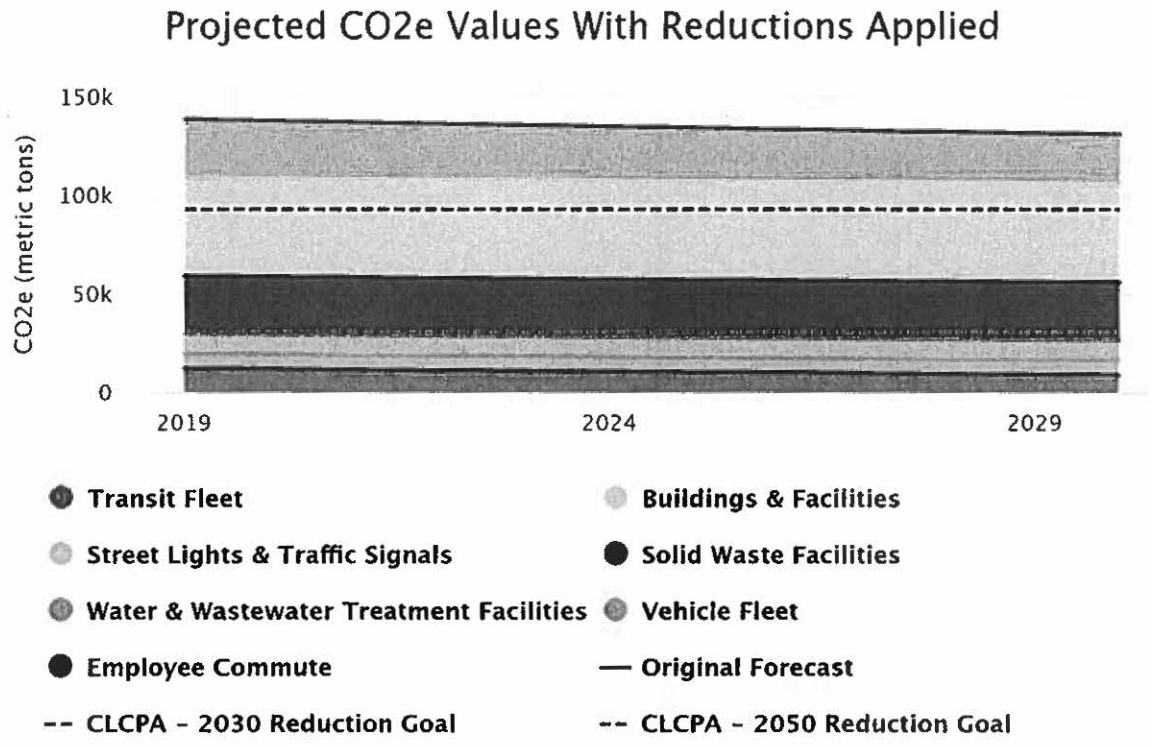


Figure 4: Westchester County "Business as Usual" Emissions Forecast

Government Operations Climate Mitigation

Emissions Reduction Focus Areas

Each of the focus areas within the Westchester County Local Government Operations Climate Action Plan is explored in the following pages. In this Climate Action Plan, Westchester County has decided to focus Climate Mitigation measures on three focus areas: Buildings & Facilities, Vehicle Fleet & Employee Commute, and Natural Resources.

In each focus area, a series of objectives with supporting strategies are outlined. An "Objective" is a broad plan to mitigate emissions in a focus area, and a "Strategy" is an action designed to help realize the objective. For most objectives, the County is setting two goals, one indicating what will be accomplished by 2030, and another what will be accomplished by 2050. Unless otherwise noted, all 2050 goals are inclusive of 2030 goals. So for instance, a goal stating a 20% increase by 2030 and a 50% increase by 2050 indicates a cumulative 50% increase over 2019 levels (20% by 2030 and an additional 30% by 2050), not a 70% increase over 2019 levels. Additionally, each objective contains an indication of which County department or departments have responsibility for advancing these goals. The County aims to complete all goals as soon as is practicable. In many cases this may mean that a goal to be completed "by 2030" or "by 2050" may actually be completed sooner; those years are the latest a goal will be achieved, not the earliest.

The summary table below (Table 2) identifies the focus areas within Westchester County's Local Government Operations Climate Action Plan, the number of strategies within each focus area, and the contribution of each focus area toward the GHG reduction goal. Each focus area has a dedicated section within this document where specific actions (both new and those already employed) are described. Through this plan, Westchester County can not only do its part toward achieving a more stable climate - it can also reap the benefits of healthier air, savings on energy costs, improved government services, and many other positive side effects of reducing its carbon footprint.

Table 2: Westchester County Climate Action Plan Summary Table – Focus Areas

Focus Area	Description	Number of Distinct Goals
Buildings & Facilities	Policies and programs to reduce County government energy usage, interfacing with local utility efforts.	9
Vehicle Fleet & Employee Commute	Policies and programs to reduce County government vehicle fleet fuel usage, including transition to electric vehicles and encourage lower-emissions commuting methods	5
Natural Resources	Policies and programs to protect additional natural areas and better manage the properties that the County already owns	5

Emissions Reduction Potential

Calculating expected emissions reductions for each objective requires making assumptions about the degree of implementation, technology, and individual behavioral changes many years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or strategy. While the expected emissions reductions for some objectives were measured using the ClearPath tool provided by ICLEI, other objectives could not be as precisely estimated.

Co-Benefits

In addition to measuring the GHG reduction potential, each strategy was also evaluated for other benefits such as public health, equity and justice, jobs and prosperity, and environmental conservation.

Climate Action Objectives

Buildings and Facilities

Westchester County's buildings and facilities are powered by electricity and natural gas. The consumption of fossil fuels for heat and energy on-site contributes directly to the government's emissions, and much of the electricity used for lighting, heat and other operations is generated from burning fossil fuels as well.

Energy consumed in County owned and operated buildings and facilities (not accounting for the wastewater treatment plants) account for approximately 36% of county government's total GHG emissions. Energy use by the County's seven wastewater treatment facilities was calculated separately, so the true share of emissions

generated by buildings and facilities is actually even higher than 36%. Improving the efficiency of Westchester County's buildings and infrastructure will contribute significantly to achieving the GHG reduction targets, while saving money on utility bills.

To achieve these goals, the County is focusing on the following objectives.

Objective 1 – Upgrade HVAC Equipment

Since 2019, Westchester County has completed approximately 15-20 projects to upgrade and improve HVAC equipment in County facilities with newer, more energy efficient equipment. As part of new construction projects, HVAC systems are being converted to all-electric, though electric service upgrades are often needed with this amount of increase in facility electric load. Among the projects completed or currently underway that will feature HVAC systems no longer reliant on natural gas are the maintenance building at the Dunwoodie Golf Course in Yonkers, the Visitor Center at Cranberry Lake Park in North White Plains, and the farmhouse at Merestead park in Mount Kisco.

Strategy: Maintain a full inventory of HVAC equipment with clear plans for when it needs to be replaced. Prioritize replacing HVAC systems with all electric equipment.

Goal: By 2030, upgrade an additional 15% of HVAC systems at County-owned buildings to all-electric. By 2050, upgrade 60% of HVAC systems to all-electric.

Co-Benefits: Shifting away from natural gas will reduce expenses to the county related to gas service. Reductions in burning gas will improve local air quality.

Departments Responsible: Public Works

Objective 2 – Convert Light Fixtures, Including Street Lights to LEDs

Conversion of traditional incandescent and fluorescent bulbs to low-energy LEDs is one of the easiest steps a local government can take to reduce energy use and thereby reduce emissions of GHG. Westchester County has already made great strides towards converting light fixtures to LEDs since 2019, and continues to upgrade fixtures on a constant basis. For example, the Michaelian County Office Building in White Plains is undergoing installation of new LED fixtures in early 2024 as part of a NYPA capital project. Other County-owned buildings in White Plains will follow. Lights in the bus garages that serve the county's bus system have also been converted to LEDs in recent years. In total, approximately 3,000 interior and exterior light fixtures have been converted to LEDs since 2019, according to the Department of Public Works, and about 30% of County facilities now have 100% LED lighting.

Westchester County does not own many streetlights; most streetlights in the county are owned by the village, town, or city in which they are located. However, the County does own and maintain streetlights on some of the parkways and on larger properties such as the Grasslands Campus in Valhalla. Even before the GHG Inventory baseline year of 2019, many of these streetlights had already been converted to LEDs[10], which is one reason why GHG emissions attributable to the energy from streetlight use were lower than any other source studied in the inventory.

Conversion of remaining streetlights is proceeding on an ongoing basis. By the end of 2024 it should be complete at the Grasslands Campus. Replacement of lights on the Bronx River Parkway is anticipated in the near future under the management of the Parks Department.

Strategy: Identify remaining non-LED streetlights and light fixtures and prioritize them for replacement.

Goals:

a. **By 2030, convert 80% of County-owned facilities to 100% LED lighting. By 2050, convert 100% of County-owned facilities to 100% LED lighting.**
b. **By 2030, complete the conversion of 100% of County-owned street lights to LEDs.**

Co-Benefits: Switching to LEDs will nevertheless lead to reductions in county energy costs and savings to taxpayers.

Departments Responsible: Public Works

Objective 3 – Improve Energy Efficiency in County Buildings & Facilities

In addition to converting to LEDs, the County will focus on identifying ways to improve energy efficiency in County-owned buildings and facilities, which could include "superinsulation" technologies that have been proven to dramatically reduce heating and cooling costs. The 17 largest buildings operated by the County now have smart meters that can assist the Department of Public Works in optimizing building energy use, especially for the Demand-Response Program.

Strategies: Work with NYPA to conduct energy audits of county-owned buildings.

Goals:

a. **By 2030, conduct energy audits of 50% of County-owned buildings by 2030. By 2050, conduct energy audits of 100% of County-owned buildings.**

[10] For example, the streetlights on Playland Parkway and on the perimeter road around the county jail fall into this category, having been upgraded to LEDs before 2019.

b. **By 2030, expand real-time energy metering to 35% of County-owned buildings. By 2050, expand real-time energy metering to 100% of County-owned buildings.**

Co-Benefits: Becoming more energy efficient will lead to reductions in county energy costs and savings to taxpayers.

Departments Responsible: Public Works

Objective 4 – Upgrade Wastewater Treatment Facilities

Westchester County operates seven wastewater treatment facilities, in Yonkers, Ossining, Peekskill, New Rochelle, Mamaroneck, Port Chester, and Blind Brook. These facilities generated approximately 7% of the County government's total GHG emissions in 2019, making improvements at these facilities a valuable goal for decreasing the County's contributions to climate change.

Recognizing this fact, the County has already begun to take a number of steps to increase efficiency and modernize these facilities. The following are projects that are anticipated to be completed by 2030.

a. Yonkers Engine Replacement Project – This project will replace two existing engine generators that currently run on either anaerobic digester gas (ADG) or natural gas with two higher efficiency engine generators that are capable of running on ADG and/or natural gas or in combination of the two. Once completed, the new engines will be able to utilize more of the ADG that is a natural byproduct of the bio-solids treatment process, reducing the amount of natural gas consumed by the facility. Currently, due to the limitations of the existing engines, some of the ADG produced is wasted and burned in the flares. These engines are currently in production with construction completion scheduled for early 2025.

b. Installation of smaller more energy efficient turbo-blowers at several of the wastewater treatment facilities. The Department of Environmental Facilities installed five turbo-blowers at the Yonkers facility in 2019, which improved the efficiency of the facility's operation. The smaller turbo-blowers employ a newer technology and utilize less energy to deliver the required amount of air to biological treatment tanks. Blowers are the number one source of energy consumption at wastewater treatment facilities. Future plans include the addition of four more turbo-blowers at the Yonkers facility and new turbo-blowers to replace the existing blowers at the Mamaroneck facility. Besides being more efficient per cubic foot per minute of air delivered, the smaller units allow the operators to incrementally utilize air as the demand varies throughout the day, as well as seasonally. Additionally, the Ossining, Peekskill, and Port Chester facilities will be replacing their respective blowers with efficient units.

c. Boiler upgrades at the Mamaroneck, Blind Brook, New Rochelle, Peekskill, and Port Chester facilities. Each of the boilers to be replaced are at or near their expected useful life and will be replaced with newer, more efficient boilers.

d. Each of the seven facilities will be going through either partial or full electrical upgrades. The upgraded electrical systems will incorporate energy savings technology that is representative of the newer electrical systems and instrumentation technologies.

Strategies: Continue making upgrades to the equipment at the County's wastewater treatment facilities

Goal: By 2030, reduce energy used at County wastewater treatment facilities by 15% from 2019 levels. By 2050, reduce energy used by 30% from 2019 levels.

Departments Responsible: Environmental Facilities

Objective 5 – Install Solar Panels on Available Locations

Installation of solar panels on County-owned buildings, facilities, and properties can help reduce the amount of energy from the grid that Westchester County government needs to operate. Already, solar panels have been installed on the Department of Emergency Services building on Walker Rd. in Valhalla. Four additional buildings are planned, and 2 solar canopies are scheduled for the Special Operations Division garage sometime in the next year.

Strategy: The Department of Public Works and Planning Department will identify the best locations for solar panel installation. Put a particular focus on identifying locations where solar canopies can be added to existing parking lots, which is often quicker and more affordable to do than new rooftop solar panels.

Goal: By 2030, increase the amount of solar panels on County property by 20% from 2019 levels. By 2050, increase the number of solar panels by 50% from 2019 levels.

Departments Responsible: Public Works

Objective 6 – Find Creative Ways to Incentivize New Energy Efficiency Projects and Reduce Greenhouse Gas Emissions Associated with Construction

In addition to the objectives mentioned above, the County will focus on creative ways to promote and incentivize new energy efficiency projects while utilizing the procurement and contracting process to encourage the adoption of greener building and construction standards by contractors doing business with the County. In 2023, the County became a certified Green Purchasing Community under the New York State Department of Environmental Conservation. Although this is an important step, this plan proposes seeking to go further by having the County take steps to make project scoping documents and bid requests include language referencing increased sustainability goals for contractors, including use of low-carbon concrete and others green building techniques.

This report envisions the creation of an internal revolving fund for efficiency projects that can help to spur the completion of new capital projects focused on improving energy efficiency and reducing GHG emissions. The fund could be available only for Westchester County government projects, or could potentially be made available to municipalities within the County as well.

Strategies: Conduct a policy review of the County's contracting process. Work with County Legislature to set up a revolving loan fund for efficiency projects.

Goals:

a. **By 2030, create a revolving loan fund for efficiency projects.**
b. **By 2030, ensure that all project bid requests include additional language reflecting the County's sustainability goals.**

Departments Responsible: Finance, Planning, County Executive, County Legislature

Vehicle Fleet & Employee Commutes

As of 2019, Westchester County's vehicle fleet (excluding buses) included over 1,300 on-road vehicles, including police cars, dump trucks, snow plows, vehicles for County employees and many others. Within this fleet, 62% of vehicles were gas-powered in 2019, 19% used diesel fuel, and 19% were gas-electric hybrids. The County also owned and operated more than 3,000 off-road vehicles and powered equipment such as lawn movers, snow blowers, hedge trimmers, leaf blowers, or portable light trailers for highway work. In 2019, emissions from the County's vehicle fleet were 7,386 metric tons of CO_2e, accounting for 5% of the Countywide total.

Westchester County also owns and operates two public transit systems, the Bee-Line Bus system which serves the general population, and the Bee-Line ParaTransit system, which serves elderly people and people with disabilities. These systems are robust, with dozens of routes, and more than 65% of Westchester live within walking distance of a Bee-Line bus route. Though running these buses undoubtedly helps reduce overall County carbon emissions by allowing people to get around without driving personal vehicles, the operation of these buses does also generate GHG emissions. In 2019, the Bee-Line buses traveled almost 10 million miles while the ParaTransit system traveled over 4.3 million miles. In 2019, the Bee-Line system used 2.6 million gallons of fuel, which generated 27,019 metric tons of CO2e and the ParaTransit system used 341,624 gallons of fuel which generated an additional 3,019 metric tons of CO2e. Collectively, the operation of the County's transit system generated 30,038 metric tons of CO2e in 2019, 21.6% of the total for County government. Collectively, the emissions generated by the vehicle fleet and public transit system accounted for 26.6% of the County's total emissions in 2019.

Besides emitting GHGs, transportation fuels such as gasoline and diesel also produce a host of criteria air pollutants when combusted, reducing local air quality and affecting residents' health.

Transitioning the municipal vehicle fleet to electric vehicles (EVs) and other low-carbon fuel sources will contribute significantly to achieving Westchester County's GHG reduction targets, while saving the government money on fuel costs and improving local air quality. The objectives that follow focus on opportunities to use more efficient vehicles and to electrify the vehicle fleet and aims to ensure that future activities in the sector are compatible with the local government and community climate protection goals.

Objective 1 – Electrify the Vehicle Fleet

Since 2019, approximately half of the county's motor pool fleet has been converted to EVs or plug-in hybrids, and the Department of Public Works, which manages the County's vehicle fleet, has maintained a constantly-updated inventory of the County's vehicles with a focus on conversion away from gas-powered vehicles. Though replacement of gas-powered cars and light trucks with EVs and hybrids has been rapid, conversion of the County's heavy vehicle fleet, which includes dump trucks, bulldozers, heavy construction equipment and more, has been slower. This is because heavy equipment typically has a longer useful life than passenger cars, and because many pieces of specialized equipment are not yet available at all in EV/hybrid versions, or are prohibitively expensive. Conversion of these heavier vehicles will depend on industry adoption and availability of EV versions of these vehicle classes.

Strategy: Continue to maintain an ongoing inventory of vehicles in the fleet, with a focus on replacing gas and diesel powered vehicles with EVs or hybrids.

Goals:

a. By 2030, convert 85% of the County's gas-powered vehicles and light trucks to EVs or plug-in hybrids. By 2050, convert 100% of these vehicles to EVs or plug-in hybrids.

b. By 2030, convert 5% of heavy duty vehicles to EVs/hybrids. By 2050, convert 35% of heavy duty vehicles to EVS/hybrids.

Co-Benefits: Shifting away from natural gas will reduce expenses to the county for purchasing fuel. Reductions in burning gas and diesel will improve local air quality.

Department Responsible: Public Works

Objective 2 – Electrify the County's Transit Fleet

In 2019, the baseline year used for the GHG Inventory, the buses of the Bee-Line and ParaTransit system generated more than 21% of the County's GHG emissions. However, since then, the County has replaced all of the older diesel-powered buses in the Bee-Line system with newer electric and electric-hybrid vehicles, which has undoubtedly contributed to substantial reductions in transit-related GHG emissions relative to the 2019 base year. The County will continue to maintain an all EV/hybrid transit fleet and begin converting the ParaTransit buses to EV/hybrid.

Goal: By 2030, convert 100% of the ParaTransit system to EV or plug-in hybrid.

Co-Benefits: Shifting away from natural gas will reduce expenses to the county for purchasing fuel. Reductions in burning gas and diesel will improve local air quality.

Department Responsible: Public Works

Objective 3 – Encourage Lower-Emission Commutes

As of 2019, Westchester had more than 4,600 County employees (excluding hourly workers), nearly all of whom commuted to work on a regular basis. Because these commutes occurred as a direct result of the operations of County government, the emissions generated by these commutes were accounted for in the County's GHG Inventory Report. Based on the employee commute survey responses, the Inventory Report estimated that the 90% of County employees who drove themselves to work drove an estimated 36.6 million miles to and from work in 2019. A much smaller number of County employees who lived outside of Westchester took a bus to get to work, and added an additional 1.1 million miles. In total, employee commutes generated an estimated 12,288 metric tons of CO2e in 2019, 8.8% of the County total GHG emissions. In order to reduce the emissions generated by employee commutes, the County will pursue several strategies.

Approximately 7% of employees who took the employee commute survey said that they sometimes commuted by bus. Fare-free promotions have been successful in generating additional Bee-Line ridership, though more work needs to be done to explore whether these additional rides represented people who would otherwise have driven, or simply people who would otherwise not have traveled

but chose to because the ride was free. More convenient buses (more frequent, new routes, longer hours of service) may also generate some new riders among employees who would shift their commuting mode.

To encourage employees to carpool, the County can support the Smart Commute Program and programs such as 511 Rideshare.

Strategies:
Encourage the construction of additional protected bike lanes in partnership with local municipalities and improved pedestrian infrastructure.

Goals:

a. Expand free bus fare and Bee-line promotions to encourage employees to use county bus system. By 2030, aim for a 5% increase in commutes by bus relative to 2019 levels and by 2050, a 15% increase in commutes by bus relative to 2019 levels.

b. By 2030, increase the share of county employees who carpool by 5% from 2019 levels. By 2050, increase the share by 10% from 2019 levels.

Department Responsible: County Executive, County Legislature, Planning

Natural Resources

Though the bulk of emissions reductions will come from the strategies and objectives outlined above, the County also envisions improving its practices in the field of natural resources and parks in order to reduce GHG emissions and meet its sustainability goals.

Westchester County's Parks System comprises nearly 18,000 acres currently. Maintaining this system requires the use of machinery and equipment including mowers, leaf blowers, hedge trimmers, etc. and the extensive use of water to keep lawns, fields, and flower beds green and healthy. Finding ways to reduce the energy and water use associated with the Parks system, while seeking to expand protected natural areas and plant new trees will help Westchester County reduce its GHG emissions and meet climate goals.

Conducting a natural resources inventory, as the Planning Department is currently doing, will allow the identification of significant or vulnerable areas that should be protected either through acquisition by government purchase or by negotiation of conservation easements with private landowners.

Identifying areas on existing County properties that can be watered and/or mowed less frequently and allowed to return to a natural or semi-natural state will reduce water and energy use while also having important benefits for wildlife and biodiversity. Conversion of equipment to electric models rather than gas-powered models will also yield emissions savings.

Strategies:

Conduct a natural resources inventory, a process that the Planning Department is currently undertaking, working with GIS. This project will be ongoing and continuously updated.

Work with private landowners to secure conservation easements in important natural areas.

Goals:

a. By 2030, reduce water used for landscaping by 5% from 2019 levels. By 2050, reduce water used by 15% from 2019 levels.

b. By 2030, reduce or end mowing on 5% of acreage currently mowed. By 2050, reduce it by 15%.

c. By 2030, conserve an additional 250 acres as part of the County Parks system, and by 2050, conserve 1,250 acres, increasing the size of the Parks system by about 7% by 2050. Priority should be given to acquiring additional open space in or near environmental justice communities.

d. By 2030, plant 10,000 trees on County-owned property, by 2050 plant 20,000 trees County-owned property. Priority should be given to planting trees on County-owned property located in environmental justice communities.

e. By 2030, convert 50% of lawn equipment (mowers, leaf blowers, hedge trimmers, etc.) to electric. By 2050, convert 100% of equipment.

Departments Responsible: Public Works, Parks, Planning, County Executive, County Legislature

Goals & Strategies Table

Goal	Emissions Reduction Potential	Costs	Timeline	Department(s) Responsible	Priority
Upgrade HVAC equipment	High	High	Underway	Public Works	High
Convert light fixtures to LEDs	Medium	Low	Underway	Public Works	High
Conduct energy audits of County buildings	Medium	Medium	By 2030	Public Works	High
Expand real-time energy metering	Low	Low	Underway	Public Works	Low
Reduce energy used at wastewater treatment facilities	Medium	High	Underway	Environmental Facilities	Medium
Install solar panels on available locations	Medium	Medium	Underway	Public works	High
Conduct a policy review of County contracting process	Medium	Low	By 2030	Finance, Planning, County Legislature, County Executive	Low
Create a revolving loan fund for efficiency projects	Low	Dependent on the size of the fund	By 2030	Finance, County Legislature, County Executive	Medium
Convert motor pool fleet to EV/hybrid	High	Medium	Underway	Public Works	High
Convert heavy vehicles to EV/hybrid	High	High	By 2030	Public Works	High

Convert Bee-Line buses to EV/hybrid	High	High	Completed	Public Works	High
Convert ParaTransit system to EV/hybrid	High	High	By 2030	Public Works	High
Encourage/incentivize low-emission employee commutes	Low	Low	Underway	County Executive, County Legislature, Planning	Low
Conduct a natural resources inventory	Low	Low	Underway	Planning	Low
Reduce water used for landscaping	Low	Low	By 2030	Parks, Public Works	Low
Reduce frequency of mowing	Low	Low	By 2030	Parks, Public Works	Medium
Conserve additional open space areas	Medium	High	By 2030	Planning, Parks, County Executive, County Legislature	Medium
Plant trees on County property	Medium	Low	Underway	Parks, Public Works	High
Convert lawn & landscaping equipment to electric models	High	Medium	By 2030	Parks, Public Works	High

Projected Change in GHG Emissions

In order to estimate how much the implementation of the strategies and goals outlined above would reduce Westchester County government emissions, the County utilized the ClearPath tool provided by ICLEI which allows municipal governments to model various strategies for reducing emissions. Not every goal could be quantified and measured in ClearPath, but many were. Because of this limitation, the resulting estimate of emissions reductions likely understates the total amount of reductions that could be achieved if the County successfully pursues all of the goals in this report. In addition, some goals that were modeled have aspects that couldn't easily be modeled. For example, while the model estimates the emissions impact of reducing vehicle miles traveled in personal cars for employee commuting, it does not estimate reductions in emissions from employees who continue to drive in their own cars but who may be driving an EV or hybrid rather than a gas-powered car by 2030. Given that most estimates suggest that the share of EVs and hybrids will be much larger in 2030 than in 2019, it is safe to assume that the emissions generated by County employees commuting to work will fall by a substantial amount that the ClearPath model does not account for.

The following 2030 goals were modeled in ClearPath:

- Upgrading 15% of HVAC systems
- Converting 100% of streetlights to LED
- Reducing Wastewater Treatment Facility energy use by 15%
- Converting 100% of the transit fleet to EV or hybrid.
- Converting 90% of the County motor pool and 5% of the heavy duty vehicles in the County's vehicle fleet to EV or hybrid
- Increasing bus commutes by 5% and carpooling by 1%
- Modeling the expected reduction in emissions from the Croton Point Landfill

Figure 2 shows the projected change in GHG emissions in Westchester County's government operations from 2019-2030. The emission change shown in the forecast below is based on population growth, employee count projections, electricity grid decarburization projections, and changes expected in automotive fuel efficiency standards. Westchester County's Local Government Operations "business as usual" forecast (the solid blue line on the chart below) shows that barring any change in County policy, emissions would decrease by approximately 5.6% from 138,802 MTCO2e in 2019 to 131,136 MTCO2e in 2030.

Since Westchester County has set targets to reduce its local government operations emissions to 40% below 1990 levels by 2030 and 85% by 2050, the "business as usual" forecast clearly points to the need to take actions to in order to reduce emissions enough to hit these targets. The specific goals and objectives planned by the County are described in the sections of this report that follow. Collectively, these efforts are expected to reduce

the County's GHG emissions to approximately 88,730 MTCO2e by 2030, a drop of 33% from 2019 levels. Coupled with the assumed 7% drop in emissions between 1990 and 2019, a further drop of 33% between 2019 and 2030 would bring the County's total 1990-2030 GHG Emissions reduction to 40%, in-line with the CLCPA's targets.

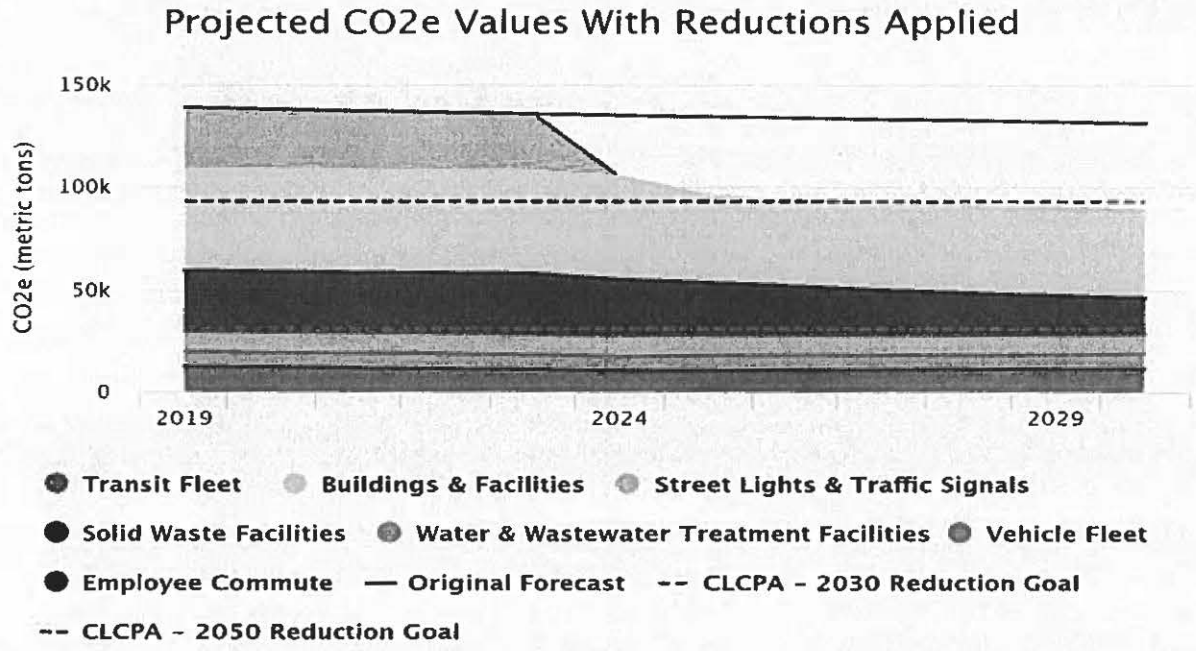


Figure 5: Projected Change in GHG Emissions from 2019 to 2030

Emissions from solid waste in the chart above come from the County's Croton Point Landfill. Even though the landfill has been closed since 1986, methane produced by the decaying of solid waste continues to be a major source of GHG emissions for Westchester as of 2019. Despite the fact that no new waste had been deposited at the landfill in 33 years, as of 2019, the landfill generated 29,554 metric tons of emissions, 21.2% of the total. Though methane capture is a proven way to reduce emissions from old landfills, not every landfill is suitable for this type of project. According to the Department of Environmental Facilities, since as far back as 2017, engineering firms working on various projects at the landfill have advised DEF that the landfill is producing a diminishing volume of gas the quality of the gas is not sufficient to sustain a methane capture project. While the amount of emissions coming from the landfill is concerning, the trends are in the right direction. Since 2010, emissions generated by the landfill are down more than 25% and appear on track to continue a steady decline in the years to come, as indicated in the chart above.

Monitoring Plan

Some of the goals and objectives of Westchester County's Local Government Operations Climate Action Plan are already well underway while others will be started in the years to come. Monitoring the County's progress towards achieving the climate goals outlined in this plan is an extremely important step to ensuring that the County remains on track to hit the GHG reduction targets for 2030 and 2050. Therefore, the County intends to conduct an annual assessment of its progress towards achieving the goals and objectives set for 2030 and 2050. The assessment will be initiated and produced by the Energy Conservation & Sustainability team in consultation with the Department of Public Works, Department of Environmental Facilities, Planning Department, Parks Departments, and other relevant departments and stakeholders. The County will share the annual assessment with the Climate Crisis Taskforce. With the approval of this Local Government Operations Climate Action Plan in June, 2024, the first annual assessment of progress towards these goals will be undertaken in July, 2025, covering the first year since the adoption of the report, and released in the third quarter of 2025.

The County will also aim to produce an upgraded Local Government Operations Greenhouse Gas Inventory every five years, with the next inventory report targeted for release in 2028.

To assist in the production of annual assessments and updated GHG Inventories, the County will evaluate the need for additional resources for the Energy Conservation & Sustainability team.

Appendix: Westchester County Local Government Operations Greenhouse Gas Inventory

See attached document.

Westchester County

Inventory of Government Operations Greenhouse Gas Emissions

OCTOBER 2023

Produced by the Westchester County Executive's Office
with Assistance from the Hudson Valley Regional Council and
ICLEI – Local Governments for Sustainability USA

Credits and Acknowledgements

George Latimer, Westchester County Executive
Ken Jenkins, Deputy County Executive, Westchester County

Joan McDonald, Director of Operations, Westchester County
Peter McCartt, Director of Energy Conservation and Sustainability, Westchester County
Elijah Reichlin-Melnick, Assistant Director of Energy Conservation and Sustainability, WC
Edward May, Director of Program Development, WC Department of Public Works
Nat Federici, Deputy Commissioner, WC Department of Environmental Facilities
Hernane De Almeida, Deputy Commissioner, WC Dept. of Public Works & Transportation
Gayle Katzman, Deputy Commissioner, WC Department of Public Works & Transportation
Peter Tartaglia, First Deputy Commissioner, WC Department of Parks & Recreation
Anthony Finateri, Director of Administrative Services, WC Department of Public Works & Transportation
Lou Vetrone, Deputy Commissioner, WC Department of Environmental Facilities
Melissa Rotini, Assistant Commissioner, WC Department of Environmental Facilities
Cesar Vargas, First Deputy Commissioner, WC Department of Finance

Mary Lambert, Climate Action Planning Institute Coordinator, Hudson Valley Regional Council

Caroline Dickey, Program Officer, ICLEI USA

The Climate Action Planning Institute (CAPI) is a *program* of the Hudson Valley Regional Council. *This program has been funded in part through a grant to the County of Westchester as lead applicant through the Climate Smart Communities Grant Program, Title 15 of the Environmental Protection Fund through the New York State Department of Environmental Conservation.*

Table of Contents

Tables and Figures

List of Tables

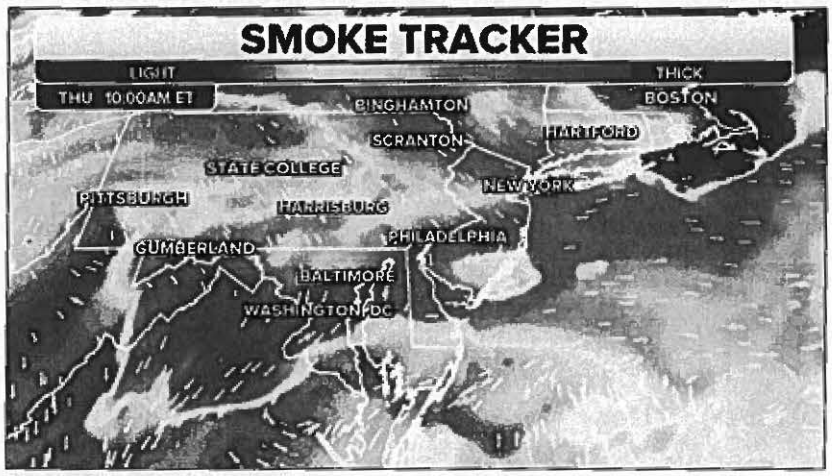
List of Figures

Introduction

Greenhouse gas (GHG) emissions from human activity are the leading cause of profound climate change across the globe, the consequences of which pose substantial risks to the future health, wellbeing, and prosperity of communities everywhere.

Westchester County is no exception.

In recent years as the planet warms, Westchester has already experienced some of the consequences of a changing climate. Winters with almost no snow. Heat waves come more frequently and last longer. Smoke from wildfires chokes our air and impacts seniors and children. Increased coastal flooding from hurricanes, tropical and winter storms, and even monthly high tides. Extreme "100 year" rain events that trigger flooding along streams and rivers occur every few years. Invasive plants and animals are showing up in our County, causing damage to property, agriculture, and our environment. It couldn't be clearer that the impacts of climate change are hitting home in Westchester. Without action from all levels of government, these impacts will only become more severe in the years ahead.



In June, 2023, Westchester County and much of the northeast was blanketed by dangerous levels of smoke from wildfires in Canada

Climate change is a global problem, and no one nation, let alone a single community acting alone, can mitigate or solve the issues it presents. The biggest impacts on reducing GHG emissions will undoubtedly rely on international cooperation. Yet with so much at stake, local communities cannot afford to wait on the actions of world leaders, and if many individual communities work to reduce their own GHG emissions, the collective impact on international GHG emissions can be substantial.

Since he began his term in office, County Executive George Latimer has prioritized making Westchester County a leader in climate issues and ensuring that the County takes meaningful steps to reduce emissions of greenhouse gases. To further this commitment, Westchester is undertaking a Government Operations Climate Action Plan of which this Inventory of Government Operations Greenhouse Gas Emissions forms a crucial first step. This inventory establishes a baseline of emissions data against which future efforts to reduce emissions can and will be measured.

Scope of Inventory

This inventory only covers emissions attributable to Westchester County government, however, several local governments are also undertaking a concurrent effort to inventory their own GHG emissions through the Climate Action Planning Institute, an initiative of the Hudson Valley Regional Council. The communities participating in this process are the Cities of Peekskill and White Plains, the Town of Ossining, and the Villages of Irvington, Hastings-on-Hudson, Ossining, Pelham, and Tarrytown. Each of these municipalities will be issuing a separate report.

It is important to emphasize what this inventory includes, and what it does not. First, and most importantly, this is an inventory only of GHG emissions produced by Westchester County government. It is **not** an inventory of all GHG emissions produced within Westchester County by all sources, and emissions produced from private property or from other public property not owned and operated by Westchester County are not included within this inventory. Among the sources of emissions attributable to Westchester County government are: energy used by County-owned buildings, facilities, and street lights; emissions from County owned vehicles, including the Bee-Line bus system, emissions generated by County employees on their commutes to and from work, methane and nitrogen produced by wastewater treatment facilities, and off-gassing from closed landfills. Examples of emissions that are not attributable to Westchester County and are therefore not included in this inventory would include: energy used by businesses or residential buildings in Westchester County; energy used by Westchester Community College, other colleges, libraries, public housing authorities or other public entities that are not owned and operated by Westchester County even though they are located within the County. As explained in the report, the Wheelabrator Westchester facility was not included because the facility is not under the operational control of Westchester County government.

A second important point of clarification is that this inventory surveys emissions produced by the operations of County government in 2019, **not in 2023**. The selection of 2019 as the

"baseline year" for which emissions was studied was driven by the impacts of the COVID pandemic. Because of COVID, neither 2020, 2021, or 2022 were fully "normal" years with respect to the operations of County government and employee commutes, and 2023 has not yet concluded. As such, 2019 was chosen as the baseline because it was the most recent full year that preceded the disruptive effects of the COVID pandemic. All data referenced in this report, except where otherwise noted, refers to 2019.

Existing/Ongoing Westchester County Programs

The current Climate Action Plan and this Inventory of Government Operations Greenhouse Gas Emissions is only the most recent of Westchester's many efforts to promote climate sustainability. Additionally, various state laws and programs will require Westchester to reduce emissions in the coming years.

Westchester Electric Vehicle Fleet Expansion

The County is constantly expanding its fleet of electric vehicles including the Bee Line Bus system, with all buses either electric-hybrid or all electric. There are also two important pieces of local legislation that have been enacted; 20% of all parking spaces must have EV charging on them whenever work is done on a garage or lot, and an electric vehicle must be purchased for any vehicle being taken out of service as long as there is an available EV model for that class.

Westchester Compost and Education Center

CompostED is a municipal-scale food scrap composting demonstration and education site. The site provides educational opportunities for County residents, students, and particularly municipal officials on the environmental benefits of composting, the process of composting, and explore the ability of local entities to incorporate food scraps into existing organic yard waste composting sites.

In addition, the County instituted a Residential Food Scrap Transportation & Disposal program, aggregating collected food scraps from the participating municipalities and hauling them to Sustainable Materials Management in Cortland Manor.

Westchester Action Plan for Climate and Sustainable Development

The Westchester Action Plan 2010 laid out a comprehensive, integrated, community-wide plan to translate leadership and vision on climate change and sustainable development into workable strategies that can generate practical actions for all sectors; County and municipal governments, educational institutions, businesses, and households. These actions, when

implemented, ultimately did lead to reductions in GHG emissions and further promoted Westchester's future as a livable and prosperous community. The reductions were both measurable and meaningful. The compact plan provided general policy guidelines for what changes could be made within Westchester County. These included enhancing public transportation, providing more green spaces, and protecting natural landscapes.

Energy Efficiency Capital Projects

Beginning in 2018 the County undertook an $85 million series of capital projects that would increase energy efficiency around buildings, operations, and our facilities. A cornerstone of this undertaking was the overhaul of the steam heating system on the Grasslands campus in Valhalla.

Demand Response Programs

Beginning in 2019 that County enrolled in several demand response programs wherein during extreme heat events the County would draw down our vast use of electricity at our facilities and buildings to decrease the load on the electric grid, thereby minimizing the need to use older coal and gas power plants that only operate at times of peak demand ("peaker plants") as well as eliminate the construction of new fossil fuel electricity generation facilities.

What is Climate Change?

Since the 19th Century, it has been well understood that naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect.

Over the past half century, overwhelming evidence has been accumulated by scientists around the world that shows that human activities are increasing the concentration of greenhouse gases in the atmosphere, which is causing significant changes to the global climate. The most significant contributor to climate change is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases (GHG) into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise. Left unchecked, rising global temperatures threaten the safety, quality of life, and economic prosperity of countries and communities around the globe.

Although the natural greenhouse effect is needed to keep the earth warm, a human-enhanced greenhouse effect is leading to the rapid accumulation of GHG in the atmosphere, causing too much heat and radiation to be trapped. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report published in 2021 confirms that human activities have unequivocally caused an increase in carbon emissions since pre-industrial times.[1] Many regions are already experiencing the consequences of global climate change, and Westchester County is no exception.

The IPCC Sixth Assessment Report found that human activities are estimated to have caused approximately 1.0°C (1.8°F) of global warming above pre-industrial levels, with a likely range of 0.8°C (1.4°F) to 1.2°C (2.2°F). The Report estimated with high confidence that global warming is likely to reach 1.5°C (2.7°F) between 2030 and 2052 if it continues to increase at the current rate. It also concluded with high confidence that warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts. The risks for natural and human systems increase the hotter the climate gets; so risks are higher for global warming of 1.5°C (2.7°F) than at present, but lower than if the climate

[1]IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

warms by 2°C (3.6°F). These risks depend on the magnitude[2]and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options.[3]

According to the 2019 National Climate Assessment, the northeast United States is already experiencing substantial impacts from climate change. Severe weather is occurring more frequently, with storms dropping record levels of rain and causing damaging flooding. Warmer winters and earlier springs are making it easier for damaging invasive species to thrive and are altering ecosystems and threatening wildlife. These impacts will continue to intensify with global warming and the steady disruption of seasonal temperatures. Many people visit and move to Westchester for its stable and mild climate, clean environment, and proximity to the cultural and economic center of New York City, however, deteriorating air and water quality as well as severe weather events present serious health risks to people in Westchester and throughout the Hudson Valley. Without substantial action, the negative impacts of climate change on Westchester County will only increase in the years and decades to come.[4]

Many communities in the United States have started to take responsibility for addressing climate change at the local level. Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, when residents save on energy costs, they are more likely to spend at local businesses and add to the local economy. Reducing fossil fuel use improves air quality, and increasing opportunities for walking and bicycling improves residents' health.

---

[3]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.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

[4] U.S. Global Change Research Program. 2019. National Climate Assessment – Ch 19: Southeast. Retrieved from https://nca2019HYPERLINK "http://about:blank".globalchange.gov/chapter/19/

ICLEI Climate Mitigation Milestones

In response to the climate emergency, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries, as well as influencing regional emissions through partnerships and advocacy. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, waste diversion, and more, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, also shown in Figure 2:

1. Conduct an LGO inventory and forecast of local government greenhouse gas emissions;
2. Establish a greenhouse gas emissions target;
3. Develop an LGO climate action plan for achieving the emissions reduction target;
4. Implement the climate action plan; and,
5. Monitor and report on progress.

Figure 1: Framework for Local Government GHG Reductions

This report represents the completion of ICLEI's Climate Mitigation Milestone One and provides a foundation for future work to reduce greenhouse gas emissions by Westchester County's government.

Greenhouse Gas Inventory as a Step Toward Carbon Neutrality

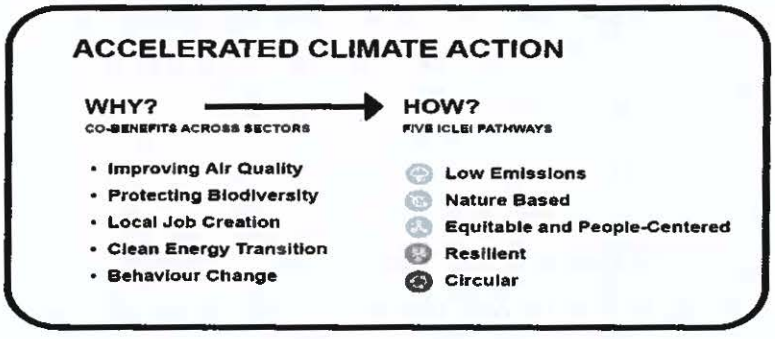
Facing the climate crisis requires the concerted efforts of local governments and their partners, those that are close to the communities directly dealing with the impacts of climate change.

Cities, towns, villages, and counties are well placed to define coherent and inclusive plans that address integrated climate action: climate change adaptation, resilience, and mitigation. Existing targets and plans need to be reviewed to bring in the necessary level of ambition and outline how to achieve net-zero emissions by 2050 at the latest. Creating a roadmap for climate neutrality requires Westchester County to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and other benefits of sustainable government operations.

To complete this inventory, Westchester County utilized tools and guidelines from ICLEI - Local Governments for Sustainability (ICLEI), which provides authoritative direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance in government operations and across the community in all sectors to an absolute net-zero emission level at the latest by 2050. In parallel to this, it is critical to adapt to climate change and enhance climate resilience across all sectors, in all systems and processes.

Figure 2: ICLEI Climate Mitigation Milestones



To achieve ambitious emissions reduction, and move toward climate neutrality, Westchester County will need to set a clear goal and act rapidly following a holistic and integrated approach.

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions is to identify baseline emissions levels and the sources and activities generating emissions. This report presents emissions from operations of Westchester County's government. As local governments continue to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol).

Figure 3: Typical Relationship of Community and Government Operations Inventories

As the chart at right illustrates, emissions from government operations represent only a small piece of overall community emissions. Most community emissions are generated by people and private businesses, making change much harder to implement, while emissions generated by government operations can more easily be reduced by policy changes within the government.

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Many of the charts in this report represent emissions in "carbon dioxide equivalent" (CO_2e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report.

Local Government Operations (LGO) Protocol

In 2010, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released Version 1.1 of the LGO Protocol. The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

The following activities are included in the LGO inventory:

- Energy and natural gas consumption from buildings & facilities
- Wastewater treatment processes
- On-road transportation from employee commute and vehicle fleet including public transit
- Waste and methane collection from government owned and operated landfills
- Emissions from closed landfill
- Energy from streetlights and traffic signals
- Operation of heavy duty refrigerating equipment

In accordance with these protocols, the inventory of government operations emissions only considers emissions that are directly attributable to, or come from sources that are owned and under the operational control of local governments. The reason for this limitation is to ensure that when sources of emissions are identified the local government has the ability to implement plans to reduce those emissions. If the emissions are being generated from a source that is outside the control of a local government, that local government would lack the authority to bring about reductions in emissions from that source.

So, for example, emissions generated by electricity use at the County emergency management center would be included because the County owns and operates the facility, while emissions generated by the factory that produces communications equipment for the County's emergency services department would not be included (even though the factory might theoretically produce lower emissions if Westchester used different equipment) because Westchester does not own or operate the facility.

Due to this protocol, the County had to make the decision not to include emissions generated by Wheelabrator Westchester in this inventory. The County does not own the land on which the facility is located and the operations of the facility are not under the operational control of County government. Therefore, it is outside the authority of the County Executive and Board of Legislators to implement reductions in emissions at this facility. If the County pursues a community-wide inventory of GHG emissions, the emissions from Wheelabrator Westchester, and all other facilities operated by parties outside of County government would be included. Of course a long term plan that minimizes the material sent to this facility would be in the best interests of county residents.

Inventory Findings & Results

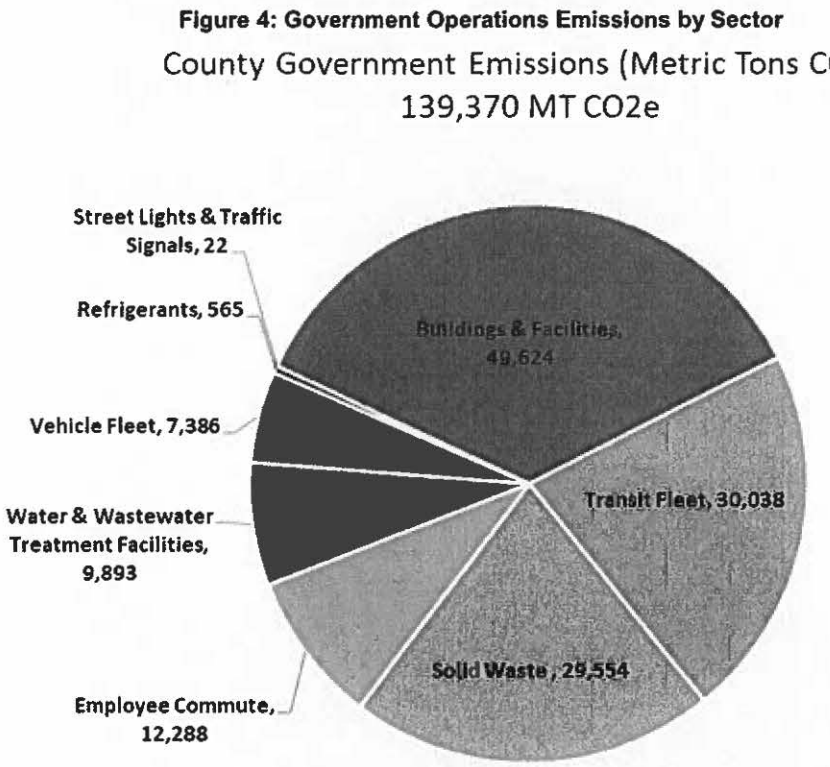
In 2019, 139,370 metric tons of carbon dioxide equivalent emissions[5] were generated either directly or indirectly as a result of the actions of Westchester County's government and employees.[6] For reference, a metric tons is approximately the same weight as 2-3 grand pianos, 32 golden retrievers, 98 bicycles, or 256 gallons of milk.

Figure 4 below illustrates where these emissions are coming from. 49,624 metric tons, a bit more than a third of the County government's emissions (35.6%), are generated by the various buildings and facilities operated by County government. Because the energy used by water and wastewater treatment facilities is counted separately, the buildings and facilities number would be slightly higher (around 38%) if wastewater treatment facilities were included. The County's transit fleet—the Bee Line and paratransit bus systems—accounted for the next largest share of emissions, 30,038 tons (21.6%), followed closely by emissions generated by off-gassing from the long-closed Croton Point landfill, 29,554 (21.2%). County employees on their commute to and from work generated approximately 12,288 metric tons of emissions (8.8%). The operation of water and wastewater treatment facilities generated 9,331 metric tons of emissions (7.1%) and the operation of the County's fleet of vehicles, including police cars, dump trucks, snow plows, etc. generated an additional 7,386 metric tons of emissions (5.3%). In 2019, the County owned and operated Rye Playland (as of 2023, the County owns, but does not operate Playland) and the chillers used in the ice rinks there emitted an estimated 565 metric tons of greenhouse gases, primarily hydrofluorocarbons. These emissions accounted for less than 1% (0.4%) of the County's total emissions. The energy used to power street lights and traffic signals generated only a very small amount of carbon emissions—just 22 metric tons, far less than 1% (0.02%) of the County total.

[5] Carbon dioxide (CO_2) is the most common greenhouse gas, by far. However, some other gases, including methane and nitrous oxide, also contribute to the greenhouse effect and add to the climate crisis. Because CO_2 accounts for such a large share of total greenhouse gas emissions, it is customary to equate other gases to CO_2 when discussing overall emissions. This is typically abbreviated as CO_2e for Carbon dioxide equivalent.

[6] It is customary to measure carbon emissions in metric tons. A metric ton = 1,000 kilograms or 2,205 pounds.

Figure 4: Government Operations Emissions by Sector



Emissions Details

The following sections will explain in more detail the findings of the Greenhouse Gas Inventory. The Inventory Results section of this report provides a detailed profile of emissions sources within Westchester County, information that is key to guiding local reduction efforts. These data will also provide a baseline against which the County will be able to compare future performance and demonstrate progress in reducing emissions.

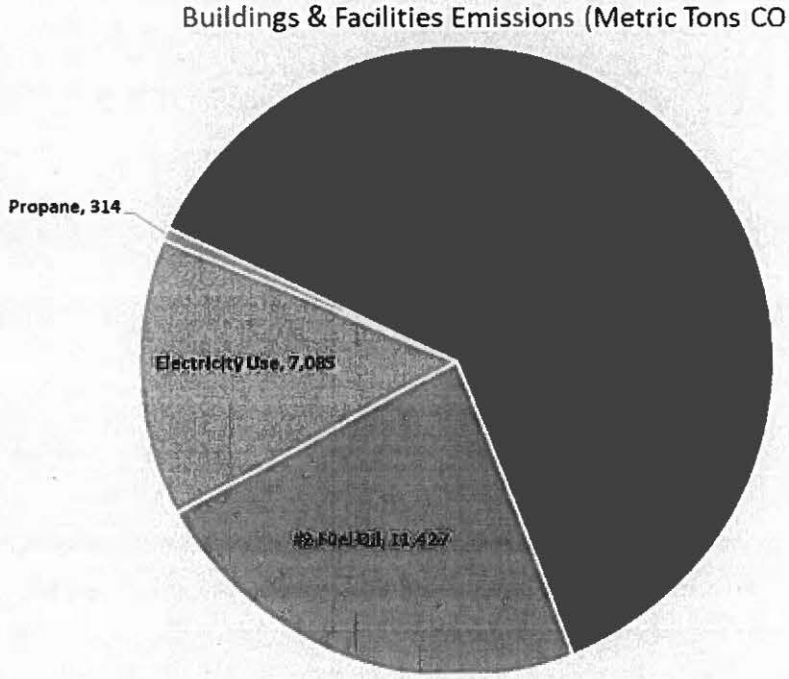
Buildings and Facilities

The County operates dozens of buildings and facilities which consume substantial amounts of electricity and require natural gas and other fuel oil to heat in the winter. This sector generated 49,624 metric tons of CO2e in 2019, which accounted for 35.6% of the County's total emissions, larger than any other sector. The largest share of emissions generated from buildings and facilities came from the use of natural gas for heating. In 2019, the County used 5,790,069 therms of natural gas (4,636,776 gallons). Use of this gas generated 30,798 metric tons of CO2e, 62% of the total from buildings and facilities and approximately 22% of the overall total. The County also used more than 1.1 million gallons of #2 fuel oil, which is typically used to heat

buildings. Use of this fuel generated 11,427 metric tons of CO2e, 23% of the total from buildings and facilities and approximately 8% of the overall total. Use of propane accounted for only a small share of emissions. In 2019, the County used 55,530 gallons of propane, which generated 314 metric tons of CO2e, only 1% of the total from the buildings and facilities sector.

The electricity needed to power the County's buildings was 140,546,015 kilowatt hours in 2019, which generated emissions of 7,085 metric tons, 14% of the emissions from buildings and facilities and 5% of overall County emissions.

Figure 5: Buildings & Facilities Emissions



Transit Fleet

Westchester County owns and operates two public transit systems, the Bee-Line Bus system which serves the general population, and the Bee-Line ParaTransit system, which serves elderly people and people with disabilities. These systems are robust, with dozens of routes, and more than 65% of Westchester live within walking distance of a Bee-Line bus route. Though running these buses undoubtedly helps reduce overall County carbon emissions by allowing people to get around without driving personal vehicles, the operation of these buses does also generate GHG emissions. In 2019, the Bee-Line buses traveled almost 10 million miles while the ParaTransit system traveled over 4.3 million miles. In 2019, the Bee-Line system used 2.6 million gallons of fuel, which generated 27,019 metric tons of CO2e and the ParaTransit system

used 341,624 gallons of fuel which generated an additional 3,019 metric tons of CO2e. Collectively, the operation of the County's transit system generated 30,038 metric tons of CO2e in 2019, 21.6% of the total for County government.

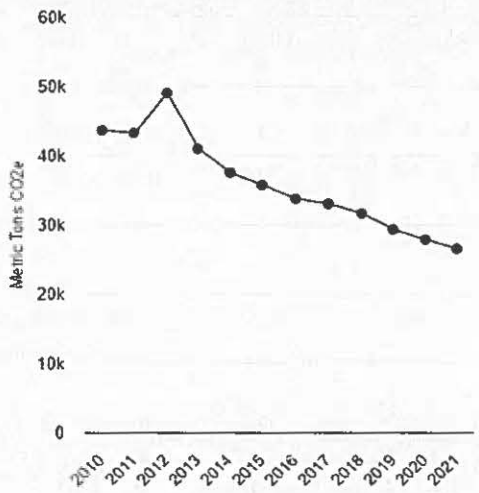
Since 2019, the County has replaced all of the older diesel-powered buses in the Bee-Line system with newer electric and electric-hybrid vehicles, which has undoubtedly contributed to substantial reductions in transit-related GHG emissions relative to the 2019 base year.

Solid Waste Facilities

Though the County's Croton Point Landfill has been closed since 1986, methane produced by the decaying of solid waste continues to be a major source of GHG emissions for Westchester. Despite the fact that no new waste had been deposited at the landfill in 33 years, as of 2019, the landfill generated 29,554 metric tons of emissions, 21.2% of the total. This is more than employee commute, water and wastewater treatment facilities, vehicle fleet, and street lights/traffic signals combined. This high level of emissions from a facility that last operated decades ago illustrates the challenges of reducing emissions when so many GHG emissions are still being generated as a result of decisions made by prior generations of leaders.

While the amount of emissions coming from the landfill is concerning, the trends are in the right direction. Since 2010, emissions generated by the landfill are down more than 25% and appear on track to continue a steady decline in the years to come.

Figure 6: CO2e Emissions from Croton Landfill (2010-2021)
Source: EPA



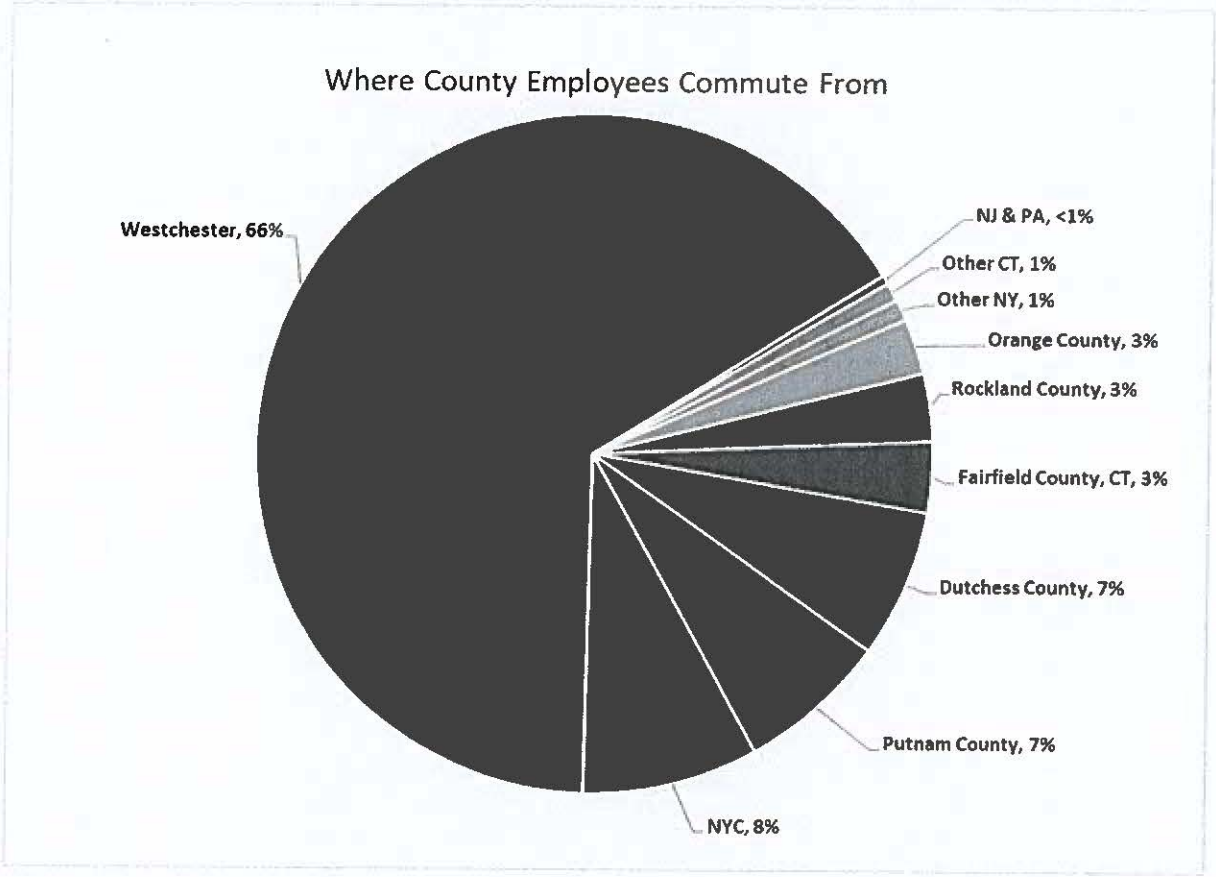
Employee Commute

As of 2019, Westchester had more than 4,600 County employees (excluding hourly workers), nearly all of whom commuted to work on a regular basis. Because these commutes are only occurring as a result of the operations of County government, the emissions generated by these commutes must be accounted for in any inventory of County government emissions.

To obtain data on the GHG emissions generated by the commutes of Westchester County Employees, the County used an online survey which was emailed to all County employees. The survey asked for information about how each respondent had commuted to work in 2019, including whether they drove alone, carpooled, or took public transit, and the mileage of their daily commute. More than 1,100 employees responded to the survey, and just under 700 who completed the survey were working for the County in 2019. These responses formed the basis for the GHG Inventory's estimate of the emissions generated by commutes by County employees.

Among survey respondents, the average commute (one way) to work was 20 miles, and the median commute was 15 miles. Two thirds of County employees in 2019 lived within Westchester, 8% lived in NYC, 7% each lived in Putnam County and Dutchess County. 3% of County employees commuted from Rockland County, 3% from Orange County, and 3% from Fairfield County, CT. Around 2.5% of County employees commuted from other areas, including Long Island, New Jersey, and other parts of Connecticut and New York.

Figure 7: County Employee Commuting Patterns



Based on the employee commute survey, 90% of employees typically drove alone to work in 2019. Among the 10% who used other methods of transportation, buses were the most commonly used alternative to driving. Less than 1% reported taking the train to work, walking, or riding a bicycle, though 46% said they would consider an alternate means of commute. Extrapolation from the survey responses indicated that the 90% of County employees who drove themselves to work drove an estimated 36.6 million miles to and from work in 2019. A much smaller number of County employees who lived outside of Westchester took a bus to get to work, and added an additional 1.1 million miles. In total, employee commutes generated an estimated 12,288 metric tons of CO_2e in 2019, 8.8% of the County total GHG emissions.

Wastewater Treatment Facilities

As of 2019, Westchester operated seven wastewater treatment facilities, three along the Hudson River, in Yonkers, Ossining, Peekskill, and four along Long Island Sound in New Rochelle, Mamaroneck, Port Chester, and Blind Brook. These facilities produce emissions as a result of

heavy power use, since they must be operated around the clock throughout the year. They also generate emissions of nitrogen and methane used in the wastewater treatment process and the combusting of digester gas.

Total emissions from wastewater treatment facilities in 2019 was 9,893 metric tons of CO2e, 7.1% of the Countywide total. Approximately 32% of these emissions came from the power used by the facilities, collectively. The operations of the Yonkers Wastewater Treatment Plant, by far the largest of the facilities, which serves the most customers, generated 45% of emissions in this sector, primarily through the discharge of nitrogen as part of the treatment process. The New Rochelle and Mamaroneck facilities each generated approximately 10% of the emissions in this sector, and the other four facilities generated less than 4% of emissions combined.

Table 1: Wastewater Treatment Facilities Emissions

Emissions Source	CO2e Emissions (MT)
System-wide electricity use	3,133
Yonkers Wastewater Treatment Facility (WWTF)	4,481
Mamaroneck WWTF	1,002
New Rochelle WWTF	936
Ossining WWTF	217
Port Chester WWTF	51
Blind Brook WWTF	51
Peekskill WWTF	22

Vehicle Fleet

As of 2019, Westchester County's vehicle fleet (excluding buses) included over 1,300 on-road vehicles, including police cars, dump trucks, snow plows, vehicles for County employees and many others. Within this fleet, 62% of vehicles were gas-powered in 2019, 19% used diesel fuel, and 19% were gas-electric hybrids. The County also owned and operated more than 3,000 off-road vehicles and powered equipment such as lawn movers, snow blowers, hedge trimmers, leaf blowers, or portable light trailers for highway work. Although information on the fuel use of these off-road vehicles and equipment was nearly impossible to obtain, data on the County's use of fuel allowed for the calculation of the overall climate impact of the vehicle fleet, both on-road and off-road. In 2019, emissions from the County's vehicle fleet were 7,386 metric tons of

CO_2e, accounting for 5% of the Countywide total. Recommendations have been made to better track and monitor these various power tools and off-road vehicles.

Other Sources – Hydrofluorocarbons/Refrigerants & Traffic Lights/Street Lights

More than 99% of the emissions attributable to Westchester County Government came from the categories listed above, however, two small additional sources of emissions were evaluated in this inventory. Although the County no longer operates Rye Playland, having contracted with Standard Amusements to run the facility in 2021, because Westchester did own and operate Playland in 2019, emissions generated from the chillers at the ice rink at Playland were included (data on electricity use from Playland was also included, but is part of the buildings and facilities emissions). These chillers generated 565 metric tons of CO_2e in 2019, through the estimated leakage of hydrofluorocarbons, which represents 0.4% of the County's total emissions.

Street lights and traffic lights were also included in the inventory, however, because many of these are owned by local governments rather than County government, and because so many street lights have been converted to energy efficient LED bulbs, the total emissions from this sector were extremely small. The power used to run street lights and traffic signals was just 22 metric tons, only 0.02% of the County's total emissions.

Government Operations Emissions Inventory Results Chart

Table 1: Local Government Operations Inventory - 2019

Sector	Fuel or source	2019 Usage	Usage unit	2019 Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	140,546,015	kWh	7,084
	Natural Gas	5,790,609	therms	30,798
	Propane	55,530	gallons	314
	Distillate Fuel Oil #2	1,112,149	gallons	11,427
Buildings & Facilities total				**49,624**
Street Lights & Traffic Signals	Electricity	439,630	kWh	22
Street Lights & Traffic Signals total				**22**
	Gasoline (on-road)	647,731	gallons	5,687
	Diesel (on-road)	166,466	gallons	1,699
Vehicle Fleet total				**7,386**
Transit Fleet	Bee Line Bus System	2,645,961	gallons	27,019
	Paratransit	341,624	gallons	3,019
Transit Fleet total				**30,038**
Employee Commute	Driving	36,590,108	miles	12,222
	Bus	1,128,299	miles	66
Employee Commute Total				**12,288**
Solid Waste	Gas Emissions	1055.5	Metric Tons CH4	29,268
Solid waste total				**29,268**
Water and wastewater	Methanol emissions	4.11	Metric Tons CH3OH per day	1,648
	Digester Gas Combusted (used for boiler operations)	650,000	scf/day	37

	Nitrogen Discharge	5,423	Kg N/day	4,121
	Electricity used	62,151,394	kWh	3,133
	N2O emissions			954
Water and wastewater total				**9,893**
Process & Fugitive Emissions	Hydrofluorocarbon & Refrigerant Emissions	565	Metric Tons	565
Process & Fugitive Emissions total				**565**
Total government emissions				139,370

Next Steps

This GHG Inventory Report is only the first phase of Westchester County's commitment to producing a Government Operations Climate Action Plan for County government. This inventory marks the completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. The next steps are to forecast emissions, set an emissions-reduction target, and build upon existing sustainability programs in Westchester with a more robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target.

The Intergovernmental Panel on Climate Change (IPCC) states that to meet the Paris Agreement commitment of keeping warming below 1.5°C we must reduce global emissions by 50% by 2030 and reach climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%. More than ever, it is imperative that countries, regions, and local governments set targets that are ambitious enough to slash carbon emissions between now and mid-century.

Westchester is planning to adopt calculated climate goals (also known as Science-Based Targets), in line with the latest climate science, that represent a community's fair share of the global ambition necessary to meet the Paris Agreement commitment. To achieve a science-based target, community education, involvement, and partnerships will be instrumental.

In addition, Westchester County will continue to track key energy use and emissions indicators on an ongoing basis with the aim of updating this inventory on a regular basis, especially as plans are implemented to ensure measurement and verification of impacts. Regular inventories also allow for "rolling averages" to provide insight into sustained changes and can help reduce

the change of an anomalous year being incorrectly interpreted. This inventory shows that reducing emissions from buildings and facilities will be particularly important to focus on. The next step will be the creation of a Climate Action Plan, in conjunction with the Hudson Valley Regional Council's Climate Action Planning Institute (CAPI), that identifies specific goals, objectives and strategies to realistically meet the County's GHG emissions reduction targets. Through these efforts and others, Westchester County can achieve environmental, economic, and social benefits beyond reducing emissions.

Appendix: Methodology Details

Buildings & Facilities

Emissions data for buildings and facilities owned and operated by Westchester County came from two main sources. Electricity use data was sourced from the New York Power Authority. Because electricity use by water and wastewater treatment facilities is reported in the water/wastewater treatment facilities section, electricity use by these facilities is not included in the totals for buildings and facilities. Data on the County government's use of natural gas, propane and #2 fuel oil in 2019 was provided by the Westchester County Department of Finance. The emissions generated by County government's electricity use and use of various fuels was calculated in ICLEI's ClearPath tool.

Transit Fleet

Emissions for the transit fleet were calculated using data on gallons of fuel used by the Liberty Lines (Bee-Line) bus system and the County's paratransit bus system and total vehicle miles traveled. Data was provided by Anthony Finateri, Director of Administrative Services in the County's Department of Public Works & Transportation. ClearPath was used to calculate total GHG emissions based on the data received.

Solid Waste Facilities

Data for the Croton Point Landfill's emissions were collected from the EPA, which reports annual data on emissions from landfills and other sources of GHG.
https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal
Though the landfill closed in 1986, it continues to generate substantial amounts of emissions.

Employee Commute

To obtain data on the GHG emissions generated by the commutes of Westchester County Employees, the County conducted a survey of County employees using an online tool, Survey Monkey. The survey was emailed to all County employees on July 26, 2023 and responses were collected for two weeks. Because this inventory uses 2019 as a base year, a screening question was asked at the beginning of the survey to confirm whether an employee had been working for Westchester County as of January 1, 2019. Respondents who answered in the negative were thanked for their participation but asked no further questions. A total of 1,174 employees

responded to the survey, however, 378 respondents were not working for the County as of January 1, 2019, leaving 796 respondents who were eligible to take the full survey. Of the 796 eligible respondents, 113 began but did not complete the survey. There were 683 completed survey responses which formed the basis of the calculations used in this inventory.

The survey included questions on the following topics:

- City, state and ZIP of respondent
- What town or city the respondent worked in
- Which County office or department the respondent worked for
- How many days per week they worked
- How many vacation, sick, or personal days they used in 2019
- How many miles their daily commute was
- How did they typically get to work (drove alone, carpooled, bus, train, bike, walk)
- Make, model, and year of their car
- Why they chose to drive alone (if they did)
- Would they consider other commute modes
- What, if anything, would encourage them to carpool
- What, if anything, would encourage them to ride public transit
- What, if anything, would encourage them to bike to work

To calculate emissions from the survey responses, the following steps were taken:

1. Using the data on make, model, and year of the vehicle driven by each employee, data on the MPG of their vehicle was obtained from the website www.fueleconomy.gov which is jointly administered by the United States Department of Energy and the Environmental Protection Agency
2. The data supplied by respondents on the mileage of their daily commute was checked and corrected where needed. For instance, since respondents listed both their home city and the city where they worked, it was clear that some respondents had misunderstand the direction to list the mileage of their commute one way and had instead provided the round trip distance. Some other respondents provided estimates of distance traveled that were either far too short or too long to fit the information about where they lived and worked.
3. The data provided about how many days per week they worked and how many days off they had taken was used to create a total of how many days each employee likely worked in 2019
4. Since some employees indicated that they didn't drive to work every day, but sometimes carpooled or took mass transit, the total of how many days employee likely

worked in 2019 was further refined to obtain a total of how many days each employee likely drove to work in 2019.

5. Finally, to obtain the annual mileage driven by each survey respondent in 2019, the mileage of their one-way commute was doubled, to account for the round trip, and then that daily mileage figure was multiplied by the total number of days each employee drove to work, to obtain total annual mileage.
6. Based on the total mileage driven by all employees in the survey, the total mileage driven by all employees was extrapolated using proportions.
7. The data on employee mileage driven was entered into ClearPath in order to calculate total emissions generated by the commute. The factor set defaults in ClearPath were modified to use the average passenger car and light truck MPG of the Westchester workforce, rather than the national averages. While the 2019 US National Defaults (updated 2021) dataset was used, the light truck national MPG average of 17.87 MPG was replaced by the calculated Westchester employee average of 23.81. The passenger car national MPG average of 24.38 was replaced by the calculated Westchester average of 31.16. We hypothesized that the higher average MPG of Westchester employees may be because Westchester employees earn a higher salary than the national median income and may therefore have been able to afford newer and more fuel efficient vehicles than the national average.

A similar process was followed to obtain the total mileage by employees who commuted by bus in 2019 which was then separately entered into ClearPath. However, because employees who live and work in Westchester and commute by bus were presumably taking a County-owned Bee-Line bus, and the emissions from the Bee-Line buses had already been separately accounted for, only employees who commuted by bus and lived outside of Westchester were considered for this section of the analysis.

One important limitation of this data is that it does not account for any emissions generated by county employees who are hired on an hourly basis. In 2019, there were approximately 1,200 hourly employees, according to Westchester County Personnel Department, who worked anywhere from a few hours a year to nearly full time. Records showing how many hours, on average, hourly employees worked would have been necessary to make an accurate calculation of the hourly employees' contribution the county's GHG emissions. Unfortunately, however, these records were not available from the Personnel Department, so this inventory does not account for any emissions generated by the commutes of hourly employees. Going forward, incorporating data from the commutes of hourly employees would lead to a more complete picture of county government emissions.

Wastewater Treatment Facilities

Detailed data on the operation of Westchester's seven wastewater treatment facilities was provided by Nat Federici, Deputy Commissioner of the County's Department of Environmental Facilities. Data provided included: total population served by each facility, total volume of water treated by each facility, information about the operations of the digester at facilities that have one, whether or not the facility used nitrification/denitrification, information about the daily nitrogen discharge from each facility, whether or not methanol was used for nitrogen removal, and whether or not solids were combusted. This data was then input into Clear Path and emissions calculated. Data on electricity use for the wastewater and water treatment facilities was obtained from NYPA.

Vehicle Fleet

Emissions from the County's vehicle fleet were calculated in Clear Path based on the total gallons of gasoline and diesel used by the County in 2019. Though detailed data on each vehicle owned by the County in 2019 was provided by Eddie May, Director of Program Development for the Westchester County Department of Public Works, data on vehicle miles traveled for each vehicle or the fleet as a whole could not be obtained. Though useful for this inventory, the overall emissions data for the County's vehicle fleet is not as detailed as would be ideal, since fuel use data was not available for individual vehicles or powered equipment, making it impossible to create a detailed picture of fuel use by the County's vehicle fleet.

Hydrofluorocarbon & Refrigerant Emissions

Data on the chillers used to operate the ice rink at Rye Playland was provided by the Westchester County Parks department, which managed Playland in 2019. To calculate emissions from the five chillers used at the ice rink, the Local Government Operations Protocol from ICLEI provided a guide, with estimated greenhouse gas potential data and equations used to calculate the total emissions.

Inventory Calculations

The 2019 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the [IPCC 5th Assessment] was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO2e emissions.