The Village of Bronxville

Westchester County NY

2018 Inventory of Communitywide Greenhouse Gas Emissions

June, 2022

Produced by the Village of Bronxville Climate Smart Communities Task Force
With Assistance from ICLEI - Local Governments for Sustainability USA

Credits and Acknowledgements

Mary Marvin, Mayor, Village of Bronxville

Helen Knapp, Bronxville Trustee and Climate Smart Communities Task Force

Jim Palmer, Village Administrator

Stephen Shallo, Assistant Village Administrator, Coordinator, Climate Smart Communities Task Force

Carole Upshur EdD, Lead Author and Analyst, Climate Smart Communities Task Force and Bronxville Green Committee

Ellen Edwards, Chair, Climate Smart Communities Task Force; Chair, Bronxville Green Committee

Susan Cody, Contributing Analyst, Bronxville Green Committee

Maria Terjanian, Climate Smart Communities Task Force and Bronxville Green Committee

Alexandra OKeefe, Intern, Climate Smart Communities Task Force, Atmospheric Science Major, Department of Atmospheric and Environmental Sciences, State University of New York at Albany

Special Acknowledgements:

Kale Roberts, Senior Program Officer, and Matthew Katz, Program Officer, ICLEI USA

Eleanor Peck, Hudson Valley Regional Council, Clean Energy Communities Coordinator for NY State Climate Smart Communities and NYSERDA Clean Energy Communities Program

Kat Carroll, Hudson Valley Regional Council, Clean Energy Communities Coordinator for NY State Climate Smart Communities and NYSERDA Clean Energy Communities Program

Jim Yienger, Climate Action Associates, NYSERDA Clean Energy Communities Program

Ali Mohseni, Munnsh Pater, Sandeep Puppala, & Debra Nelson, Mid-Hudson South & New York Metropolitan Transportation Councils

Vincent F. Kopicki, Commissioner, Westchester County Department of Environmental Facilities

Andrew Ziegler, Program Administrator,Bus Operations, Westchester County Department of Public Works and Transportation

James Keogh, Vice President, Support Services, New York Presbyterian/Lawrence Hospital

Mayor Nicola Armacost, Village of Hastings-on-Hudson, NY

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Executive Summary

Introduction

The world stands at a crossroads. Climate change has been firmly established by an ever-growing body of scientific evidence to be real, manmade, and already catastrophic for large numbers of people around the globe. Even in the U.S., which contributes most to climate change per capita, our citizens have suffered storms, wildfires, and flooding that are exacerbated by climate change. Numerous reports, most recently the Intergovernmental Panel on Climate Change produced by the United Nations in February and April of 2022, tell us that the world must drastically reduce its release of greenhouse gases produced by the burning of fossil fuels by 2030 to have any chance of restricting a global rise in temperature to 1.5 degrees Celsius, reiterating the goal set in the 195 nation Paris Climate Agreement of 2015. Beyond that point, global climate systems are expected to be so disrupted that they cannot be repaired with any existing technologies, and great sections of the globe are expected to become uninhabitable for humans and many other species.

New York State became a leader on this issue when, in 2019, it passed the Climate Leadership and Community Protection Act (CLCPA). This legislation sets into law ambitious targets that scientists tell us we must meet to avoid the worst effects of climate change. Those include 70% electricity from renewable sources by 2030 and an 85% reduction of fossil fuel emissions along with carbon neutrality by 2050. (Carbon neutrality means that although we will still emit greenhouse gases, they will all be offset by technologies and natural systems that capture and retain 100% of those emissions.)

Although national and international action is needed to address the biggest contributors to greenhouse gas emissions (GHG), local communities and their residents, have a huge role to play.

In this context, recognizing the urgent need to act both to mitigate climate change and to strengthen our ability to adapt to its impacts, in February 2021, the Bronxville Trustees passed a resolution to join New York State's Climate Smart Communities (CSC) program. (CSCFactSheetModelRes2020_v2.pdf (ny.gov)). The Village of Bronxville's Climate Smart Communities Task Force (CSC), formed to implement CSC activities, has undertaken various steps to document climate impacts, mitigation, and planning for future sustainability. In April 2022, the CSC completed and reviewed with the Village Trustees a report on emissions from municipal operations, which are a subset of communitywide emissions (Municipal Green House Gases Report | Bronxville NY (villageofbronxville.com).

This current report provides estimates derived from public deidentified data sources of greenhouse gas emissions resulting from all municipal, resident and business activities, combined, for a baseline year of 2018. Additional data from large energy users that may not be reflected in this report is still being collected and will inform the Village's planning and future actions around climate mitigation. These data will be updated periodically to measure the Village's progress in reducing greenhouse gas emissions by undertaking both municipal and communitywide efforts to meet climate mitigation goals.

Methodology

The community inventory in this report includes 2018 estimated emissions from the five Basic Emissions Generating Activities required by nationally accepted standards for conducting such inventories (GHG Protocols | ICLEI USA), These elements include:

- ✓ Use of electricity by the community
- ✓ Use of fuel in residential and commercial stationary combustion equipment (natural gas & heating oil)
- ✓ On-road passenger and freight motor vehicle travel (gasoline and diesel consumption)
- ✓ Use of energy in potable water treatment and distribution
- ✓ Generation of solid waste by the community

The community inventory also includes the following activities:

- ✓ Energy use from Metro-North Railroad and Bee-Line bus transportation within the Village
- ✓ Wastewater processing
- ✓ Fugitive emissions from natural gas leakage

The results of the inventory are reported 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.

Key Findings

Figure 1 shows communitywide emissions by sector. The Village produced about 58,825 metric tons of CO2 equivalents in 2018 (MTCO2e). The largest contributor was residential energy with 40.4% of emissions, followed closely by commercial energy at 34.7%. Transportation and other mobile sources represented 18.5%. Solid waste disposal (3.5%), water and wastewater treatment (1.6%), and fugitive emissions from natural gas distribution (e.g., leakage, 1.3%) combined make up less than 10% of the total.

The Inventory Results section of this report provides a detailed profile of emissions sources within the Village of Bronxville, information that is key to guiding local reduction efforts. As noted in the detailed methodology sections, various data assumptions and substitutions had to be made to calculate emissions in all sectors because of inconsistencies and gaps in public data sources. Commercial use of heating oil, for example, is not publicly available. In addition, some, but not all, the activities of large energy users such as New York Presbyterian/Lawrence Hospital and the Bronxville School are reflected in communitywide public data, and the Village will need to continue to work with these entities to better understand overall emissions and to plan and estimate future reductions in GHG emissions. Nevertheless, these data will provide a baseline against which the Village will be able to target climate mitigation strategies for the most effective impacts and will be able to monitor future performance and demonstrate progress in reducing emissions.

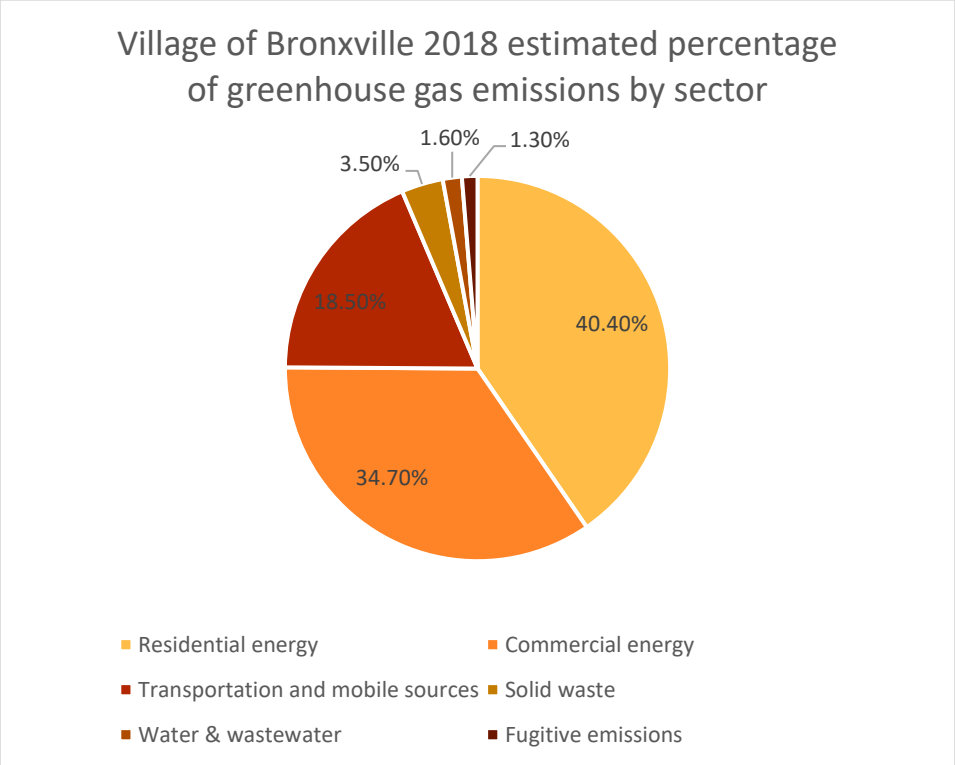


Figure 1. Communitywide sources of greenhouse gas emissions in 2018

The Village of Bronxville Communitywide Greenhouse Gas Inventory Report: 2018

The Village of Bronxville recognizes that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, wellbeing, and prosperity of our community. While over the last decade Village government has taken steps to become more energy efficient, by installing a geothermal heating and cooling system in Village Hall, transitioning traffic signals to LED bulbs, promoting recycling, and inaugurating a residential food scrap recycling program, these efforts have taken place without an understanding of the overall climate impacts of municipal, residential, and commercial activities within the village and ways they might be lessened.

In order to take steps both to mitigate climate change, and to strengthen the Village's ability to adapt to its impacts, in February 2021, the Bronxville Trustees passed a resolution to join New York State's Climate Smart Communities (CSC) program. (CSCFactSheetModelRes2020_v2.pdf (ny.gov)) The CSC program supports local government and communitywide efforts to reduce greenhouse gas emissions, adapt to the increasing threats of climate change, and develop a productive green economy for its residents and businesses. The CSC program seeks to improve the livability, health, resilience, and equity of all communities.

The Village created a Climate Smart Communities Task Force (CSC) consisting of a staff coordinator, a Village Trustee, and several members of the Bronxville community to guide the CSC work. The Village of Bronxville's Climate Smart Communities Task Force identified a number of action steps outlined in the CSC program that address areas of opportunity to address climate mitigation and resiliency within its municipal operations and overall community activities. Undertaking some of these action steps will qualify the Village for technical assistance and grant funding through various state agencies. In April 2022, the CSC completed and presented to the Village Trustees a report on municipal operations greenhouse gas emissions (Municipal Green House Gases Report | Bronxville NY (villageofbronxville.com)). The current report represents estimated greenhouse gas emissions within the Village from all municipal, residential, and business activities combined for the 2018 baseline year.

This report was facilitated by technical assistance and software programming provided by ICLEI Local Governments for Sustainability USA, which the Village of Bronxville joined in August 2021. The report follows the recommendations of the CSC New York Community and Regional GHG Inventory Guidance, 2015 (New York Community and Regional GHG Inventory Guidance (ny.gov) , the Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, Version 1.1, 2010 (Local Government Operation Protocol), and the US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Version 1.2, 2019 (US Community Protocol - (icleiusa.org))

Introduction to Climate Change

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise. Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere[1]. Many regions are already experiencing the consequences of global climate change, and The Village of Bronxville New York is no exception.

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (high confidence). 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 (high confidence), but these emissions alone are unlikely to cause global warming of 1.5°C (medium confidence). Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C (high confidence). These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options (high confidence).[2]

An illustration of how accumulating GHG levels affect global temperature and how policies and actions adopted by business, government, and individuals have already made an impact can be found in the following two illustrations prepared for this report based on data provided from an April 3, 2022 New York Times Morning Newsletter authored by German Lopez :"We Have Reasons for Hope on Climate Change".

While we can be discouraged by the worst-case scenarios, these data demonstrate that actions since 2015 have already made an impact on lowering global temperature, and continued changes such as increased efficiencies in automobiles and home appliances, energy conservation, and the development of new,

[1] International Panel on Climate Change. 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.)]. IPCC, Geneva, Switzerland, 151 pp. Retrieved from https://www.ipcc.ch/report/ar5/syr/

[2] 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.

green energy options are also making a difference. However, to protect our community and the globe from escalating climate risks, we need to do much more. That is why the Village has joined New York State's Climate Smart Communities Program and seeks to have municipal operations as well as the whole community work toward substantial reductions in greenhouse gas emissions.

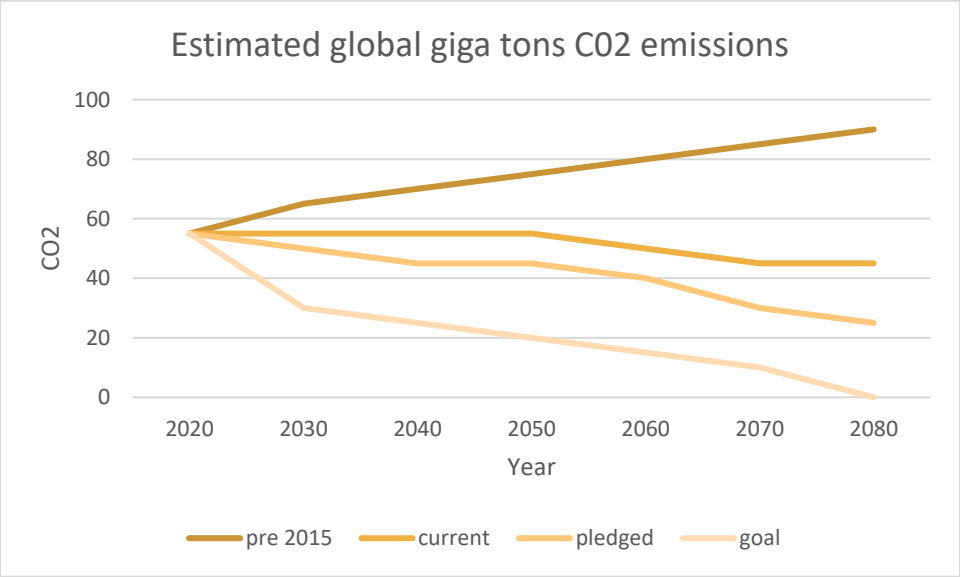


Figure 2: Projected GT of C02 based on different levels of climate mitigation policy

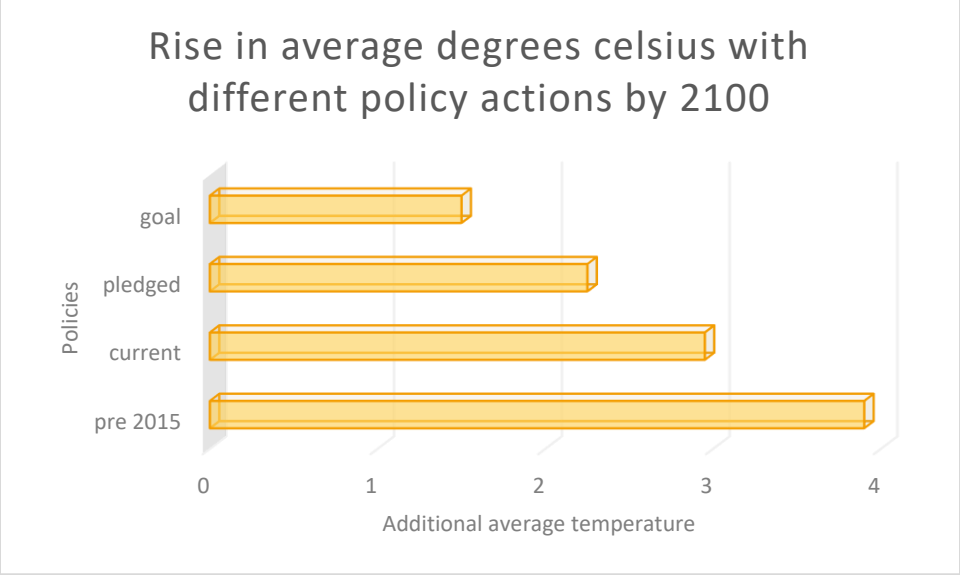


Figure 3. Rise in global temperature forecast by 2100 with different policy scenarios

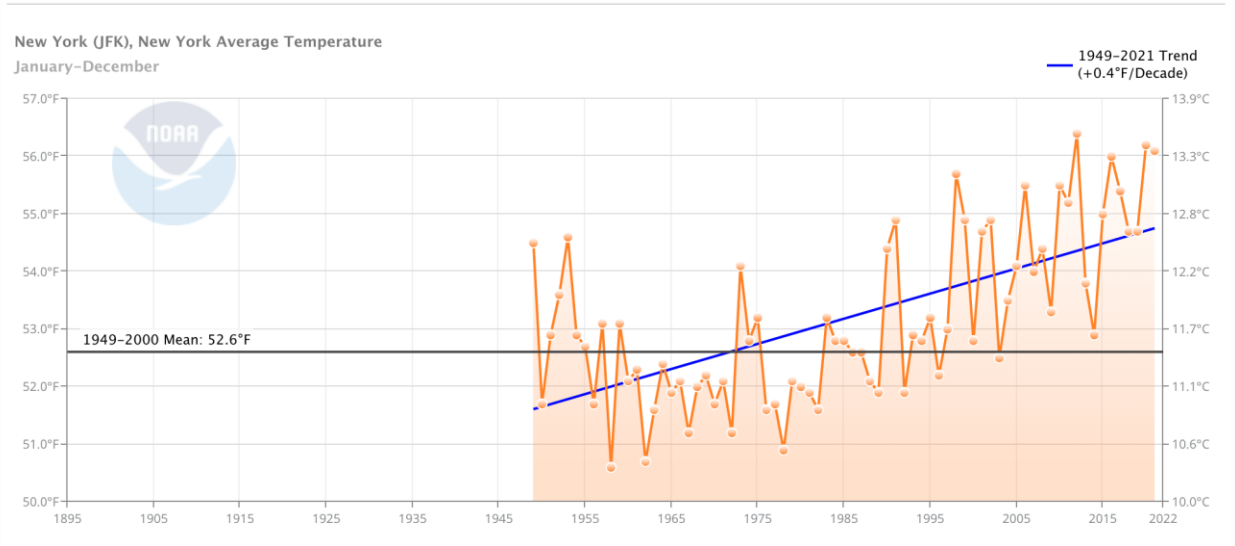
Climate Change and the Village of Bronxville

As indicated earlier, climate impacts are not even across the globe and across regions. While the Village of Bronxville may be spared some of the most prominent climate risks, data on various climate trends for our area indicate substantial changes that will require adaptation. Decreasing overall global warming will mitigate the worst effects for Bronxville as well the rest of the nation and globe. The threatening climate effects for the Village of Bronxville include dangerous warming, increasing storm intensity and flooding, effects on our drinking water and air quality, and increases in health-related problems such as breathing problems, allergies and vector-borne diseases.

According to a New York State Energy Resource and Development Authority (NYSERDA) 2014 overview of climate change risks to New York overall temperatures have already risen about 2.4 degrees Fahrenheit (or 1.3 degrees Celsius) in the last 50 years in the state, with warmer winters and more cooling degree days in summers (e.g. days when the temperature exceeds 65 degrees and may require energy use to make living and working environments comfortable). Responding Climate Change in New York State (ClimAID) - NYSERDA Westchester-specific data updated in 2021 shows a 2-degree Fahrenheit average increase (or 1.1 degrees Celsius). Since climate impacts occur are unevenly this suggests that New York State overall, as well as Westchester County, may be more at risk than some other geographic areas for heat-related impacts. (www.dec.ny.gov/docs/administration_pdf/ccnys2021.pdf)

Rising temperatures in the Village of Bronxville could make it an increasingly difficult place to live year-round. Modeling below completed using NOAA timeseries plotting tools and weather data from the JFK airport collections station from 1949-2001 clearly shows the overall continuous rising trend in local temperatures. Source: Climate at a Glance | National Centers for Environmental Information (NCEI) (noaa.gov)

Figure 4: Temperature trend in NY-Westchester area based on NOAA monitoring data at JFK airport.



Rising temperature translates to risk for the very young, very old, those with various health conditions, and outside workers due to heat stress. Heat stress is serous and can result in hospitalizations and death. Annual heat index days (taking into account humidity and temperature in the shade) have varied widely in the New York area, but in the last five years one year had 22 such days and one had 13. The average maximum heat index in NYC across 2010-2019 was 106.9^0 Fahrenheit, although the Village of Bronxville's maximum would be expected to be a bit lower. Source: NYC Environmental Health (cityofnewyork.us) Overall, it is projected that days above 90 degrees could increase by 12 to over 30 in our area by the 2030s. These data show just how difficult summer temperatures in our area could become.

Changes in precipitation patterns and amounts, as well as sea level rise will pose the other major climate risk for the Village. While parts of the West will be struggling with drought, the Northeast will be struggling with floods. Flooding will be caused by more heavy rain and snow events. Combined with rising levels of water along Long Island Sound and along tidal rivers such as the Bronx River and the Hudson River, storm runoff will be increasingly difficult to control. Precipitation is projected to increase in the winter and spring, in particular, potentially also causing short periods of drought in late summer. It is easier for flooding to occur in the winter and spring when the soil is harder due to lower temperatures.

Area street after Hurricane Ida (*Bronxville Green Committee)*

In the next decade, Westchester County is one of three counties in the state expected to have significantly more rainfall events that produce more than 3" of precipitation. New York Climate Change Science Clearinghouse (nyclimatescience.org)

Figure 5 below also shows Westchester County among NY counties most at risk for the highest predicted increases in precipitation over the next 50 years. Source: [Impacts of Climate Change in New York - NYS Dept. of Environmental Conservation]

Figure 5. Projected rainfall amounts, NY State, Department of Environmental Conservation

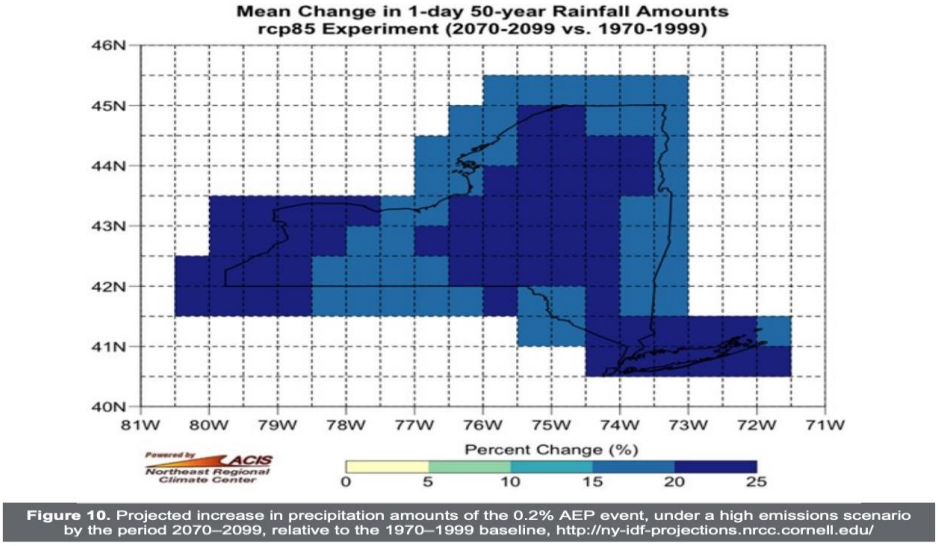


Figure 10. Projected increase in precipitation amounts of the 0.2% AEP event, under a high emissions scenario by the period 2070–2099, relative to the 1970–1999 baseline, http://ny-idf-projections.nrcc.cornell.edu/

Increases in tropical storms and Nor'easters are both probable, although specific increased risks cannot be calculated at this time because of uncertainties in the prediction of storms. However, in the past 20 years, NOAA has already documented a number of wind, rain, power, and flooding issues in our area. Westchester County spent half a billion dollars on Hurricane Sandy restoration alone. (Source: [WESTCHESTER | Climate Change Resources]). Most of the data used in this report, does not encompass any information about damage from Hurricane Ida in September 2021, which was the most recent serious storm event for the Village.

Hurricane Ida: Paxton Avenue & Bronx River Flooding September 2021

(photo credits*: Village Staff & Bronxville Green Committee)*

A 2021 update of the Westchester County Hazard Mitigation Plan identifies high risks for the Village of Bronxville as flooding and severe rainstorms, with a medium risk of severe winter storms. About 20 properties in the Village have been exposed to repeated flooding losses, as identified by the National Flood Insurance Program. The most vulnerable areas of the Village are Parkway Road, Stone Place, lower Milburn, and Paxton Avenue. According to a NOAA Storm Events Database (Storm Events Database - Event Details | National Centers for Environmental Information (noaa.gov)), from 2001-2021, 48 storm events were recorded in Westchester County. Three of these were widespread, 3 were focused in Bronxville, and an additional 10 occurred in abutting areas such as Fleetwood, Yonkers, Mt Vernon and Tuckahoe. Overall, 31% of storm events in Westchester County in the last 20 years, before Hurricane Ida, had some impact on Bronxville.

While not as obvious, climate change also jeopardizes the availability of clean drinking water, and has other broad ranging health effects.

- Clean drinking water is affected by storm water runoff. Uncontrolled surface runoff can cause water sources to become polluted (How Climate Change Impacts Our Water (columbia.edu)).
- Water resources are affected by a decreasing snowpack caused by warming temperatures.
- Warming increases air pollution, when sunlight interacts with human made chemicals, and causes earlier and longer plant pollination cycles, extending the allergy season.
- Unsafe air causes millions of lost life years and is particularly harmful to children and older populations; it is implicated in development of asthma.
- Increasing heat and moisture make it harder to control mold which can lead to human health problems.
- Finally, a warming climate also affects the distribution of animal borne diseases by increasing the spread and the length of time during the year that ticks, mosquitoes, and fleas abound. In Westchester this suggests increasing cases of Lyme disease, West Nile virus, Eastern Equine Encephalitis, and perhaps the appearance of Dengue virus and Zika virus.

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 and makes indoor environments more comfortable year-round. 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 both local and regional air quality and increasing opportunities for walking and bicycling improves residents' health.

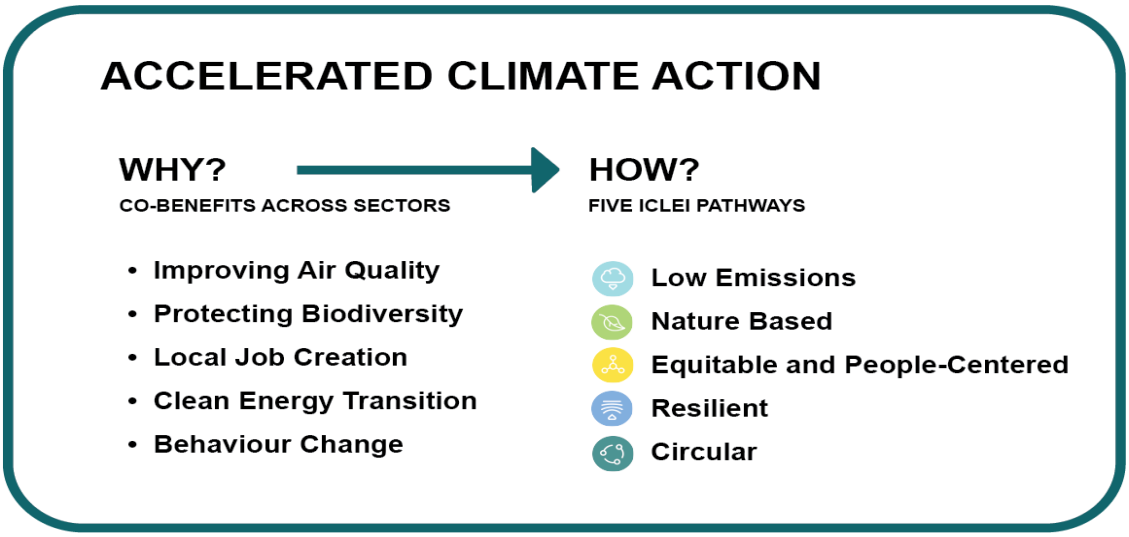
Greenhouse Gas Inventory as a Step Toward Carbon Neutrality

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 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. Creating a roadmap for climate neutrality requires the Village of Bronxville to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and many other impacts that can also deliver on sustainable development.

To complete this inventory, the CSC Task Force 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 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.



To achieve ambitious emissions reduction, and move toward climate neutrality, the Village of Bronxville will need to set a clear goal and act rapidly following a holistic and integrated approach. Climate action is an opportunity for our community to experience a wide range of co-benefits, such as creating socio-economic opportunities, reducing inequality, and improving the health of people and nature.

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.

Figure 6: ICLEI Milestones for identifying and reducing GHG emissions

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, also shown in Figure 6:

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

This report, along with the Village of Bronxville Municipal Operations GHG Inventory, completed in April 2022, represents the completion of ICLEI's Climate Mitigation Milestone One, and provides a foundation for the Village administration and the community to undertake planning to impact community-wide GHG emissions.

[3] Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent your community's fair share of the ambition necessary to meet the Paris Agreement commitment of keeping warming below 1.5°C. To achieve this goal, the Intergovernmental Panel on Climate Change (IPCC) states that we must reduce global emissions by 50% by 2030 and achieve climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. This report presents emissions from the Village of Bronxville community activities. A government operations inventory is a subset of the community inventory, as shown in Figure 7. For example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles. The Village's municipal operations GHG emissions (bronxville_greenhouse_gas_inventory.pdf (villageofbronxville.com)) make up 1.3% of the total community emissions estimated in this report.

Figure 7: Relationship of Communitywide and Government Operations Inventories

As local governments have continued 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), which is described below.

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.

Table 1: Global Warming Potential Values (IPCC, 2014)

	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265

Community Emissions Protocol

Version 1.2 of the U.S. Community Protocol for Accounting and Reporting GHG Emissions[4] was released by ICLEI in 2019 and represents a national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

The community inventory in this report includes emissions from the five Basic Emissions Generating Activities required by the Community Protocol. These activities are:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment (natural gas & heating oil)
- On-road passenger and freight motor vehicle travel (gasoline and diesel consumption)
- Use of energy in potable water treatment and distribution
- Generation of solid waste by the community

This community inventory also includes the following activities:

- Energy use from Metro-North Railroad and Bee-Line bus transportation within the Village
- Wastewater processing
- Fugitive emissions from natural gas leakage

Quantifying Greenhouse Gas Emissions

Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations of emissions are used in the community inventory: 1) GHG emissions that are produced by "sources" located within the community boundary, and 2) GHG emissions produced as a consequence of community "activities".

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A source-based emissions inventory estimates total emissions created/released within the community's jurisdictional boundary. In contrast, an activity-based emissions inventory provides perspective on the overall greenhouse gas emissions of the community, even when the associated emissions occur outside the jurisdictional boundary (such as production of energy that is imported like electricity, or treatment of exported solid waste and wastewater). The division of emissions into sources and activities replaces the scopes

[4] ICLEI, 2019.. US Community Protocol | ICLEI USA

framework that is used in a government operations inventory, which does not have a clear definition for application to community inventories.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. This report on community greenhouse gas emissions inventory utilizes 2018 as its baseline year, because ICLEI software utilizes 2018 emissions factors derived from other research data (such as the proportion of electricity in NYS in 2018 that is generated from solar, wind or hydro vs. burning of fossil fuels) to calculate emissions. Data were also mostly readily available for 2018.

Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

Source
Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere

Activity
The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used:

Activity Data x Emission Factor = Emissions

Most emissions sources in this inventory are quantified using calculation-based methodologies. Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. Analysis for each sector included in this inventory is detailed in the results section.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO_2/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

Inventory Calculations

This inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. The IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factors to calculate the final CO_2e emissions.

The Village of Bronxville Community Emissions Inventory Results for 2018

Residential Energy Use

Residential energy use was derived from two major public data sources. These sources are deidentified of any personal or commercial information. First was the New York State Energy Resource and Development Authority (NYSERDA) Utility Energy Registry (UER) Utility Energy Registry (utilityregistry.org) and the second was the US Census Bureau American Community Survey (ACS) estimates of home heating types for the Village of Bronxville. B25040: HOUSE HEATING FUEL - Census Bureau Table The ACS provided estimates of home heating oil use (684 residential units) and also provided information on tank (propane) use, which was 32 housing units; 1303 units were estimated to use natural gas for heating, and 129 electricity. In 2018 the data were estimated for 2190 housing units, although the margin of error suggested there could be up to 2294 units.

In 2022, the Village Assessor office indicted a total of about 2486 housing units inclusive of single family, two to three-family, rental buildings, condominiums, and cooperative units, so the ACS may be slightly undercounting occupied housing units. All heating emissions sources were included in the overall calculations, along with electricity consumption. Annual household heating oil use was estimated from a 2018 report from the US Energy Information Administration indicating 2015 estimates of Residential Energy Consumption for the Mid Atlantic area. Table CE2.1. This report based on survey data gave a figure of 455 gallons total per household. Source: ce2.1.xlsx (eia.gov)

All information was cross-checked over several years and with the Village assessor count of residential properties and types. A major data error in natural gas data was found in the state's UER registry for the years 2016-2019 with regard to allocation of accounts within categories (e.g., commercial vs residential) and total accounts for the Village of Bronxville. Therefore, while electric use by category appears to be relatively accurate for 2018, the 2018 natural gas use in the Village for both residential and commercial had to be estimated using part of 2019 and also 2020 data ,when the errors in the UER had been corrected. Given that consumption in 2020 would have been affected by the Covid-19 restrictions on commercial activity and many residents staying home all day, the figures we are using likely inflate residential energy use for natural gas, while underestimating commercial consumption.

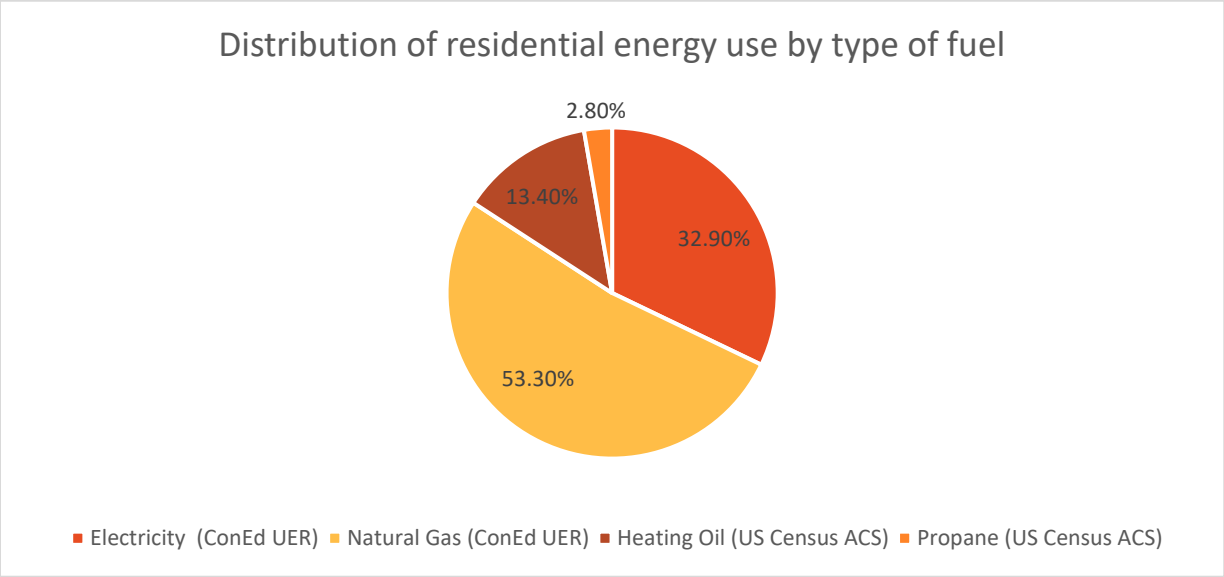
Electric use is reported in Mwh, equivalent to 1000 kilo watts of energy generated per hour. Natural gas use is reported in therms, which measures the heat energy of the gas; one therm is equivalent to about 100 cubic feet of gas. Both heating oil and propane are measured in gallons. Table 2. Shows the total annual Village of Bronxville residential consumption estimates for this energy use, and the GHG emissions associated.

Table 2. Residential energy use estimates and GHG emissions

Type of fuel	Estimated total consumption	Unit of Measurement	Total Estimated MT CO2
Electricity (ConEd UER)	28,772	Mwh	7829.2
Natural Gas (ConEd UER)	2,385,388	therms	12,687.0
Heating Oil (US Census ACS)	311,220	gallons	3197.8
Propane (US Census ACS)	11,904	gallons	67.2

Overall, residential energy is the largest category of energy use in the Village of Bronxville, reflecting a total of 23,781 MT of C02e emissions. Thus, the residential energy sector represents a prime target for GHG emission reductions through energy efficiency programs and the introduction of green solutions for home energy consumption. The graphic below shows the percentage breakdown in MT C02e between electricity, natural gas, propane, and home heating oil in terms of total GHG emissions for residential energy use.

Figure 8. Distribution of MTCO2e emissions for residential energy use by type of fuel



Commercial Energy Use

Commercial energy use data were also derived from the New York State Energy Resource and Development Authority (NYSERDA) Utility Energy Registry (UER) Utility Energy Registry (utilityregistry.org) As with the residential information, the electricity data base seemed accurate for the 2018 base year, but commercial accounts for natural gas use were apparently misclassified and there was double counting of some accounts in the years 2016- part of 2019. Estimates for this report were calculated based on partial 2019 and 2020 accounting years. This likely inflated use of residential energy and reduced the estimate of commercial energy use due to Covid-19 closings in 2020. Note that we did not classify any business as 'industrial' for this report since there are no major industrial operations withing the Village. Businesses include municipal operations, health care, schools, services, religious organizations, retail, and restaurants. Also of note is that there is no public source for commercial heating oil use. Therefore, those emissions are not reflected in this inventory except data from municipal operations and the hospital.

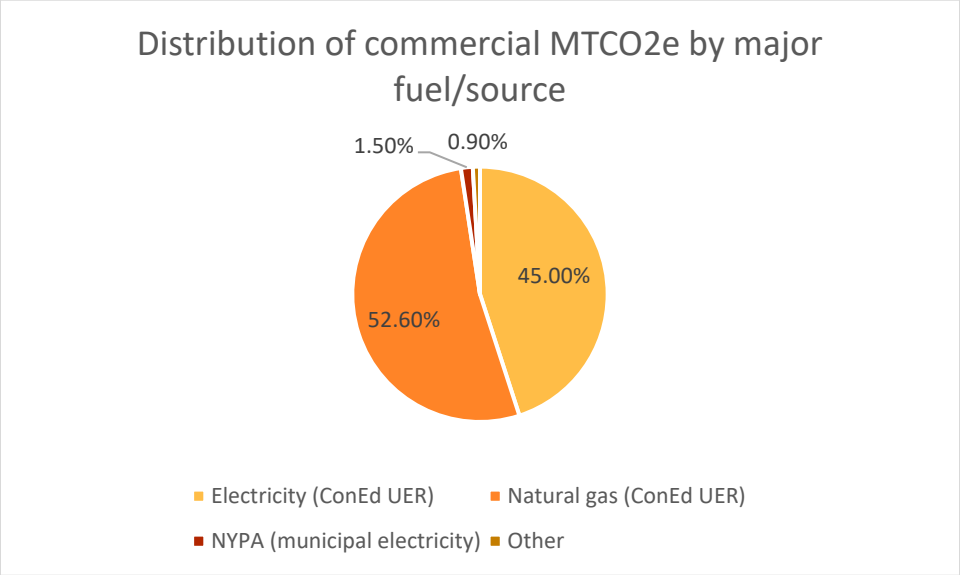
Further, while municipal electricity use was captured and included in these data from the Village report on municipal operations, we were not able to obtain detailed Bronxville School electricity use data at the time of this report. Both the Village of Bronxville and the Bronxville School electricity is purchased from the New York Power Authority (NYPA) and therefore is not reflected in the bulk ConEd utility registry information. School natural gas use is included in the ConEd data. NYP/Lawrence Hospital also provided data showing most of their energy use is purchased from ConEd and therefore is reflected in the public aggregate databases we used to complete this report. The small amount of hospital use of heating oil for backup power has been added into the data base.

Table 3. Commercial energy use estimates and GHG emissions

Type of fuel	Estimated total consumption	Unit of measurement	Total Estimated MT CO2
Electricity (ConEd UER)	33,871	Mwh	9184.8
Natural gas (ConEd UER)	2,017,482	therms	10,730.0
NYPA (municipal electricity)	1,129	Mwh	306.2
Municipal heating oil use	11,266	gallons	115.7
Municipal propane use	935	gallons	5.3
Lawrence Hospital heating oil use	5858	gallons	60.2

Overall, commercial energy use represented 20,402 MT CO2e or 34.7% of total Village GHG emissions. The distribution among electricity and natural gas are illustrated in Figure 9. Interestingly, Lawrence Hospital use alone represents 37% of all commercial electricity use, and 44% of all commercial natural gas use in the Village as indicated in data provided to the Task Force. The proportion of heating oil and propane use by the Village operations, and the small amount of hospital heating oil use together account for 0.9% of the commercial energy use.

Figure 9. Percent distribution of MT CO2e for commercial energy use by major type of fuel/source



On Road Transportation and Transit

On road transportation and transit typically reflect a large proportion of GHG emissions. This category of GHG emissions includes both vehicle use, as well as public transit such as commuter rail and bus service. In the case of the Village of Bronxville, which is only about one square mile and does not contain any major highway or parkway road segments, the GHG emissions within boundary for vehicle use is modest compared to other locations. Data for VMT (vehicle miles traveled per day) are the primary measurement, along with estimates of the distribution of type of vehicles (cars vs light and heavy trucks), and fuel (gasoline vs. diesel).

Vehicle Use

We obtained preliminary VMT from state/county Department of Transportation (DOT) traffic counts on main road segments in the Village for 2018, and we also were able to obtain a customized 2019 VMT report from the DOT New York Metropolitan Transportation Authority (nymtc.org > Home) after submitting a FOIL request (Freedom of Information Law). Both estimates of VMT were very close so we used the 2019 customized data, however, road segments for Sprain Brook Parkway and the Bronx River Parkway were included in this estimate and had to be excluded as the Village boundary ends before these roadways.

A total of 22,956,364 annual miles were travelled on roads by cars, trucks and motorcycles within the Village of Bronxville boundaries in 2018/2019 according to these estimates. Distribution of type of vehicles was derived from Mid Hudson figures provided in the 2015 NYSERDA report on methods and data sources for conducting GHG inventories (Table 17) New York Community and Regional GHG Inventory Guidance (ny.gov). The distribution estimates that the majority of vehicles (79.2%) are gasoline powered passenger vehicles, with 12.4% light trucks and 3.3% heavy trucks, and 0.5% motorcycles. The remainder are diesel powered passenger vehicles and trucks. The ClearPath software used US Department of Transportation 2018 Default data (updated in 2021) County Transportation Profiles | Bureau of Transportation Statistics (bts.gov) to estimate emissions based on mpg, type of fuel and profiles of vehicles in use.

Commuter Rail/Metro-North

The Harlem Line of the Metro-North Railroad runs 0.84 miles through the Village of Bronxville (calculated through GPS programming by the New York Metropolitan Transportation Authority specifically for this report). We did not receive replies for two FOIL (Freedom of Information Law) requests to Metro-North Railroad for information about schedule and type of engine used. We were able to identify the main type of electric train engine used on the

Harlem line through various internet sources and had to use general information about kwh expended per mile in rail engines to calculate emissions for this report.

A complete train schedule for 2018 could not be located online or by the DOT; only a weekend schedule was found. However, the Transportation Authority staff provided a complete 2019 weekday schedule. Other data on passenger boardings from Bronxville Station over a few years indicated that year to year changes were not significant, therefore 2019 trips through the Village, and stops at Bronxville Station, both weekdays and weekends/holidays, were counted. About 104 trips inbound and 108 trips outbound were noted for the daily weekday schedule. The Saturday schedule was 65 trips both ways, and Sunday/holiday schedules indicated 58 inbound and 50 outbound trips. The total annual trips were estimated at 67,958 trips, or 57,085 miles travelled within Village of Bronxville boundaries.

Based on various posted Metro-North information, we determined that the train engines used on the Harlem line were purchased in the mid-2000s, and likely were Bombardier M7A engines. Energy use in kwh per mile for electric train engines is discussed in a few research and transportation papers found online 1427870 (osti.gov).
Since we could not determine the specific energy consumption for these engines, and energy use varies by load, grade and temperature, we estimated kwh energy use per mile by averaging a range of information found online. A figure of 59.9 kwh/mile was used to calculate that Metro-North engine electric use withing Village of Bronxville boundaries was 3491.4 Mwh, resulting in emissions of 927.2 MT CO2e.

We also examined passenger use of the Harlem line. A 2018 Metro North report indicated total Harlem line ridership at 27,450,985 rides, an increase of 3.9% from 2007. MNR-2018-Annual-Ridership-Report.pdf (mta.info) Based on a ridership report for Bronxville Station boardings in 2007 (inbound only) (mnrr_2007_ridership.pdf (wordpress.com), and growth in ridership overall, we estimated that the 2018 total annual inbound passenger boardings from Bronxville Station was 1,811,765 passengers. Over half of all New York area workers use public transit, representing about a third of all public transit commuters in the entire country. Unfortunately, despite steady ridership in the NY metro area, overall use of public transit has declined in the US in the last 50 years, accounting in part of the US increase in GHG emissions. Commuting by Public Transportation in the United States: 2019 (census.gov)

Westchester County Bee-Line Bus Service

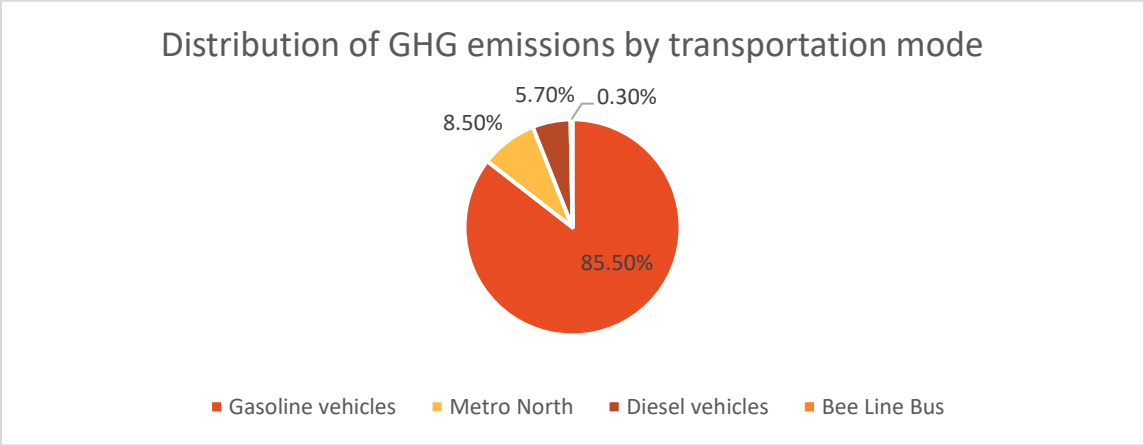
We were provided data about the Westchester County Bee-Line Bus Service by the Program Administrator for Bus Operations for the county. He identified that Bee-Line buses traveled 421 miles per week in the Village of Bronxville, or 20,852 miles annually. There were 676 weekly passenger boardings in the Village, or 35,152 annually. While we did not have exact mpg for the diesel-powered buses, online information Alternative Fuels Data Center: Maps and Data - Average Fuel Economy by Major Vehicle Category (energy.gov) indicates that transit buses use 3-9mpg. We used 6.1 mpg to calculate estimated GHG emissions of 34.9 MTCO2.

Table 4 shows the distribution of GHG emissions by type of transportation and fuel and Figure 10 shows the distribution of transportation emissions by MTCO2e. This sector totals 10,895 MT CO2e emissions and represents 18.5% of total community emissions.

Table 4. Transportation types and estimates of GHG emissions

Type of transportation	Type of fuel	Estimated total consumption	Unit of measurement	Estimated MT CO2
On-road transportation	Gasoline (motorcycles, passenger vehicles & light trucks)	21,521,403	VMT	9312.2
	Diesel (passenger vehicles & trucks)	1,434.961	VMT	620.9
Bus Transit	Diesel	3418	Gallons	34.9
Rail	Electric	3419.4	Mwh	927.2

Figure 10. Distribution of MTCO2e GHG emissions for different transportation modes



Solid waste

Solid waste data for the Village of Bronxville was identified from Westchester County posted reports from the Department of Environmental Services: 2018annual.pdf (westchestergov.com) This report indicates the tons of municipal waste collected as well as total county commercial waste delivered to the county transfer and trash-to-energy facilities. A description of the county solid waste process can be found here: Facilities (westchestergov.com)

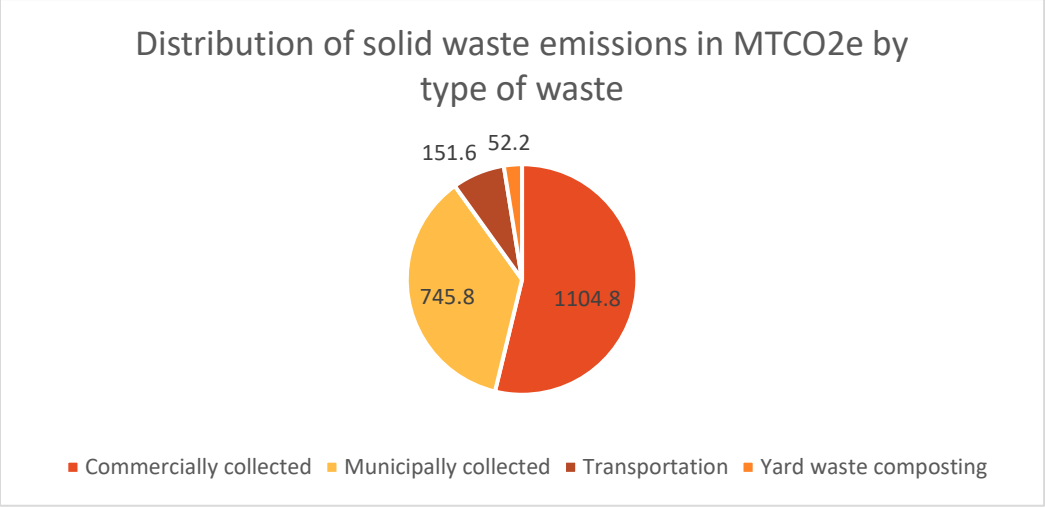
The amount of municipally collected solid waste for the Village was reported to be 2149 tons in 2018, while we estimated the commercially collected amount as 3190 tons, based on population proportion of the Village compared to the population served by the county facilities. The recycling percentage assigned to the Village of Bronxville in 2018 was lower than many other localities (30%), but the 2020 report cites a 64% recycling rate, so the data for 2018 may not be accurate.2020 Annual Report (westchestergov.com)

In addition, we calculated the energy used to collect and transport the Village's solid waste to the Peekskill trash-to-energy facility (60 miles round-trip). Village administration reported that 750 tons of yard waste from the Village is composted annually, and that figure was used to estimate GHG releases in the composting process.

Table 5. Solid waste production and treatment emissions

	Type of energy used	Amount of waste	Unit of measurement	Estimated MTCO2
Solid Waste	Treatment of waste generated	5339	tons	1850.6
	Energy used in collection and transport	5339	tons	151.6
	Energy released in yard waste composting	750	tons	52.2

Figure 11. Distribution of total GHG emissions by type of solid waste including collection and transport



The total solid waste emissions were 2054 MT CO2e, or 3.5% of total emissions. NYP/Lawrence Hospital reports that 60% of their solid waste goes to the trash-to-energy facility and would be reflected in these estimates. We were not able to account for the hospital's landfill emissions for this report (327 tons). The Village is already working

on mitigating the amount of solid waste collected by joining a countywide program to recycle food scraps. The food scrap program, launched in December 2021, is already collecting 1.86 tons of food scraps a month.

Water and Wastewater

Information on Bronxville's potable water consumption and energy used in its treatment and transportation were not made available by the local water utility, Suez, in a timely manner after several requests. To complete an estimate of energy use for potable water treatment and transportation, we adjusted information we obtained from another local municipality in the same water district by reducing their figures to meet the slightly smaller population of the Village. It is estimated that about 791 MTCO2e were generated in treatment and transport of potable water for the Village of Bronxville in 2018

Wastewater treatment information was provided for the Village of Bronxville by the Commissioner of the Westchester County Department of Environmental Facilities. Wastewater treatment is a complex process during which gases are both created and diverted to energy generation, flared and discharged. Estimates in Table 6. were adjusted based on the facility population base (Sewer district 2, population 509,921) and the 2018 Village of Bronxville estimated population of 6403. Wastewater treatment is also influenced by groundwater runoff and rainfall amounts depending on the extent of remaining illegal storm drain-sewer connections.

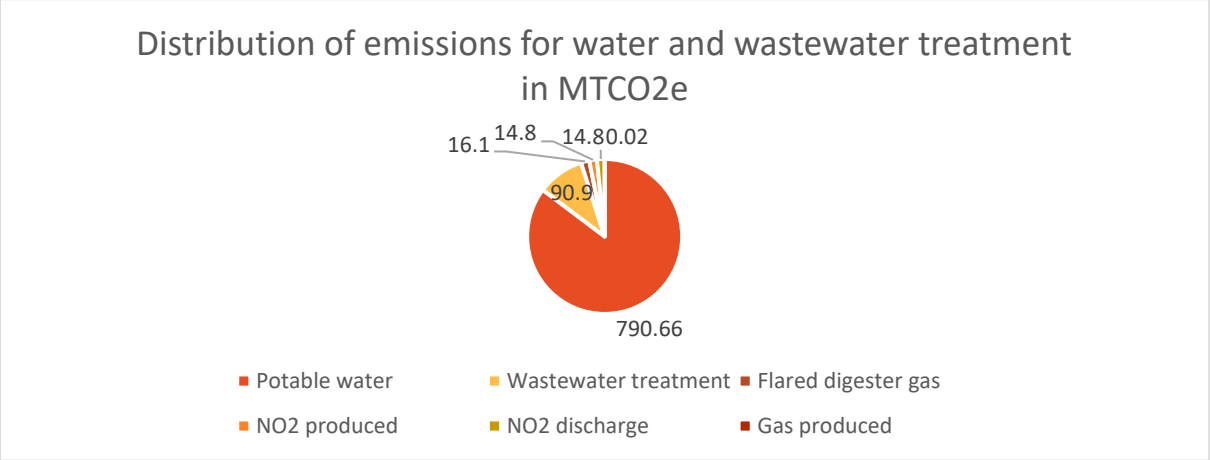
It should be noted that NYP/Lawrence Hospital uses both Suez and the county wastewater facilities and therefore hospital emissions are included in these data. The emissions for water and wastewater total 927 MT CO2e and represent 1.6% of community emissions.

Table 6. Energy use in potable water treatment and transportation and wastewater treatment

	Category of energy use	Amount	Unit of measurement	Estimated MT CO2
Water and wastewater	Potable water treatment energy usage	192	Million gallons/yr	790.7
	Wastewater treatment energy usage	1.1	Million gallons/day	90.9
	Wastewater treatment flared digester gas	105776	Scf/yr*	16.1
	Digester gas produced	289.6	Scf/day	0.02
	NO2 process emissions	population	%	14.8
	NO2 effluent discharge into waterways	Population	%	14.8

- Scf=standard cubic feet; a measure of gas that takes into account temperature and pressure of 100 cubic feet of gas

Figure 12. Distribution of emissions for water and wastewater treatment



Fugitive Emissions

Fugitive emissions for transmission of natural gas in the Village were calculated using the estimated total volume of both residential and commercial natural gas use as derived from the NYSERDA Utility Energy Registry, or 4,402,870 therms annually. The ClearPath software uses standard estimates based on studies for different geographic locations. The leakage rate used was 0.3% and represents 764 MTCO2e.

Summary

The total communitywide emissions estimated for this inventory for baseline year of 2018 are shown in Table 7 and Figure 13.

Overall the total level of emissions estimated for the Village of Bronxville in this report, 58,825 MTCO2e, is very similar to a Mid-Hudson Regional GHG report based on 2010 data (59,138 MTCO2e), suggesting that the information and calculation of emissions is fairly accurate despite the need to estimate various aspects of the emissions factors due to data inconsistencies or need to use other local estimates instead of data specifically calculated for the Village. (Mid-Hudson Regional Greenhouse Gas Emissions Inventory (ny.gov) Consistency over the last decade would be expected given the negligible population changes and few changes in the types of businesses in the Village.

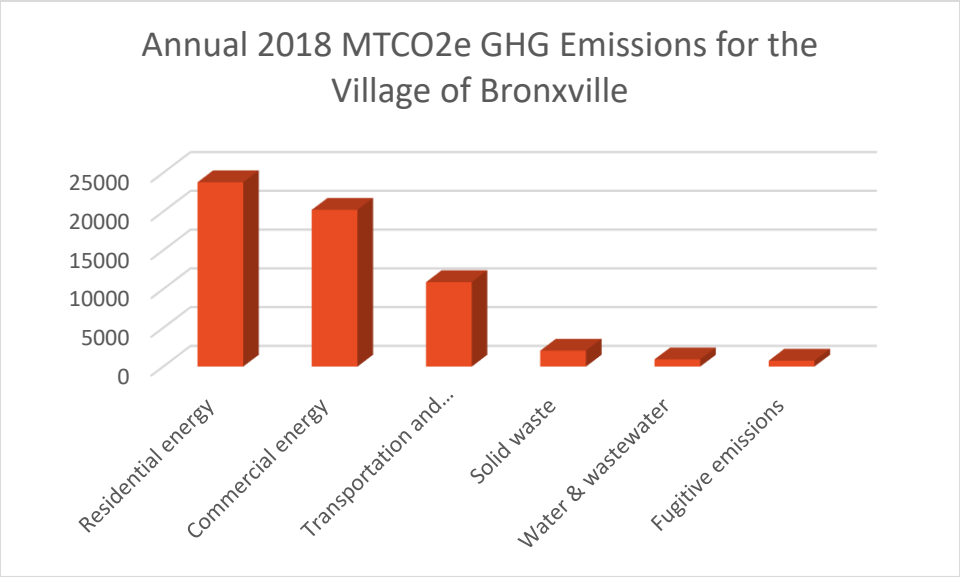
Table 7: The Village of Bronxville 2018 Communitywide Emissions Inventory Results

Sector	Fuel or source	2018Usage	Usage unit	2018 $MTCO_2e$
Residential energy	Electricity (ConEd UER)	28,772	Mwh	7829.2
	Natural Gas (ConEd UER)	2,385,388	therms	12,687
	Heating Oil (US Census ACS)	311,220	gallons	3197.8
	Propane (US Census ACS)	11,904	gallons	67.2
			Residential energy total	**23,782.2**
Commercial energy	Electricity (ConEd UER)	33,871	Mwh	9184.8
	Natural gas (ConEd UER)	2,017,482	therms	10,730
	NYPA (municipal electricity)	1,129	Mwh	306.2
	Municipal heating oil use	11,266	gallons	115.7
	Municipal propane use	935	gallons	5.3
	Lawrence Hospital heating oil use	5858	gallons	60.2
			Commercial energy total	**20,402.2**
On-road transportation	Gasoline (motorcycles, passenger vehicles & light trucks)	21,521,403	VMT	9312.2
	Diesel (passenger vehicles & trucks)	1,434.961	VMT	620.9
Bus Transit	Diesel	3418	gallons	34.9
Rail	Electric	3419.4	Mwh	927.2
			Transportation total	**10,895**
Solid Waste	Treatment of waste generated	5339	tons	1850.6
	Energy used in collection and transport	5339	tons	151.6
	Energy released in yard waste composting	750	tons	52.2
			Solid waste total	**2054**
Water and wastewater	Potable water treatment energy usage	192	Million gallons/yr	790.7
	Wastewater treatment energy usage	88	Million gallons/day	90.9
	Wastewater treatment flared digester gas	105776	Scf/yr	16.1
	Digester gas in produced in wastewater treatment	289.6	Scf/day	0.02
	NO2 process emissions	Population	%	14.8
	NO2 effluent discharge into waterways	Population	%	14.8
			Water and wastewater total	**927.3**
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	4,402,870	therms	763.9
			Fugitive total	**763.9**
			Total community-wide emissions	**58,825**

Figure 13 shows the distribution of communitywide emissions by sector. The largest contributor was residential energy with 40.4% of emissions, followed closely by commercial energy at 34.7%. Transportation and other mobile

sources represented 18.5%. Solid waste disposal (3.5%), water and wastewater treatment (1.6%), and fugitive emissions from natural gas distribution (e.g., leakage, 1.3%), combined, make up less than 10% of the total.

Figure 13. Annual estimated 2018 GHG emissions by sector



How to Interpret Our Results

Because of the technical nature of these data, it may be difficult for community members to understand the results and the action steps needed to mitigate climate change on the Village level. To provide a context, we reviewed several other communitywide greenhouse gas inventories completed by smaller New York State towns and villages.

- A 2019 inventory for the Village of Hastings-on-Hudson, for example, estimated a total of 64,620 MTCO2e GHG emissions, just slightly more than Bronxville's total. The Village of Hastings has a population of about 7800 and is about 3 square miles. The main difference from the Village of Bronxville is much higher on-road vehicle miles. This may be because of the bigger land size, and because segments of the Saw Mill River Parkway fall within Village boundaries. In contrast, the Village of Bronxville has no major highways or parkways crossing Village boundaries. However, both estimated residential and commercial GHG emissions for energy use were significantly lower for the Village of Hastings than the estimate for the Village of Bronxville. This could be due to the size, condition, and age of housing units, as well as a more extensive commercial base in Bronxville. hoh_community_ghg_inventory_report_2019.pdf (hastingsgov.org)
- A 2010 inventory for the Village of Nyack, NY estimated 89,782 MTCO2e GHG emissions. Nyack had a population very similar to the Village of Bronxville, 6765 in 2010, and occupies 1.6 square miles. Nyack's largest source of GHG emissions comes from transportation sources, 40,729 MTCO2e, most likely due to the Mario Cuomo Bridge and Interstate 87 passing through its boundaries. The Nyack emission estimates for residential energy use were much lower than this inventory, while the commercial estimates were similar. These differences could be due to different age, size and construction of housing units. Nyack_Comm._GHGI_Narrative.pdf (evocloud-prod3-public.s3.us-east-2.amazonaws.com)
- The City of Beacon conducted a 2018 communitywide and government operations inventory jointly. They estimated a total of 112,570 MTCO2e emissions. Beacon has a population of 13,769 and is almost 5 square

miles. The largest category of emissions, representing almost 70% of the total, was the transportation sector. Beacon contains a major interstate highway, Route 84. Residential and commercial energy use appear to be a bit lower than in the Village of Bronxville, especially given that the population was almost double. Government Operations Inventory Report Template (beaconny.gov)

These comparisons demonstrate that the Village of Bronxville has relatively few emissions from transportation due to our smaller size and lack of major road segments crossing village boundaries. However, the Village is bordered by several major parkways and the air pollution and climate impacts of continued growth in gasoline and diesel transportation will still have a negative impact on the Village. The estimates for the Village use of residential and commercial energy also appear to be somewhat higher than other similar municipalities and should be areas to examine for improvement in GHG emissions.

Next Steps

These inventory results can be used to focus and prioritize actions to reduce emissions. Based on the inventory results, the sectors that should be targeted to reduce GHG emissions in the Village are primarily residential and commercial energy use. These ideas have already started to infuse public planning. Using this data-driven report, the Village can more readily set targets and quantify outcomes. Village government should continue to work with the NYP/Lawrence hospital administration and the Bronxville School to document their contributions to local GHG emissions and identify ways in which those two entities can participate in communitywide efforts toward climate mitigation. Many promising early steps have begun and should be continued.

The Village should also continue to support and improve its recently revised residential solar permitting process to make it easier for homeowners to install solar panels. Plans in process to increase village building energy efficiency and potentially install solar panels on municipal buildings should be incorporated into overall targets for emissions reductions.

(Photos by *Bronxville Green Committee*)

Efforts to increase awareness and provide technical assistance for conversions to green residential and commercial energy generation should be considered.

The village has invested in a new food scrap recycling program, installed 3 public vehicle charging stations, and passed a new ordinance limiting times of the year gasoline powered leaf blowers can be used.

The Village has long supported a local Farmers Market which attracts thousands of visitors a year from both the Village of Bronxville and surrounding areas to support local agriculture and other small food businesses.

These recent and ongoing efforts can be categorized and incorporated into long-term planning to achieve ambitious GHG emission reductions. Through these actions, the Village of Bronxville seeks to be an important participant and local leader in climate mitigation.

Completion of another GHG inventory as a 5- year progress evaluation after this 2018 baseline year should be undertaken. This effort will assist the community in assessing its progress resulting from the many actions implemented in the last few years. The quantitative benchmarks provided in the current report should help identity the achievement of specific GHG reductions. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath tool, will be helpful to those who complete future inventories.

Conclusion

This inventory marks the completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. These data will be used in the next milestone activities to forecast emissions, set an emissions-reduction target, and review

and create a coherent, robust climate action plan that identifies specific quantified strategies that can cumulatively allow us to 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. Science-Based Targets are calculated climate goals, 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.