

# Village of Irvington Local Government Operations Climate Action Plan

**JUNE 12, 2024**

**Produced by the Irvington Green Policy Task Force** with Assistance from ICLEI – Local Governments for Sustainability USA and the Hudson Valley Regional Council.

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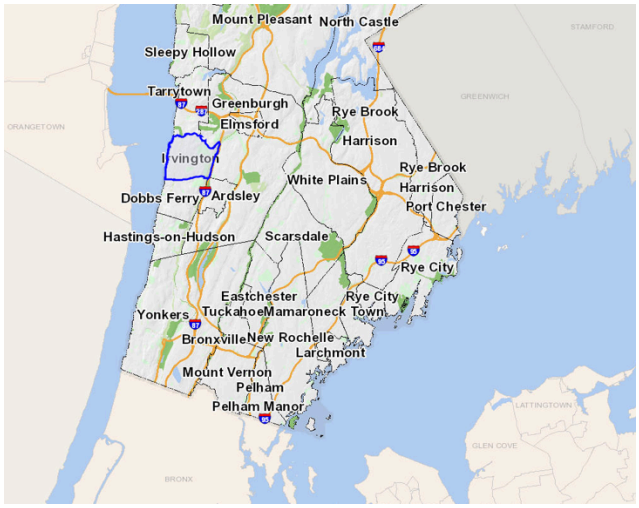
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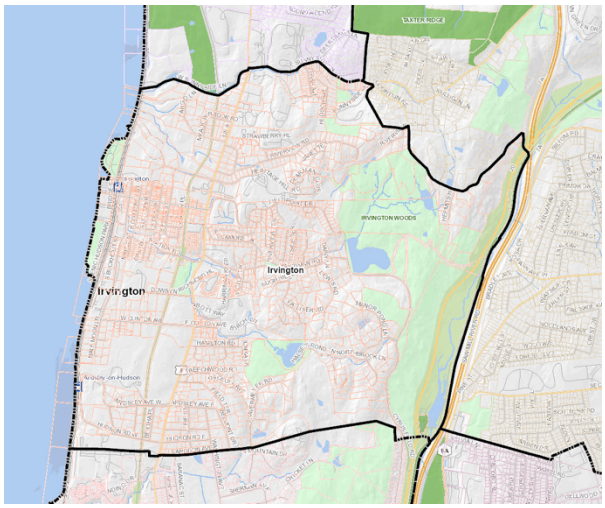
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# Executive Summary

Overwhelming evidence has led to the scientific consensus that climate change is the greatest environmental challenge of the 21st century. It poses a serious threat not just to New York's natural resources, but also to our jobs and our health. Simultaneously, climate change presents unprecedented opportunities for creating a healthier, safer, and more equitable zero-carbon world.

Irvington is committed to making strategic sustainable changes that benefit the local government, residents and the planet and act as a model for the community and other public agencies. Scientists expect that with the current trends in greenhouse gas (GHG) emissions, Americans will experience more intense heat waves, droughts, rainstorms, floods, wildfires and landslides. 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. Action is required at all levels, and local governments have a unique role to play in building low-carbon communities.

Regional climate impacts include significantly increased precipitation, more severe storms, warmer winters, earlier summers, heat waves, air pollution and potential forest fires. In addition to reducing impacts globally, local action has the co-benefits of saving money for the municipality and residents, improving public health and creating energy resilience. Participating in solutions has been found to mitigate climate anxiety for volunteers, while fostering a resilience community network.

Irvington first created a Climate Protection Task Force in 2007, adopted a Climate Smart Pledge in 2012, and became a Bronze Certified Climate Smart Community in 2021. The Climate Action Planning process began in 2023 with a government emissions inventory, and in 2024 with a community inventory. The work will continue, with adaptation and resilience work, into 2025 with annual reviews of accomplishment and goals. All Irvington Climate reports and updates can be found at https://www.irvingtongreen.org/climate

Irvington's vision is to lead by example through sustainable improvements to municipal buildings, operations, properties and community assets to mitigate greenhouse gasses, sequester carbon and

build resilience in a changing climate. We are dedicated to understanding and mitigating climate-related risks while preparing our infrastructure for extreme weather events.

Irvington has chosen to align with the Intergovernmental Panel on Climate Change (IPCC) emissions reductions targets of 50% reductions by 2030, and climate neutrality by 2050, to meet the Paris Agreement commitment of keeping warming below 1.5°C.

The Irvington 2023 GHG emissions inventory determined that, in 2019, government buildings and operations produced an estimated 1119 Metric Tons of $CO_2e$ with 46% from the vehicle fleet, 29% from buildings and facilities, and 23% from employee commuting. A comparison to peer municipalities showed higher municipal emissions per capita, with particularly high fleet emissions. Analysis of the Irvington Woods determines a net carbon sequestration of 1104 $MTCO_2e$ per year, almost the same amount as the total municipal emissions. Though with declining health and a plummeting population, the woods' ecosystem services are in peril.

To achieve reduction targets, Irvington's goal is to have electrified at least 50% of its fleet and buildings and hopes to incentivize at least 50% of employees to upgrade to EVs by 2030. Solar array and battery storage are a priority with the target of 100% electrification and energy independence by 2050. Additionally, many resolutions governing sustainable municipal operations and waste are in process for implementation now. And plans to protect the Irvington Woods from further decline are in development.

Going forward, Irvington will monitor progress towards our goals with annual lookback reports and plans for the subsequent year. GHG emissions will be inventories again in 2025 and, subsequently, every four years.

# Climate Change

## Climate Change Overview



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."[1] 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.[2] 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."

[1]. 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

[2]. 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.

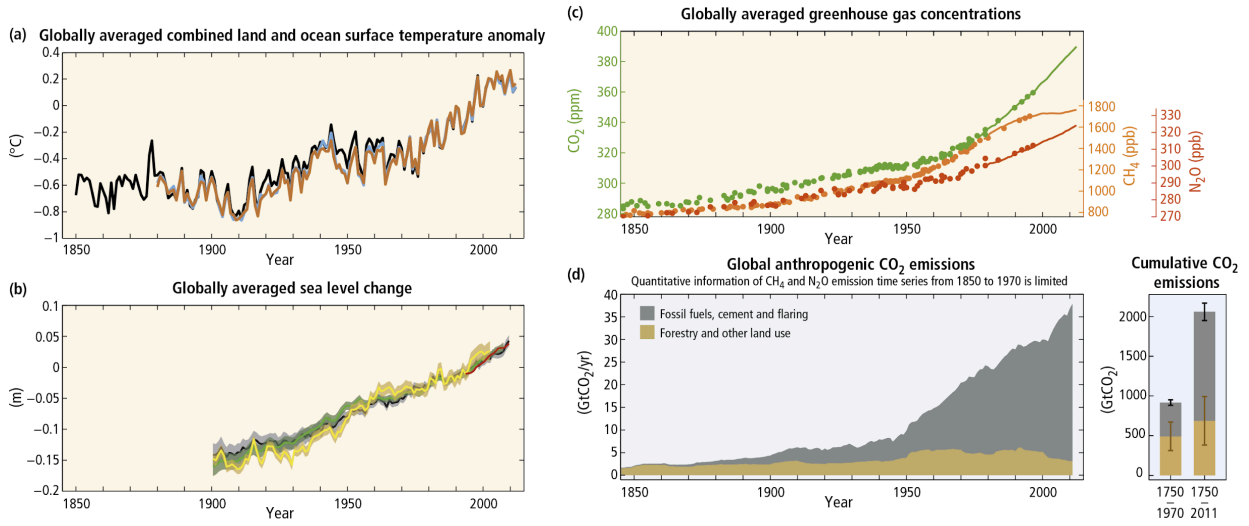



Figure 1. Observations and other indicators of a changing global climate system[3]

The Fifth IPCC 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 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".

The Earth is already responding to climate change drivers introduced by mankind. Global temperatures exceeded 1.5C of warming on average for the first time in 2023, a limit established as part of the 2015 Paris climate agreement to avoid a cascade of tipping points, which would irreversibly alter the global climate system and further exacerbate warming. Increased warming results in an escalating series of consequences which our descendents must endure.

About half of all carbon dioxide emitted between 1750 and 2010 occurred in the last 40 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. While there is a great need for community-wide climate action plans, addressing emissions from local government operations and leading by example is critical.

[3]. 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

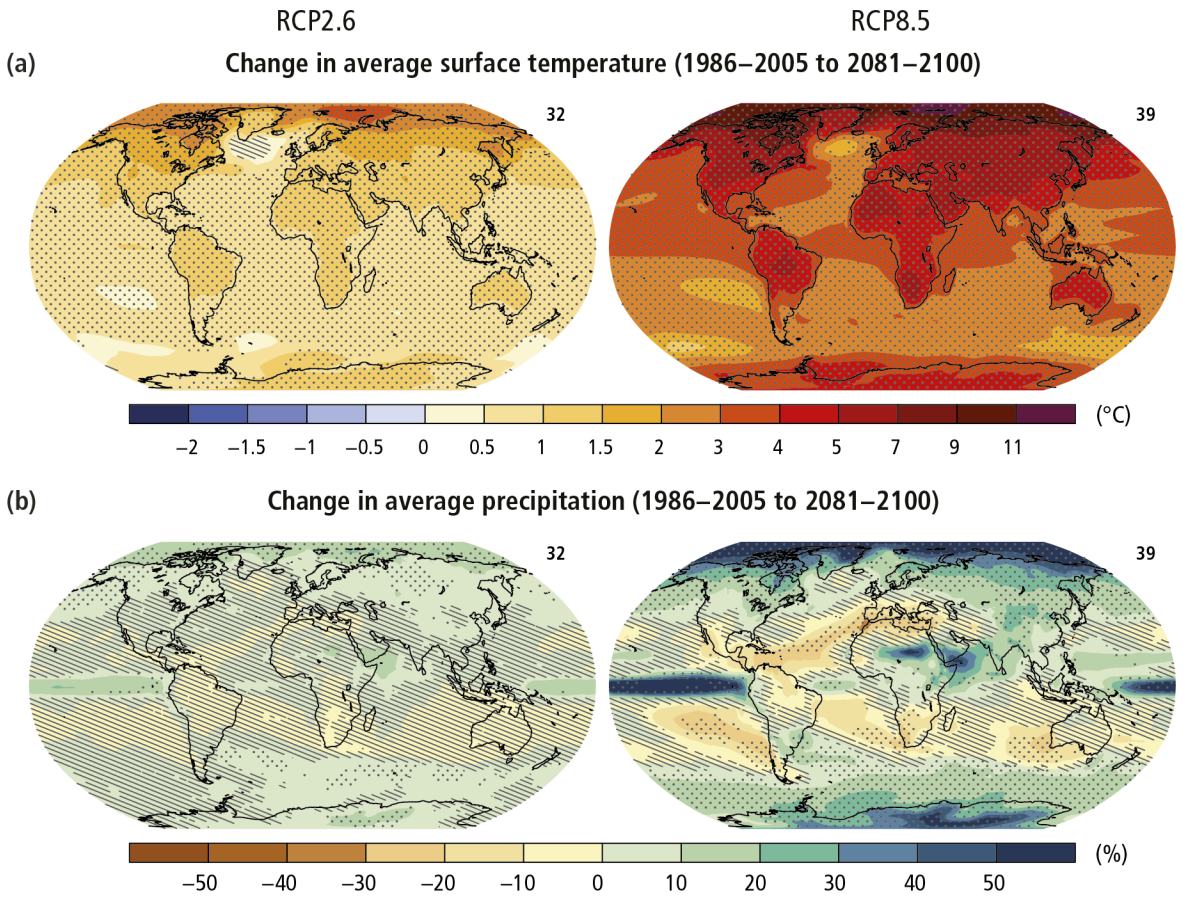



Figure 2. Change in average surface temperature (a) and change in average precipitation (b) based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios. RCP 2.6 requires that carbon dioxide (CO2) emissions start declining by 2020. In RCP 8.5, emissions continue to rise throughout the 21st century.

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.[4]

[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

# 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.[5]

[5]. 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

# Regional Impacts & Opportunities

Irvington is a suburban village in the Town of Greenburgh, Westchester County, New York, situated between the Hudson River and the Saw Mill River Parkway, 20 miles north of central Manhattan. As of 2020, the population was 6460, with 2109 households across 4 square miles. The median income is $184,000.

## Regional Climate Changes

The weather station  nearest to Irvington with a long data record is Westchester Airport (9 miles away). The average yearly temperature here has warmed 3°F since 1960 (see Figure 3).

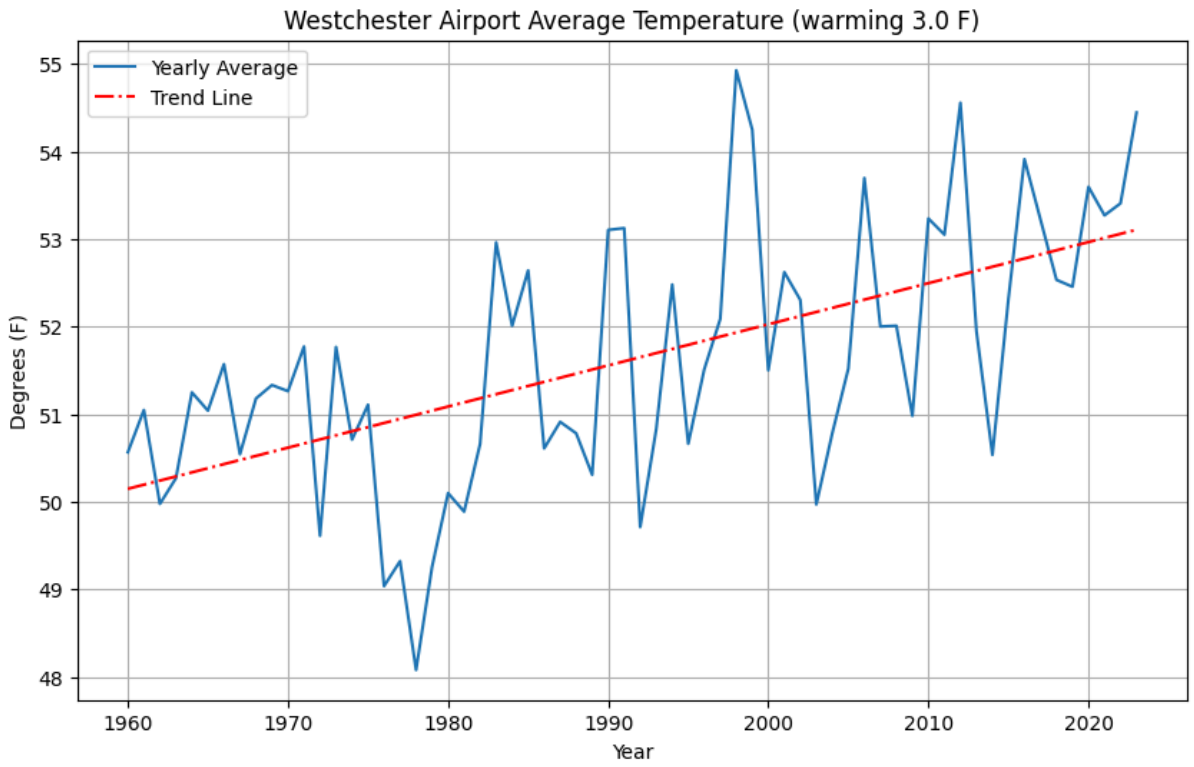



Figure 3. Westchester Airport yearly average temperature.

Winters are warming even faster than the yearly average, with the average winter temperature over 5°F warmer than it was in 1960 (see Figure 4).  Mild winters are now much more common than cold winters, with the last cold winter being 9 years ago (the winter of 2014/15). The impact of this is fewer snow events for the Village of Irvington to clear the roads, though large snowfalls still occur, notably in January 2016 and February 2021. Winter heating demand has been reduced which somewhat offsets higher energy prices. Another impact of milder winters is greater numbers of wild

animals surviving the winter, this is particularly seen in the increasing population of white-tailed deer.

Summer temperatures (not shown) have warmed by a smaller amount, 1.8°F since 1960, but the last cool summer was 14 years ago (2009). Summers have become more humid which adds to the heat stress and cooling demand.

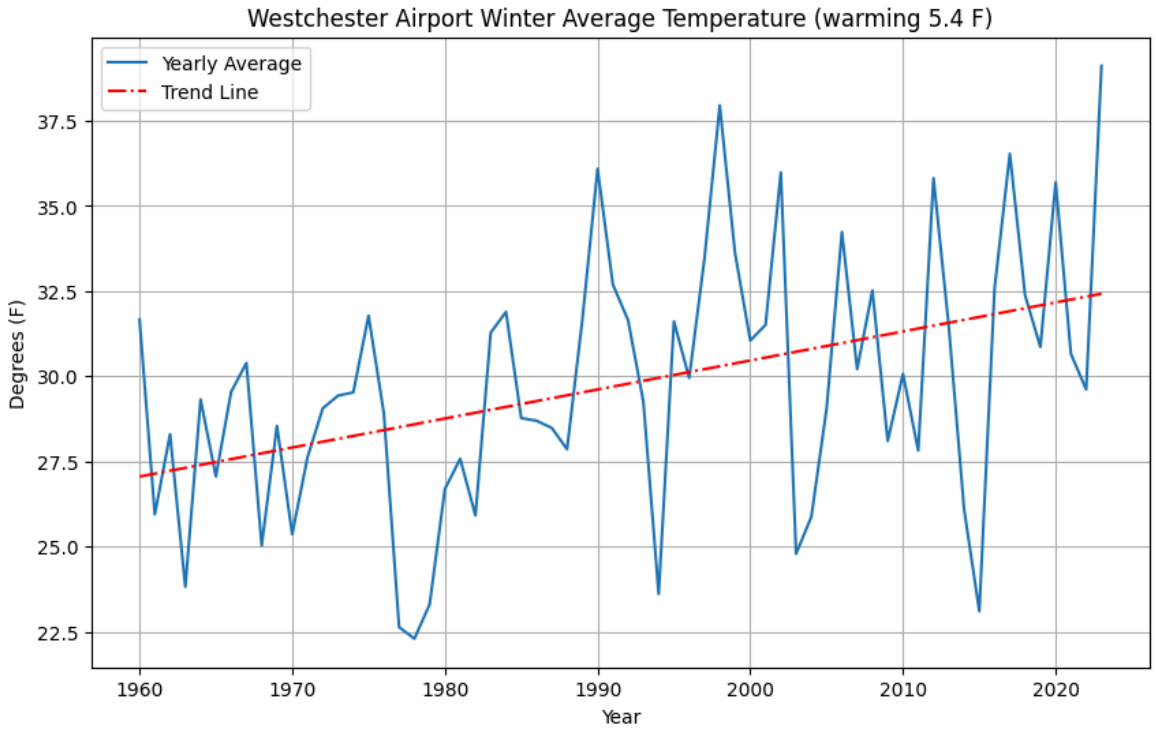



Figure 4. Westchester Airport winter (December-February) average temperature.

Yearly total rainfall at Westchester Airport (not shown) has not significantly changed since 1960, average total rainfall is 48 inches per year. However summer total rainfall (see Figure 5) has increased by 20% with the succession of dry summers and drought conditions that occurred in the 1960s, and late 1970s to early 1980s, not occurring in recent years. If this wetter trend continues, it is positive for the security of the Village of Irvington's water supply which comes from the Catskill and Delaware Aqueducts.

However, rain in summer is increasingly occurring in severe storm events. Over the last 25 years, events where over 4 inches of rain occurred in one day was approximately twice as likely as in the preceding 25 years (see Figure 6). These events often are associated with the remnants of hurricanes. In particular, the remnants of hurricane Ida in September 2021 was particularly intense with over 6 inches of rain occurring in 24 hours, with 3+ inches occurring in just one hour. This event caused considerable damage in the Village of Irvington including washing away the culvert under Dows Lane (the main access to the elementary school) and to the DPW. Climate change scenarios indicate that rainfall intensity will keep increasing which makes it particularly problematic in specifying 10-100 year design storms in the planning of new infrastructure.

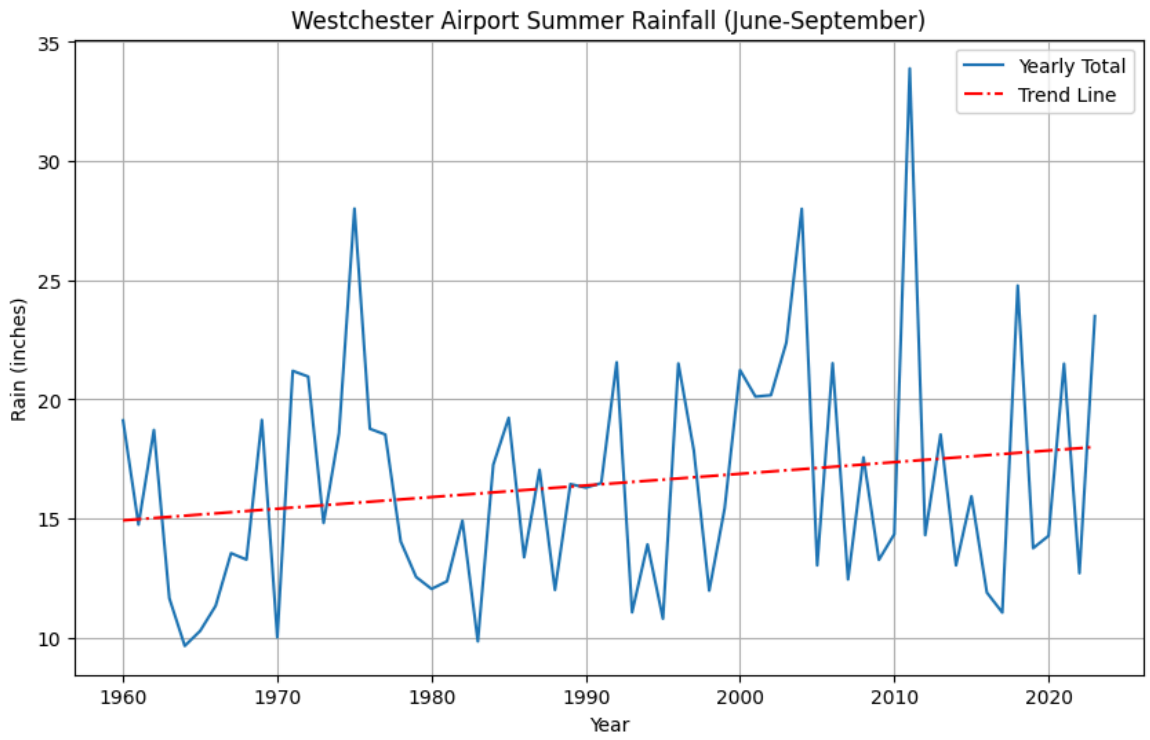



Figure 5. Westchester Airport summer (June-September) total rainfall.

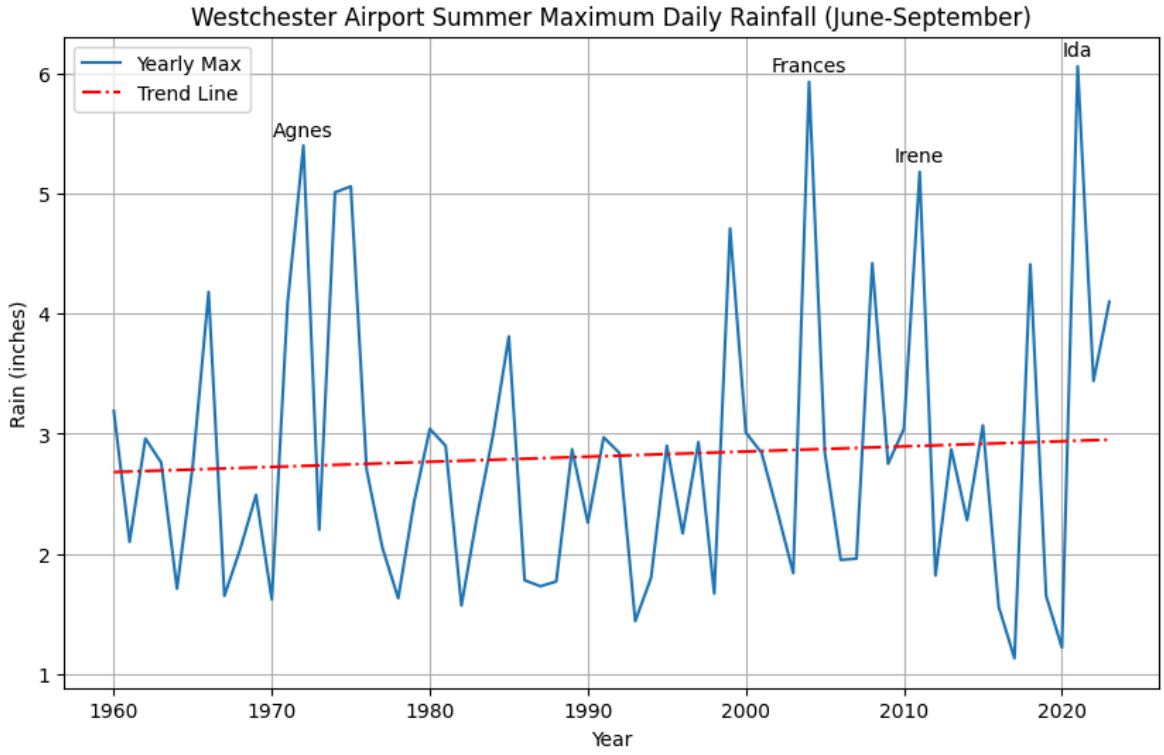



Figure 6. Westchester Airport summer maximum daily rainfall.

## Co-Benefits of Climate Protection Measures

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

## Saving Money

In addition to addressing climate change, measures taken to reduce GHG emissions have other important benefits, such as the potential for 10-30% cost savings. 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. For instance, a "right-sized" vehicle fleet is less expensive to purchase and fuel, while also being less costly to maintain. Irvington's upgrade to LED streetlights saves an estimated $45,000 per year. Climate Smart and Clean Energy Communities work, including flooding and culvert infrastructure has already earned the Village $3,353,705 in grants in the last decade with significantly more on the table for projects currently underway.

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

### Improving Public Health

Climate change mitigation activities, particularly building efficiency and renewable energy, enhance public health by improving air quality and reducing emissions. Upgrading buildings with insulation and heat pumps ensures comfortable temperatures, reducing respiratory and cardiovascular issues. Solar panel installations and heating system electrification lower fossil fuel reliance, leading to cleaner air.

### Improving Energy Resilience

Climate change mitigation activities, such as changes to infrastructure and energy sources, strengthen Irvington's ability to withstand and recover quickly from unexpected disruptions. Solar energy and the electrification of heating systems in buildings diversify and decentralize energy sources, minimizing vulnerability to energy supply disruptions.

# Irvington Climate Work

## Historic Climate Work

Irvington has joined 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 such as Climate Smart Communities, Clean Energy Communities, EnergySmart Homes, and Grid Rewards. In 2007, Irvington created a Climate Protection Task Force to study the problem and make recommendations, resulting in a 2008 report that formed the basis for a number of subsequent Village actions. In 2012, the Board of Trustees adopted the Climate Smart Pledge and in 2014 adopted an Environmental Action Plan, prepared by the Green Policy Task Force, consisting of action items based on the principles embodied in the Pledge. The Village's 2018 update of its 2003 Comprehensive Plan–an update based on the work of a group of subcommittees broadly representative of the community–incorporated this Environmental Action Plan as one of its references, and included a number of recommendations related to climate change and sustainability.

In its Climate Smart process, the Village has so far completed 11 high impact actions including converting government fleet vehicles to electric, becoming a Climate Smart Community (Bronze), Community Choice Aggregation (choosing 100% renewable energy as the default for residents on an opt-out basis), changing street and office lights to LED (saving us much as $45,000 annually) and adopting the NY Energy Stretch Code enforcement training for the building department.

More recent improvements such as updating the air conditioning in the Library and upgrading to heat pumps in the Senior Center and DPW and multiple fleet upgrades have taken place since the 2019 base year for the GHG assessment, so their impact will be reflected in our next inventory.

The Village of Irvington recognizes the risk that climate change poses to its residents, and is acting now to reduce the GHG emissions, or "carbon footprint," of its government operations through the innovative programs laid out in this Climate Action Plan. Furthermore, it is recognized that Irvington[6] needs to address existing climate risks such as increased extreme precipitation and adapt its systems and infrastructure to new conditions. Action is needed to reduce Irvington's contribution toward the problem of climate change and adapt to its current and future effects. This Climate Action Plan takes advantage of common sense approaches and cutting-edge policies that our local government is uniquely positioned to implement – actions that can reduce consumption of fuel and electricity and the production of waste. At the same time, we look at ways to protect current carbon sequestration and storage services through our trees and forest.

By creating a clear course of action and giving every department a role in achieving climate and sustainability goals, our Climate Action Plan drives and coordinates efforts toward a 50% reduction in local government GHG emissions of 2019 levels by 2030 and 100% below 2019 levels by 2050.

[6] Intergovernmental Panel on Climate Change. Climate Change 2014: Impacts, Adaptation, and Vulnerabilities: Summary for Policymakers, 2014.

## Scope of the GOCAP

The Irvington Government Operations Climate Action Plan covers objectives and strategies for reducing GHG emissions resulting from local government facilities and operations within Irvington. It addresses the major sources of emissions and sets forth objectives and strategies in three focus areas that Irvington can implement to achieve greenhouse gas reductions: Transportation, Buildings & Facilities, and Solid Waste. This Climate Action Plan employs practical approaches and innovative policies that Irvington's local government can effectively implement. These actions aim to reduce energy consumption in municipal buildings and facilities, lower fuel usage in our municipal vehicle fleet while incentivizing electric vehicles for employees and minimize waste production.

The Plan creates a framework to document, coordinate, measure, and adapt efforts moving forward. In addition to listing actions, the Plan discusses how each action will be implemented via timelines and assignment of responsibilities to departments, staff, or other partner agencies where known.

## Process

Irvington worked with CAPI, the Climate Action Planning Institute, an initiative of the Hudson Valley Regional Council who partnered with ICLEI, the International Council for Local Environmental Initiatives, and the County, working with 8 other Westchester municipalities to create a Climate Action Plan. The first meeting was held Feb 2, 2023 and the process took 16 months. The Village Administrator, Sustainability Director and two volunteers were involved.

As the first step in creating a Climate Action Plan, Irvington collected and analyzed the data for the Irvington Government Greenhouse Gas Inventory Report. A simplified slidedeck was presented to the Village Board of Trustees on Aug 16, 2024 which can be watched here from :47. After meeting with Department Heads, a preliminary overview of mitigation strategies was assembled in a presentation deck for the Board of Trustees, on 12/18/2023 (which can be seen here, from 1:15).

Irvington Green hosted a Climate Plan Workshop with the public on March 6th 2024, (photos and slidedeck can be found by scrolling down the Events page here). Following this, the Government Operations Climate Action Plan, or GOCAP, was presented to the Village Board on April 10th 2024. The presentation can be found here and the meeting can be seen here from 44:17.

Starting February 8, 2024, the Climate Planning Committee embarked on CAPI Adapt, a yearlong process to create a Climate Vulnerability Assessment and a Climate Adaptation Chapter for the Climate Action Plan. Four additional volunteers joined the team, as well as an intern. All Climate Action Planning materials are posted to irvingtongreen.org/climate/climate-planning

## Vision and Objectives

**Irvington's vision is to lead by example through sustainable improvements to municipal buildings, operations and properties and community assets to mitigate greenhouse gasses, sequester carbon and build resilience in a changing climate.** We are dedicated to understanding and mitigating climate-related risks while preparing our infrastructure for extreme weather events.

The Climate Action Plan offers a robust set of objectives and strategies to address climate hazard vulnerabilities and comply with the New York Climate Leadership and Community Protection Act (CLCPA). The CLCPA recommends reducing greenhouse gas emissions by 40% below 1990 levels by 2030 and 85% by 2050. Additionally, the Intergovernmental Panel on Climate Change (IPCC) states that to meet the Paris Agreement commitment of keeping warming below 1.5°C, global emissions must be reduced by 50% by 2030 and achieve climate neutrality by 2050. Equitable reductions in global emissions also require high-emitting, wealthy nations to reduce their emissions by 63% by 2030.

Irvington's goal is the IPCC goal: 50% reduction from 2019 levels by 2030. Perhaps in future years, as we further assess mitigation implementation strategies, we can increase our goals to meet equitable reductions for wealthy nations.

Each strategy and objective was created and reviewed through an internal engagement and input process where participants considered technology limitations, funding constraints, the feasibility of implementation, as well as co-benefits, grants, and further synergistic developments. The following targets were set to maintain and support safe, efficient, and holistically sustainable Irvington facilities and operations:

By 2030, the Village will have:

- 50% electrification of buildings
- 50% electrification of fleet
- 50% electrification of commute
- Solar and battery storage installation
- Many additional sustainability policies governing municipal operations and waste

By 2050, the Village will have

- 100% electrification of buildings
- 100% electrification of fleet
- 100% electrification of commute
- Energy independence

# Climate Equity & Vulnerability Within Irvington

Equity means ensuring that all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being, and achieve their full potential. While Irvington is a predominantly wealthy community, there are pockets of low-income residents who often bear the brunt of climate impacts without adequate infrastructure and support systems, and without gaining the benefits of a clean and sustainable future. There are also elderly, disabled and locationally disadvantaged households that are more likely to experience flooding. Creating a resilient community means addressing the inequities that cause disparities in health outcomes, income, educational attainment, and more.

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.

Government action alone is not enough to address climate change; everyone must be part of the solution. Currently, however, not everyone has equitable opportunities to participate and benefit. Historically, low-income populations have been under-served by programs and investments and under-represented in decision-making on climate policy. Lack of low-carbon, safe transportation options and energy-inefficient housing are examples of disparities that result in fewer benefits from climate action opportunities. These inequities primarily result from ongoing institutional biases and historical discriminatory practices that have led to the inequitable distribution of resources and access to opportunities.

Climate change is likely to amplify the impacts of these existing inequities, and frontline communities such as low-income residents, unhoused individuals, outdoor workers, the very young, and older residents will disproportionately bear the burdens. Additionally, the economic and health benefits of carbon reduction investments are not shared equitably across the village.

Climate equity is integrated into Irvington's Climate Action Plan in the following ways:

- 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 uplift climate equity and reduce disparities.
- Irvington will determine climate equity-specific metrics to help track progress on these actions and report on the targets.

To identify and reach low-income populations, Irvington is creating a survey which could be shared through the school free lunch program, the Recreation and Parks Department Thanksgiving Dinner basket program, local food pantries, churches, and the Senior Center. These initiatives help pinpoint and support those in need, hearing directly about vulnerabilities from them, and ensuring that the benefits of climate action are distributed equitably.

# Government Operations Emissions Inventory

## ICLEI Inventory Model

Since the early 1990s, U.S. cities have developed community-wide and local government operations greenhouse gas inventories based on accounting protocols created by the International Council for Local Environmental Initiatives, or 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 provided 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. Irvington used the Local Government Operations Protocol for the inventory described in this report.

## Summary of Inventory Results

Through the completion of a local government operations GHG emissions inventory, Irvington has determined emissions levels for Village government operations. Emissions from local government operations represent the sum of total emissions produced by government facilities, vehicle fleets, and other government-owned or operated activities. In this way, the local government operations figures represent emissions for which the local government is responsible. Government operations are therefore a subset of total community emissions.

For this Climate Action Plan, Irvington completed a Local Government Operations inventory that analyzes the 2019 data. This inventory was conducted using the Local Government Operations Inventory and ICLEI's ClearPath tool. Through this inventory, the Village determined that its overall emissions in 2019 equated to 1,119 metric tons of carbon dioxide equivalent ($MTCO_2e$). The Fleet sector accounts for a vast majority at 46% with 515 $MTCO_2e$ (Figure 10). The next largest contributor is Buildings and Facilities with 29%, or 329 $MTCO_2e$, followed by Employee Commute with 23%, or 260 $MTCO_2e$. Street Lights amounted to 8% while Wastewater and Water Pump Infrastructure was 7% $MTCO_2e$ (Figure 10).

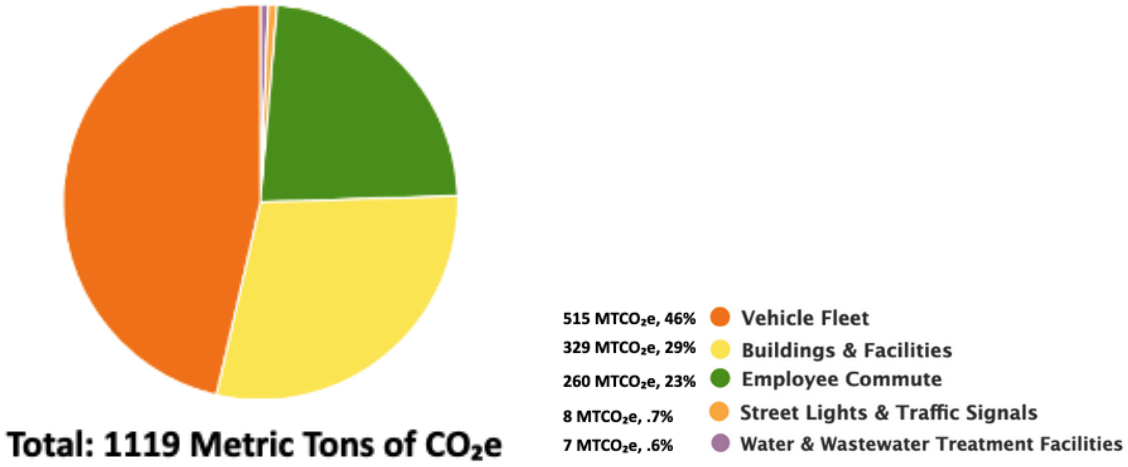



Figure 7. Irvington's 2019 Local Government GHG Emissions Inventory

# Government Operations Emissions Reductions

## Mitigation Focus Areas

In this Climate Action Plan, Irvington has decided to focus their Climate Mitigation measures on the following focus areas:

| Transportation | Buildings & Facilities | Solid Waste |
|---|---|---|

In each focus area, a series of objectives with supporting strategies are outlined. An "Objective" is a goal, end result, or target that mitigates emissions in a focus area, and a "Strategy" is an action designed to help realize the objective.

The summary table below (Table 2) identifies the focus areas within Irvington 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.

While the Irvington local government cannot address climate change by itself, government policies and practices can dramatically reduce GHG emissions from a range of sources and help prepare Irvington for the anticipated impacts of climate change. Through this plan, Irvington can not only do its part toward achieving a 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 1. Irvington Climate Action Plan Summary Table – Focus Areas

| Focus Area | Description | Number of Distinct Strategies |
|---|---|---|
| **Transportation** | Policies and programs to reduce municipal vehicle fleet fuel usage and employee commute, including transition to electric vehicles and other low-carbon fuel sources . | 12 |
| **Buildings & Facilities** | Policies and programs to reduce municipal energy usage, interfacing primarily with local utility efforts. | 17 |
| **Solid Waste** | Policies and programs to reduce waste generation and landfill emissions, while promoting reuse, recycling, and green procurement | 3 |

Calculating expected emissions reductions for each objective requires making assumptions about the degree of implementation, technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or strategy.

## Forecast Model by 2030

Forecasts were modeled in Clearpath, a product of ICLEI. The dotted red and green lines show CLCPA goals of 40% reductions from 1990 levels by 2030 and 85% by 2050. Irvington's goal of 50% by 2030 is exceeded with the following strategies:

- 50% electrification of buildings
- 50% electrification of fleet
- 50% electrification of commute
- Solar and battery storage installation

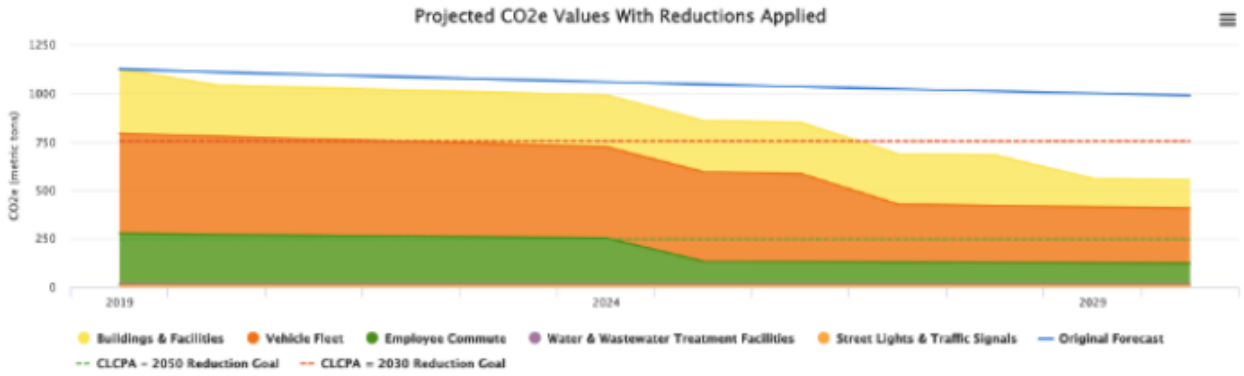



Figure 8. All Reductions Measures: 586 $MTCO_2e$

## Forecast Models: Business as Usual

Irvington 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.

Figure 9 shows the projected change in GHG emissions in Irvington from 2019 to 2030. The emission reduction shown in the forecast below is based on population growth, employee count projections, electricity grid decarbonization projections, and changes in automotive fuel efficiency standards. Jurisdiction's Local Government Operations business as usual forecast shows that emissions will decrease to 26,304 $MTCO_2e$ by 2030. This is a 21% reduction in emissions.

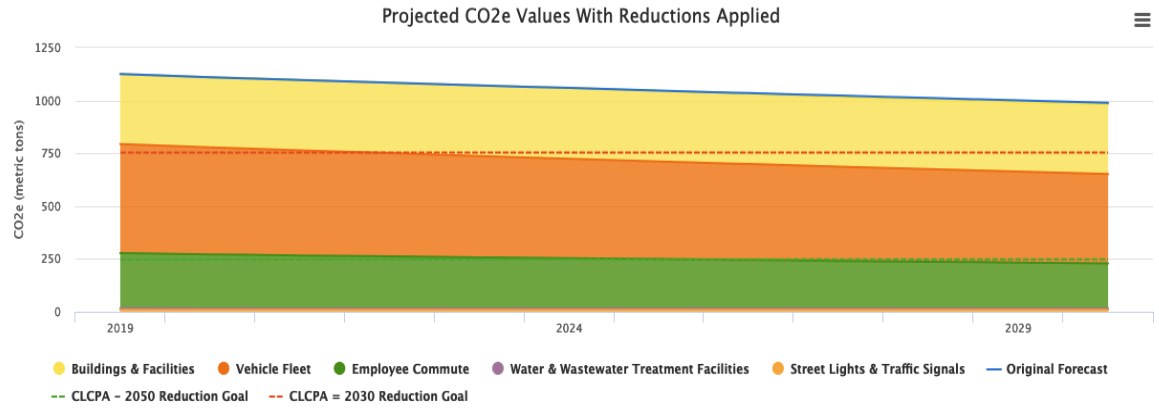



Figure 9. Business as Usual Forecast: 136 $MTCO_2e$

# Transportation

## Municipal Fleet

Irvington owns and operates a suite of government vehicles, ranging from passenger cars to large construction equipment. 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.

Energy consumed by fleet vehicles accounts for 46% of Irvington's total GHG emissions. The climate action planning cohort of municipalities made it possible to compare results. Irvington, with a population of 6,600, fleet emissions came to 515 $MTCO_2e$ while Hastings, with a population of 8,600, had 339 $MTCO_2e$, and Pelham, population 5,700, had 305 $MTCO_2e$.

Transitioning the municipal vehicle fleet to electric vehicles (EVs) and other low-carbon fuel sources will contribute significantly to achieving Irvington's GHG reduction targets, while saving the government money on fuel costs and improving local air quality. The objectives in the table below 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. See Appendix IV for supporting strategies.

Table 2: Vehicle Fleet Objectives

| Task | Co-Benefits | Stakeholders | Timing | GHG Impact |
|---|---|---|---|---|
| **Fleet Inventory** | Public Health, Saving Money | Admin | Done | ★ |

| | | | | |
|---|---|---|---|---|
| **Fleet Efficiency Policy** | Public Health, Saving Money | Admin, Police, DPW, Rec & Parks, BOT | 2024 | ★ |
| **Upgrade 35% of fleet to hybrid / EV** | Public Health, Saving Money | Admin, Police, DPW, Rec & Parks | Done | ★★ |
| **Upgrade 37% of fleet to hybrid / EV** | Public Health, Saving Money | Admin, Police, DPW, Rec & Parks | 2024 | ★★ |
| **Upgrade 50% of fleet to EV** | Public Health, Saving Money | Admin, Police, DPW, Rec & Parks | 2030 | ★★★★ |
| **Upgrade 100% of fleet to EV** | Public Health, Saving Money | Admin, Police, DPW, Rec & Parks | 2050 | ★★★★★ |
| **Municipal charging infrastructure installation 8 chargers.** | Public Health, Saving Money | Admin, Building Department | Done | ★★ |
| **Municipal charging infrastructure installation +2 chargers** | Public Health, Saving Money | Admin, Building Department | 2024 | ★★ |
| **Municipal charging infrastructure can use the excess from 58 residential chargers being installed** | Public Health, Saving Money | Admin, Building Department | 2030 | ★★★★ |
| **Municipal charging installation of any additional infrastructure required to support 100% electrification** | Public Health, Saving Money | Admin, Building Department | 2050 | ★★★★★ |

## Forecast 50% Electrification of Fleet

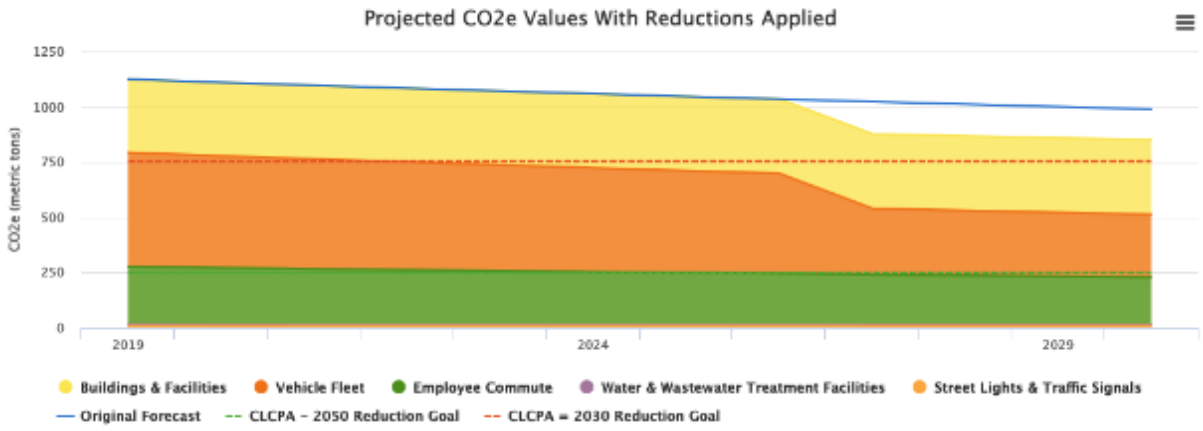



Figure 10. Fleet 50% Electrification: 146 $MTCO_2e$

## Employee Commute

At 260 $MTCO_2e$, employee commuting makes up 23% of Irvington's government emissions. Eighty full-time employees drive an average of 34 miles to work. Little public transport is available for most employees, and schedules are sufficiently different to make ride-sharing a challenge. However, an employee survey clearly indicated interest in upgrading personal vehicles to EVs if free charging is offered in the Village. The Village is prepared to offer free charging to employees on the assumption that charging infrastructure installation is supported by the County as has been indicated. An application is in process.

Table 3. Employee Commute Objectives

| Task | Co-Benefits | Stakeholders | Timing | GHG Impact |
|---|---|---|---|---|
| **Incentivize employees to convert to EVs with free charging on 8 municipal charging stations** | Public Health | Admin | 2024 | ★★★ |
| **Incentivize employees to convert to EVs by adding 58 public chargers (including replacing existing)** | Public Health | Admin | 2025 | ★★★ |

### Forecast 50% Electrification of Employee Commute

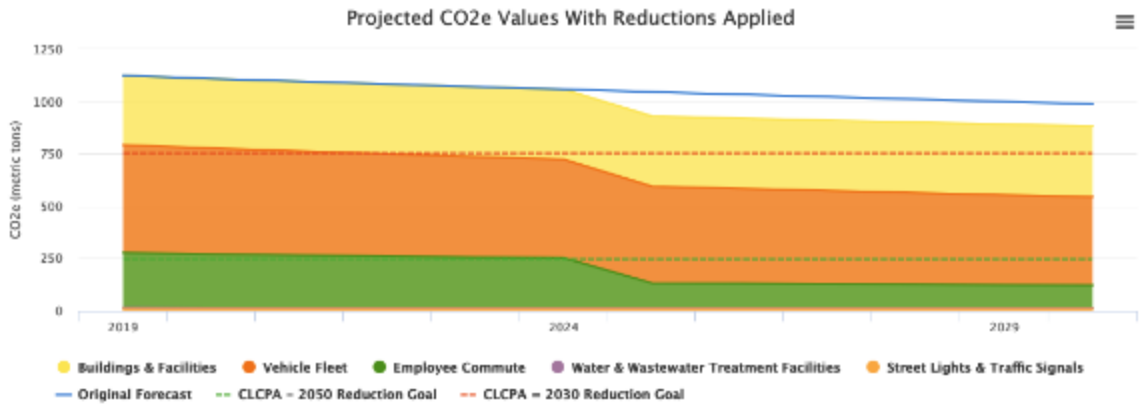



Figure 11. Employee Commute 50% Electrification: 116 $MTCO_2e$

# Buildings and Facilities

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

Energy consumed in Village owned and operated buildings and facilities account for 29% of Irvington's total GHG emissions. Improving the efficiency of Irvington's buildings and infrastructure will contribute significantly to achieving the Village's GHG reduction targets, while saving the government money on utility bills and reducing the need for new infrastructure. The objectives in the table below focus on opportunities to retrofit existing facilities and road safety infrastructure and aims to ensure that future management and planning of these operations is compatible with the local government and community climate protection goals.

Table 4. Building and Facilities Energy Objectives

| Task | Co-Benefits | Stakeholders | Timing | GHG Impact |
|---|---|---|---|---|
| **Buildings / facilities benchmarking** | Saving Money, Public Health, Energy Resilience | Admin | 2024 | ★ |
| **Town Hall efficiency upgrades** | Saving Money, Public Health, | Admin, Building Department | 2024 | ★★ |

| | | | | |
|---|---|---|---|---|
| | Energy Resilience | | | |
| **DPW complex upgrades for efficiency and emissions reductions** | Saving Money, Public Health, Energy Resilience | Admin, DPW, Building Department | 2025 | ★★★ |
| **Solar assessment and budget for two buildings** | Saving Money, Public Health, Energy Resilience | Admin | 2024 | ★ |
| **Install solar array on Senior Center** | Saving Money, Public Health, Energy Resilience | Admin, Building Department | 2026 | ★★ |
| **Install battery storage** | Saving Money, Public Health, Energy Resilience | Admin, BOT | 2030 | ★★★ |
| **Install solar on 50% of buildings** | Saving Money, Public Health, Energy Resilience | Admin, Building Department | 2030 | ★★★ |
| **Subscribe municipal accounts to community solar (as it becomes available)** | Saving Money, Public Health, Energy Resilience | Admin, BOT | 2025 | ★★ |
| **Energy audit Library** | Saving Money, Public Health, Energy Resilience | Admin, Library | 2025 | ★ |
| **Upgrade HVAC in Senior Center** | Saving Money, Public Health, Energy Resilience | Admin, Rec & Parks, Building Department | Done | ★★★ |
| **Upgrade HVAC in Theater** | Saving Money, | Admin, Building | 2024 | ★★ |

| | | | | |
|---|---|---|---|---|
| | Public Health, Energy Resilience | Department, Theater | | |
| **Upgrade HVAC in Town Hall** | Saving Money, Public Health, Energy Resilience | Admin, Building Department | 2026 | ★★★ |
| **Upgrade HVAC / electrify 50% of municipal buildings** | Saving Money, Public Health, Energy Resilience | Admin, Building Department, BOT | 2030 | ★★★★ |
| **Upgrade HVAC / electrify 100% of municipal buildings** | Saving Money, Public Health, Energy Resilience | Admin, Building Department, BOT | 2050 | ★★★★★ |
| **Electrify all landscaping equipment** | Public Health, Saving Money | Admin, Rec & Parks | 2025 | ★★ |
| **Green Power procurement policy, including a commitment to 100% renewable supply by 2030** | Saving Money, Public Health, Energy Resilience | BOT, Admin | 2024 | ★★ |
| **Shade policy** | Saving Money, Public Health, Energy Resilience | BOT, Admin, Building Department | 2024 | ★ |
| **Low embodied concrete policy** | Saving Money, Public Health, Energy Resilience | BOT, Admin, Building Department | 2024 | ★★ |
| **Refrigerant management program & policy** | Saving Money, Public Health, Energy Resilience | BOT, Admin, Building Department | 2024 | ★★ |

## Forecast Model: Buildings by 2030

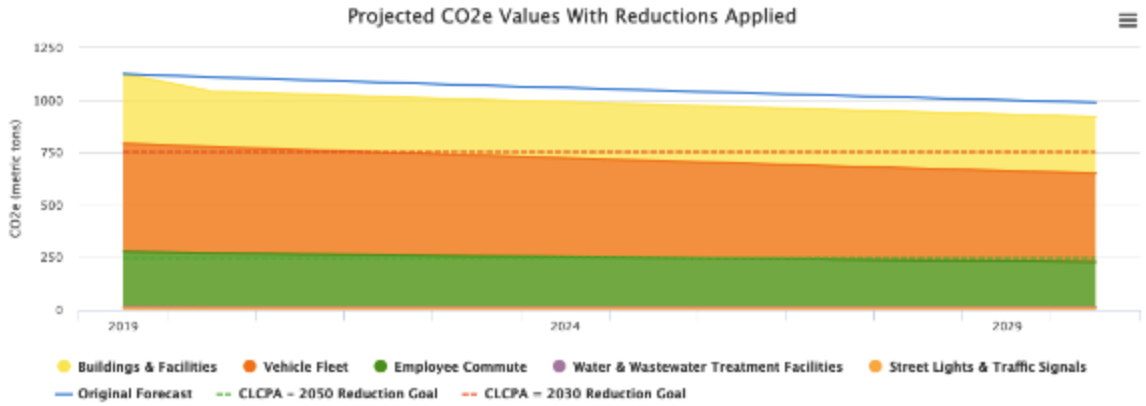



Figure 12. Buildings 50% Electrification of Gas: 68 $MTCO_2e$

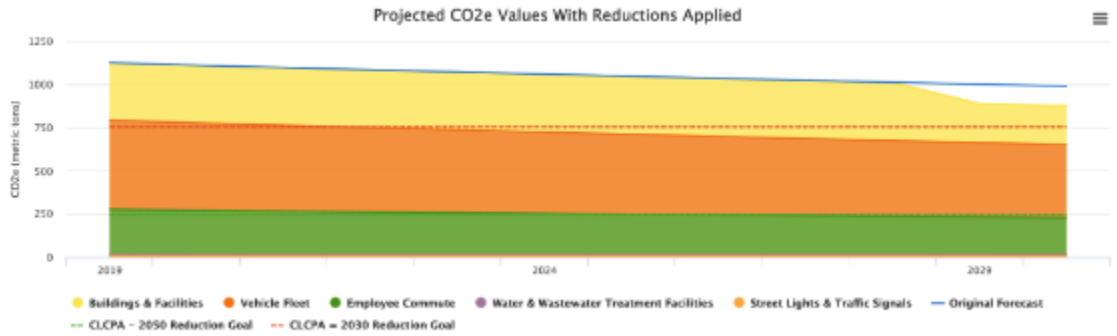



Figure 13. Buildings 50% Electrification of Oil: 112 $MTCO_2e$

## Forecast Model: Solar Array

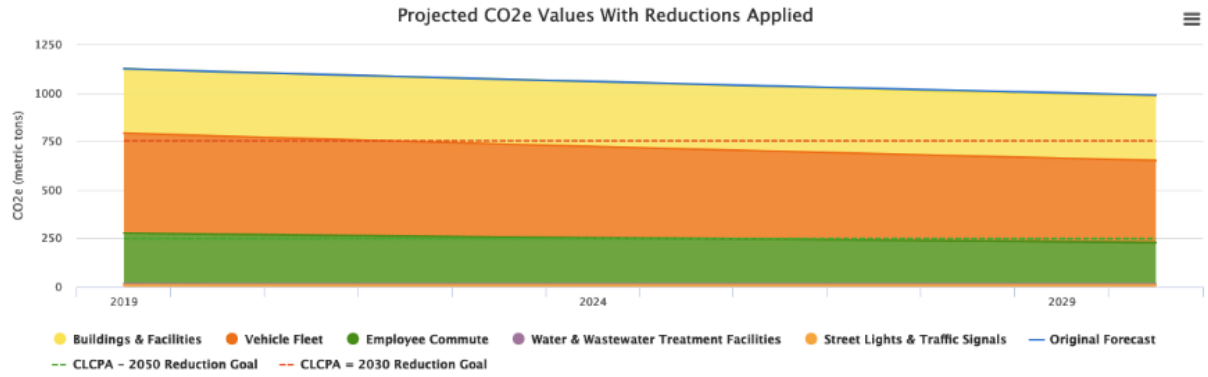



Figure 14. Solar on Senior Center Roof & Parking Lot Canopy = 93.2 kWh / year or 6 $MTCO_2e$

**Solar Solutions in Irvington**

The village is exploring the limited potential sites for solar arrays on government properties. Analysis of GHG emissions impacts of solar on government buildings in Irvington reveals relatively small reductions compared with other measures. However, there are co-benefits to solar installation.

Rooftop solar installations typically offer a good return on investment, often paying for themselves in about seven years and continuing to provide savings over their estimated 20-year lifespan. Additionally, solar energy enhances energy security and reliability. Installing solar panels with battery storage can support the grid as the community transitions to greater electrification, reducing the strain on the electric grid by supplying more electricity directly from solar arrays. This is particularly important as increased electrification will drive up electricity demand. Battery storage also provides resilience during grid outages, allowing buildings to maintain power and continue normal activities. Moreover, integrating solar with other electrification measures can mitigate the need for expensive electric panel upgrades, which are often necessary to support new electric loads in buildings.

Where government buildings cannot accommodate solar, limited community solar subscriptions are available for government accounts. Through community solar, members can save 10% on their electricity bills, as calculated by ConEdison, with no associated fees. This participation not only reduces costs but also contributes renewable energy to the grid, helping to lower carbon emissions. Irvington continues to monitor opportunities to subscribe and support updating and cleaning the grid in New York State.

# Solid Waste

Government-produced waste generates GHGs in a number of ways. Over time, landfilled waste breaks down through anaerobic decomposition, releasing large amounts of methane into the atmosphere. Waste management contributes to emissions in the transportation sector as well, from the hauling of waste to and from facilities. Additionally, embodied energy within the items that we throw away might be harnessed through reuse and recycling of materials.

Irvington's solid waste is disposed of, primarily, at Westchester County's Wheelabrator waste-to-energy facility in Peekskill. Significant portions of solid waste are kept out of that waste stream through recycling, yard waste composting, food scrap composting, and reuse/reduction education (the Village was a recipient of a 2024 Eco Award for having the highest waste percent reduction in Westchester County in 2023). While emissions from solid waste were not measured as part of the Village government operations inventory, as it is not possible to separate municipal building waste from residential waste collected by Village trucks, it is in Irvington's long-term interest to implement waste reduction programs, expand recycling facilities and enable re-use of construction materials and other goods. This will become particularly important when residential waste becomes part of the planned Community GHG inventory and reduction measures. The objectives in the table below focus on opportunities to reduce waste, reuse materials, and recycle what cannot be reused, and it aims to ensure that future activities in the sector are compatible with the local government and community climate protection goals.

Table 5. Solid Waste Objectives

| Task | Co-Benefits | Stakeholders | Timing | GHG Impact |
|---|---|---|---|---|
| **Municipal Waste Audit** | Saving Money, Public Health | DPW | 2025 | ★ |
| **Recycling in government buildings policy** | Saving Money, Public Health, | BOT, Admin, Department Heads | 2024 | ★ |
| **Organic waste program for government buildings, pilot project** | Saving Money, Public Health | Admin, BOT, DPW | 2024 | ★ |
| **Recycling Bins in Government Buildings Policy** | Saving Money, Public Health | Admin, all Dept Heads | 2024 | ★ |

# Carbon Sequestration & Storage

Carbon makes up around 50% of the mass of a tree. Hence trees are an important component of carbon storage. As trees grow through photosynthesis they absorb $CO_2$ from the atmosphere. The (yearly) increase in the stored carbon by trees is called the carbon sequestration.

## Tree Care and Forest Management

The Village of Irvington finds that the existence of trees within the Village makes a fundamental contribution to the health, safety and general welfare of Irvington citizens and the community at large. Trees, in addition to their aesthetic benefits, are essential to riparian habitat, wildlife, energy conservation, temperature moderation and the healthy ecology of the area; trees help improve air quality and reduce global warming. These benefits to the community and environment increase as trees mature. Maturation of trees protects surface water quality, provides shade, offers windbreaks, controls water pollution by reducing soil erosion and flooding, offers a natural barrier to noise, yields advantageous microclimates and fundamental ecological systems. Trees, together with shrubs, contribute to property values of residential and commercial establishments, and preserve and enhance the natural beauty and appearance of the Village and its historic, non-urban character.

The Tree Commission has been established to protect and preserve trees within the Village, whether municipal, commercial or residential, and to ensure review, regulation and inspection of any activity affecting trees that might adversely affect the health, safety and general welfare of the community.

The activities of the Tree Commission, including review and approval of tree permits, outlining municipal tree policies and providing tree education, help the village and its residents to better serve as stewards of our air, water, land and living resources. It is our joint obligation to protect the environment for the use of this and future generations.



Figure 15. CJ Reilly, Education Director and Groundskeeper for the Irvington Woods Park

Irvington is fortunate to have 259 acres of preserved forest, a nature center and an ecologist working on engaging the community and, specifically the youth, in effective stewardship techniques.

Programs include measuring trees and studying pressures on tree health, removing invasive species, understanding soil health and deer impacts, and planting native trees.

For over forty years committed Village officials and residents have worked to acquire, preserve and protect the 19 parcels of land which make up the Irvington Woods, for the public good. And in 2006, the Greater Irvington Land Trust began advocating for the preservation and protection of the Woods as a key open space and scenic resources asset. The organization conducted a comprehensive historical review of the protections applying to the various parcels and, in 2018, petitioned the Board of Trustees to dedicate the Woods as public parkland. In April 2019, the Board of Trustees passed the resolution of Dedication of the Irvington Woods Park (the Irvington Reservoir and area immediately surrounding the reservoir, although made subject to the rules and regulations of public parks, were excluded from the public parkland designation in case a future need arises to restore the Reservoir as a source of drinking water supply).

In 2011 the Village established the Irvington Woods Committee to help the Recreation and Parks Advisory Committee maintain and improve the Irvington Woods and the adjacent O'Hara Nature Center. A new extensive trail system was developed by the community (no fewer than five Boy Scouts earned their Eagle Scout awards through trail rehabilitation projects) which is well used for hiking, running, walking, nature enjoyment, cross-country skiing and dog walking. Programming at the O'Hara Nature Center draws visitors from other communities to the Irvington Woods.

The forest, though, is in declining condition, and the Village of Irvington recognized the imperative to improve its overall health in order to assure its longevity and sustainability as an important recreational and ecological resource to the region. In 2020, the Village of Irvington received a New York State Department of Environmental Conservation Urban and Community Forestry Grant to complete a Tree Inventory and Community Forestry Management Plan for Irvington Woods. The report found:

- 63,750 trees
- $73.3M structural value
- $2.68M in carbon storage
- $60.8K carbon sequestration
- $47.5K avoided runoff
- $83.7K pollution removal

# Irvington Woods Park: Carbon Inventory and Projection



Figure 16. Irvington Reservoir in the Irvington Woods Park

Data collected in Irvington Woods Park as part of the Harvard Changing Forest Research Project by Irvington Middle School and High School students were analyzed by i-Tree, the industry standard tree ecology model (https://www.itreetools.org/) developed by the USDA Forestry Service. From ten-by-ten-meter research plots, it is estimated there are approximately 93,000 trees in the Woods which store 47,000 MT of carbon. The current gross carbon sequestration of trees is approximately 3,900 $MTCO_2e$ per year, and the net carbon sequestration is 1104 $MTCO_2e$ per year, nearly the same amount as our total municipal emissions from 2019: 1119 $MTCO_2e$. Gross sequestration is the amount of $CO_2$ that a forest absorbs from the atmosphere while net sequestration is the gross sequestration minus any releases of $CO_2$ back into the atmosphere released through processes such as respiration, decomposition of organic matter, and disturbances like deforestation. Net sequestration is a more relevant measure when considering the role of forests in mitigating climate change, as it reflects the forest's actual contribution to reducing atmospheric $CO_2$ levels.

i-Tree has the capability to run future projections, several scenarios have been run with different assumptions. Results below are for the base case where there is no regeneration of trees (which is occurring because of deer browsing) with 2% annual mortality (results shown in blue). A second scenario is shown where there is an additional 20% annual mortality of American beech trees (results shown in red). There are approximately 17,000 beech trees in Irvington Woods; it is the second most prevalent tree in the Woods to Sugar maple. These trees are infected with Beech Leaf Disease and are already in poor health; it is possible they will largely die off in the next 10 years (this is being studied by a further community based project).

The figure below shows the prediction for the number of trees. By 2050 with 2% annual mortality the number of trees is only 59% of what there are currently. With additional beech mortality, it is even lower at 45%.

The figure below shows the prediction for the net carbon sequestration. With 2% annual mortality, this remains relatively constant for the next 10 years but then declines to be only 55% of the current value by 2050. With additional beech tree mortality, the net sequestration declines rapidly to be less than 30% of the current value after 10 years because of the increased decomposition from the dead beech trees. After this, it recovers somewhat, but the total net sequestration over the 27 years out to 2050 is only 39% of what it would be if the current value is maintained.

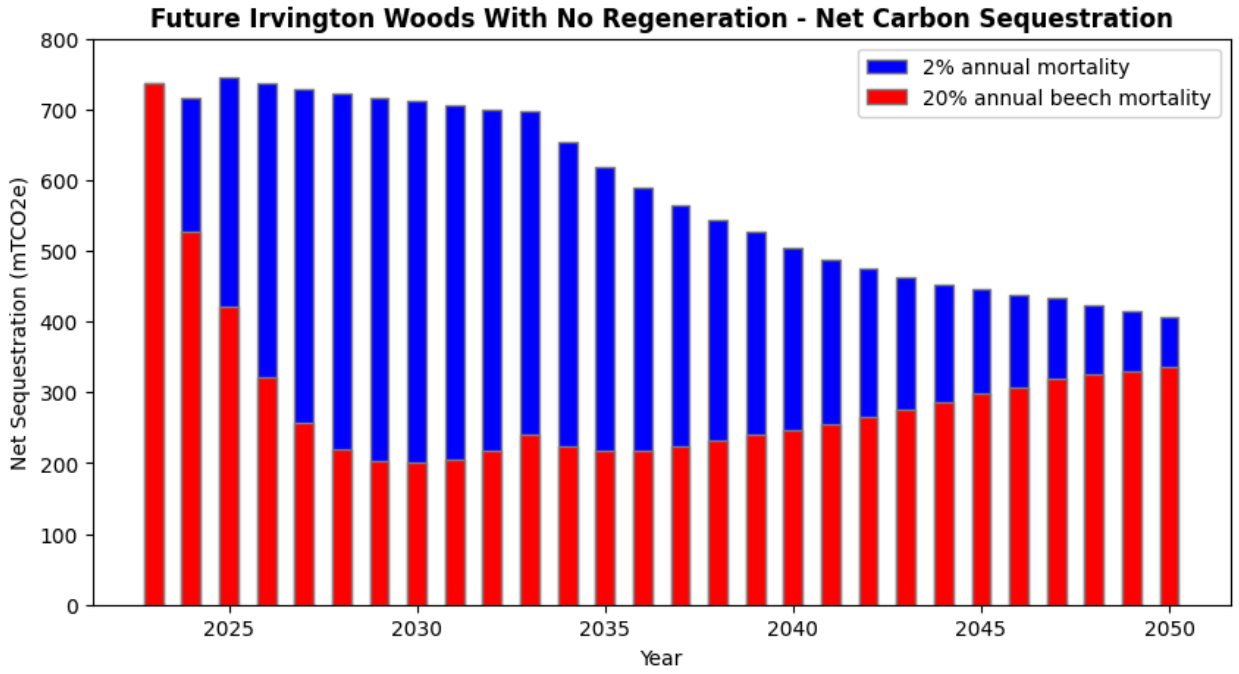



Figure 17. Future Irvington woods with no regeneration

Given this drastic scenario, efforts are under way to manage Irvington Woods Park to increase carbon sequestration through reforestation and improved forest management practices to enhance its future role in mitigating climate change.

# Monitoring Plan

While some of the actions within the Irvington's Local Government Operations Climate Action Plan are well under way, over the coming months Irvington will engage with stakeholders to prepare for any prerequisite or additional actions needed to begin Plan implementation.

These prerequisite actions include:

- Gathering bids for contracted services and equipment.
- Making necessary changes to local policies or existing programs.

Establishing a monitoring process enables Irvington to track the impacts of the actions included in the plan and compare estimated impacts to what is actually achieved in terms of energy savings, renewable energy production, and GHG emissions reduction. Assessing the implementation status of the actions will allow for determination of whether the action is performing well or to identify corrective measures. This process is also an opportunity to understand the barriers to implementation and identify best practices or new opportunities for moving forward.

At the beginning of the Capital and Operating budget seasons each year, new climate actions should be considered and compiled into a new report every year and will include any status updates on the overall strategy, the mitigation action plan, and the adaptation action plan. Key stakeholders and department heads should be reminded of these requirements for their budget planning. Reflections of actions taken in the prior year per department should be part of their review.

A full monitoring report will be developed every four years, and in addition to the components in the action report, it will include an updated local government operations GHG inventory. Ideally, the most recent GHG inventory should be no more than four years old. Since the included inventory dates from 2019, and subsequent years were impacted by unusual COVID pandemic patterns, another inventory will be completed before the next annual report in 2025. This will help Irvington track its GHG emissions reduction progress. With the approval of this Local Government Operations Climate Action Plan in 2024 and Adaptation chapter complete in 2025, Irvington will complete its first full monitoring report in 2029. All reports will be posted to both https://irvingtonny.gov/684/Climate-Initiatives and https://www.ecoirvington.org/climate with greater details and updates on Irvington Green. Further, the Climate Action Plan will be incorporated into the Comprehensive Plan at the next update.

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