



Westford Climate Roadmap

A plan to reduce net greenhouse gas emissions
to zero by 2050

Westford Clean Energy &
Sustainability Committee

November 2021

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Introduction

A landmark climate report was released August 9, 2021 by the U.N.'s Intergovernmental Panel on Climate Change (IPCC). It was written by more than 230 leading scientists from countries around the world, and is part of the IPCC's [Sixth Assessment Report](#) — the most significant climate report published in years by the international science community. It states:

- Current atmospheric levels of carbon dioxide are the highest in at least 2 million years
- The past decade is likely the hottest the planet has been in 125,000 years
- It is unequivocal that the rise in global average temperatures since the 19th century has been driven by humans burning fossil fuels, clearing forests and loading the atmosphere with greenhouse gases like carbon dioxide and methane that trap heat
- Ocean levels have risen 8 inches on average over the past century, and the rate of increase has doubled since 2006
- Heat waves have become significantly hotter since 1950 and last longer in much of the world. Wildfire weather has worsened across large swaths of the globe. Bursts of extreme heat in the ocean — which can kill fish, seabirds and coral reefs — have doubled in frequency since the 1980s

The report says that if we make immediate, drastic cuts in emissions, we can stabilize the climate at about 1.5 degrees Celsius of warming compared to pre-industrial levels. The report states “Global net human-caused emissions of carbon dioxide (CO₂) will need to fall by about 45 percent from 2010 levels by 2030, reaching ‘net zero’ around 2050.” Carbon sequestration – removing CO₂ from the atmosphere – is also vital to mitigating climate change. These efforts must be implemented at all levels of government, business and community.

Climate change will affect Westford. There will be more very hot days, and more droughts. Hurricanes and nor’easters will hit New England more often, and there will be more floods. The warmer climate will be inhospitable to some native species, and promote some invasive ones. Westford is not isolated, so the effects of climate change across the country and the world will impact us in many other direct and indirect ways.

This Roadmap to net zero GHG Emissions has been created by the Town of Westford Clean Energy and Sustainability Committee (CEASC). It follows from a net zero resolution passed at Special Town Meeting in October 2020. Its purpose is to plan specific and measurable actions and guide Westford’s Town government, residents, and businesses, to achieve net zero emissions of greenhouse gases (GHGs) by 2050. This is consistent with similar goals on local, state, national, and international levels. The initial version of this Roadmap, created in 2021, serves as a baseline to be refined and revised in future years as developments progress.

Many of the efforts to reduce GHGs in the next three decades will depend on tax incentives and rebates, new standards and laws, major infrastructure improvements, and new technologies. Many of these are beyond the scope of the Town of Westford, its residents, and its businesses. However, our individual and corporate actions are essential to the success of our net zero GHG goals. The choices we make about our transportation, our home and business electricity, heating and cooling, land use, and our lifestyles, underpin this effort. Our purchasing decisions, voting behaviors and lobbying efforts will all help create the policies and changes we require to meet our goal of net zero greenhouse gas emissions. We must raise our voices in public forums, and the media, as well as in private, to persuade everyone that we all play a part in the future we create and we need to be united.

Why Net Zero?

Climate scientists have made it clear that the world needs to reduce net greenhouse gas pollution to zero by 2050 to avoid catastrophic climate change, and Westford has committed to achieving this. This goal is consistent with:

- Worldwide efforts to reduce GHG pollution, including the Paris Climate Accord, which was signed by the European Union, China, Russia, India, Japan and more than 170 other countries
- President Biden's commitment to ensure that the U.S. achieves a 100% clean energy economy and net zero emissions no later than 2050
- Massachusetts' Next Generation Roadmap, overwhelmingly passed by the State Legislature and signed by Governor Baker on March 26, 2021

What Does Net Zero Mean?

A greenhouse gas is any gaseous compound in the atmosphere that absorbs infrared radiation, thereby trapping heat. This is commonly referred to as the "greenhouse effect" because these gasses act like the glass in a greenhouse: they let visible light in, but block heat from escaping. Carbon dioxide from fossil fuel combustion is the principal GHG. Methane from natural gas and organic decomposition is also a large contributor. The greenhouse effect leads to global warming and other changes in climate. To halt global warming, we must stabilize, and ultimately reduce, the amount of greenhouse gases in the atmosphere.

When we think about net zero, we are referring to the act of (1) reducing our GHG emissions into the atmosphere, and (2) balancing the amount of GHGs we emit with the amount we can remove. Carbon removal can take numerous forms, from new technologies to land management practices. Removing CO₂ through forests is relatively inexpensive compared to other carbon removal options and yields cleaner water and air in the process.

Methodology

The Clean Energy and Sustainability Committee created a Westford Climate Roadmap subcommittee to develop the first version of the Roadmap. The plan is that version 1.0 will be presented to Town management,

boards, residents and businesses to seek their feedback and support. The Roadmap will be adapted based on this collaboration.

The Roadmap subcommittee followed the guidelines developed by the Massachusetts Area Planning Council in its [Municipal Net Zero Playbook](#) and [Greenhouse Gas Inventory Tools](#).

The following plans were also used as foundation documents:

- [Massachusetts 2050 Decarbonization Roadmap](#)
- [Arlington's Net Zero Action Plan](#)
- [Westborough Climate Action Plan](#)
- [Sustainable Dedham Climate Action and Resiliency Plan](#)
- [Sustainable Concord](#)
- [Natick's Net Zero Action Plan](#)

How Do We Get There?

The journey to net zero GHG emissions in Westford will be challenging. Implementing this plan will require dedication and commitment from the Town, residents, and businesses over the next 30 years. We know we need to reach net zero by 2050 or earlier, and we have assessed where we are today. The Roadmap must start with the energy infrastructure, transportation systems, buildings, and policies of 2021. Along the way, all of these will undergo major changes. As those develop, we will adjust the Roadmap to incorporate new technologies and developments.

This Roadmap serves as an organizing framework for our path to net zero. It will be revisited and updated as time and technology move forward in the coming years. We know that we need to make our buildings and vehicles, the two major sources of GHG pollution in our community, much more efficient, and powered by renewable electricity. It is essential to implement the net zero transformation as rapidly as possible, in the most affordable and least economically disruptive way. We also know that we must increase our environment's ability to absorb CO₂, while simultaneously reducing our emissions. Emissions reduction alone will not get us to net zero.

To reach our net zero goal, our residents, businesses and municipality will have to make key changes in the following areas:

- **Transforming the electric power supply to 100% renewable energy and producing more renewable energy locally**

To achieve net zero carbon emission, all of Westford's electricity sources must be renewable, such as solar, wind, nuclear, and hydro power. Small-scale clean energy projects, such as home and business rooftop solar photo-voltaics (PVs), can supplement power from the grid.

- **Electrifying our heating and cooling systems**

Switching to electric heating and cooling systems like heat pumps, and cooking appliances like induction cooktops, immediately reduces carbon emissions and improves indoor air quality, and these benefits only get better as our electric power supply gets cleaner.

- **Increasing the energy efficiency of our homes and building infrastructure**

Making existing buildings more efficient, and constructing new buildings to high efficiency standards, will reduce emissions and make energy bills more affordable.

- **Driving electric and plug-in hybrid vehicles**

Electric vehicles (EVs) are cleaner, and cheaper to operate and maintain. Driving an EV is one of the most impactful ways to reduce GHG emissions, especially when paired with renewable electricity sources for charging. Providing public access to EV charging stations is critical to the successful transfer to electric vehicles.

- **Reducing our solid waste**

Westford's trash is incinerated, which emits greenhouse gases. Reducing the volume of waste through new purchasing patterns and reuse will improve our carbon footprint, and save money.

- **Protecting and enhancing Westford's forests, wetlands and turf for increased carbon sequestration**

Woodlands, wetlands and grasslands absorb carbon dioxide. Protecting and enhancing our natural landscapes will increase carbon sequestration, and assist us in meeting our net zero goal.

- **Advocating for change**

At the polls, at work, at home, at the state house and the White House, with our vendors and suppliers, as stockholders, and as members of our virtual and live communities, it is vital to advocate for changes that enable our Roadmap to net zero by 2050.

- **Changing our personal behaviors**

Many personal habits contribute to global warming, and changing small things can have big consequences for the environment and the economy.

Getting There Equitably

As we transition to an economy based on renewable energy, we need to consider what steps need to be taken to make these changes accessible, affordable, and inclusive for all Westford residents. The specific needs of

vulnerable populations such as the disabled, the elderly, the young, newcomers to town, those with limited resources, and those with limited English proficiency will be considered as we plan and implement actions.

We need to determine where inadequate transit options exist, which neighborhoods have a deficit of trees, which lack access to EV charging stations, and who may not have the resources to retrofit their homes with heat pumps. Housing and climate policy are interrelated and a known source of inequity. We can set equitable housing policy and also ensure that all new housing in our town is renewable and resilient. We can rethink public transportation to increase access.

With equity and climate justice in mind, all in our community will benefit from reduced carbon emissions, increased energy savings, improved air quality, and improved health. Together we will have a stronger community.

Where Are We Starting?

Before deciding on future actions, it is important to understand our starting point. The CEASC did an initial inventory of Westford's GHG emissions. Although the inventory was performed in 2021, the year with the most complete data available was 2017. This GHG inventory serves as the baseline to measure future progress and provides us with the ability to focus our efforts for the biggest impact. Inventories in the following years will give us feedback to adjust our priorities.

The inventory used the [Metropolitan Area Planning Council \(MAPC\) Community Greenhouse Gas Inventory Tool and Step-by-Step Guide](#). For more information on this tool, please see "[GHG Inventory: What's Included, What's Not](#)" in the appendix.

The GHG source categories are Stationary Energy (buildings, electricity, heating, residential, commercial, government), Transportation (private, commercial, and municipal vehicles), and Waste (transport, incineration, decomposition).

The data sources for Stationary Energy were:

Electricity:	National Grid
Natural gas:	National Grid
Heating oil:	mass.gov, mapc.org

For Transportation:

Vehicles:	mapc.org
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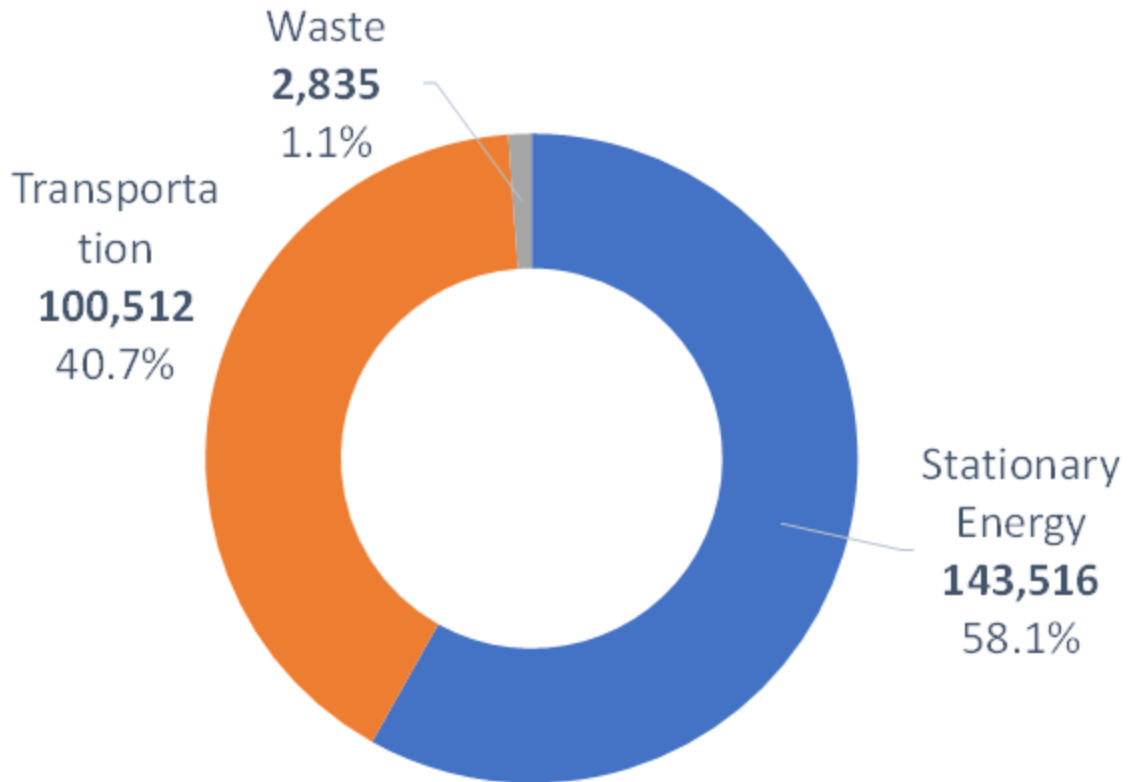
For Waste:

Residential:	mass.gov/orgs/massachusetts-department-of-environmental-protection
Commercial:	not included yet

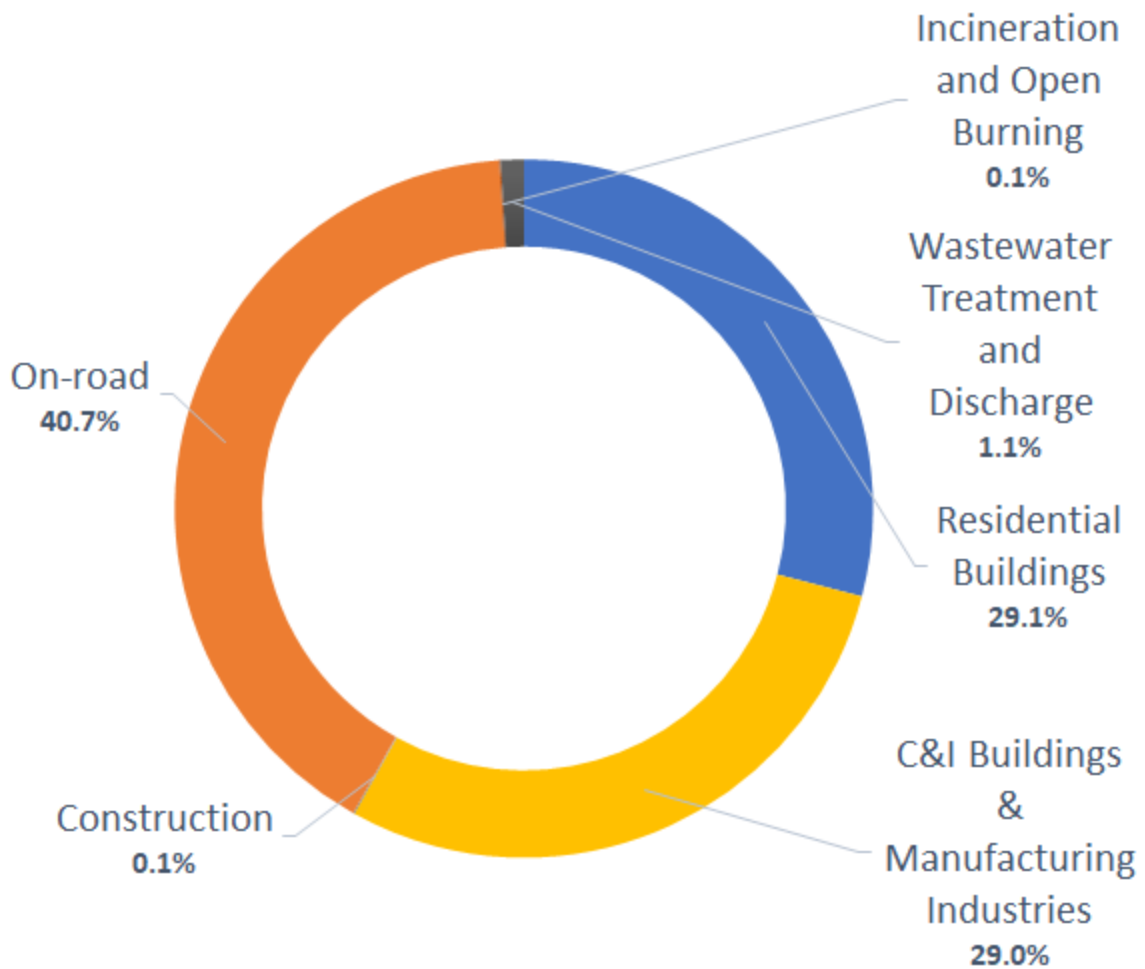
The most recent year with data available for Stationary Energy was 2017, for Transportation was 2014 for private passenger and commercial, 2017 for municipal, and for Waste was 2017 (although 2020 is available). 2017 was recommended as the best common year for comparison among towns.

The MAPC tool produced the following graphs:

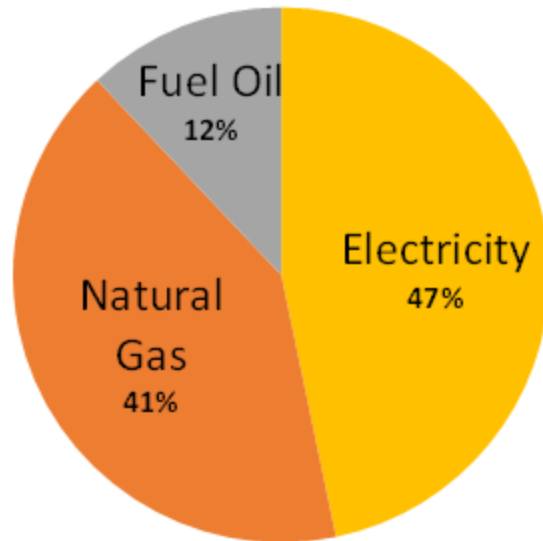
Westford's 2017 Emissions (MT CO2e) by Sector



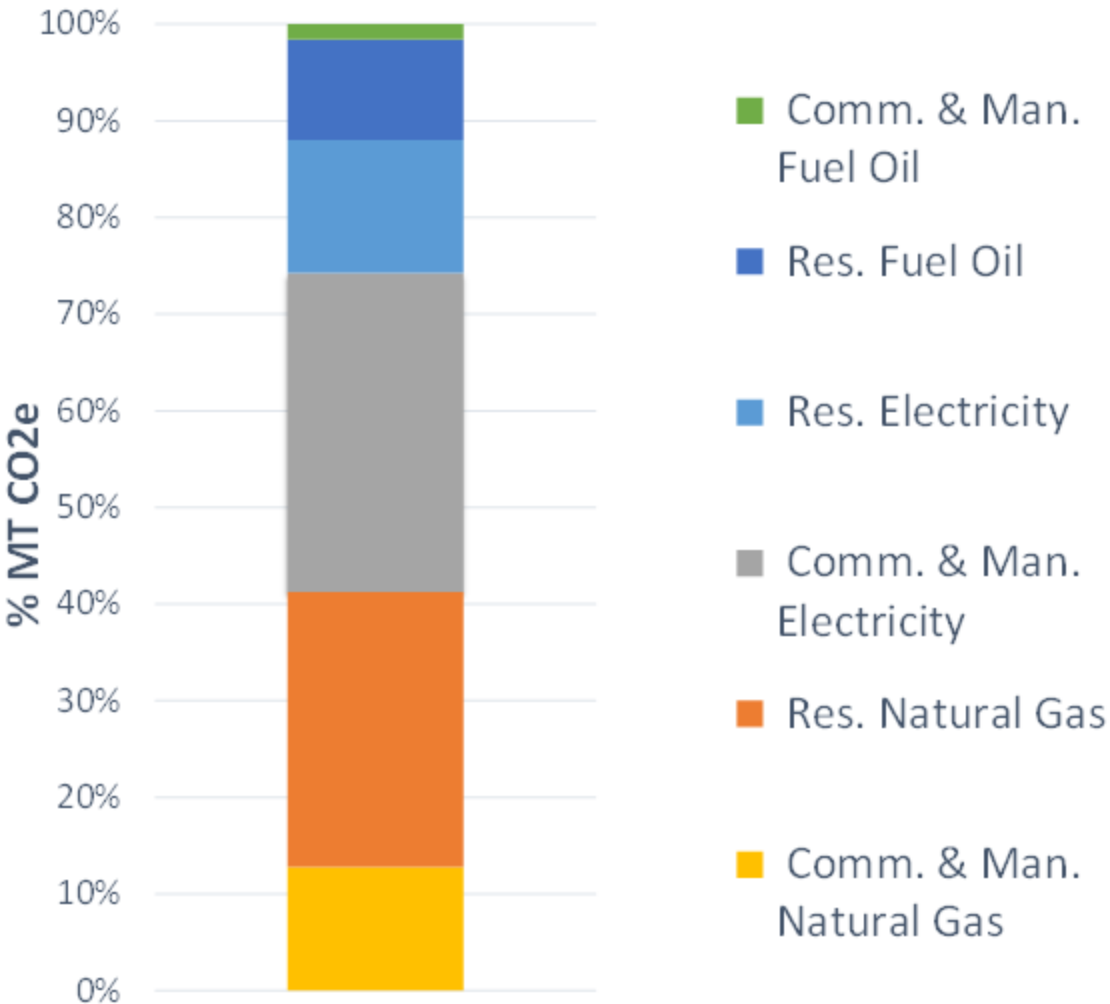
Percent of Westford's Total 2017 Emissions by Subsector



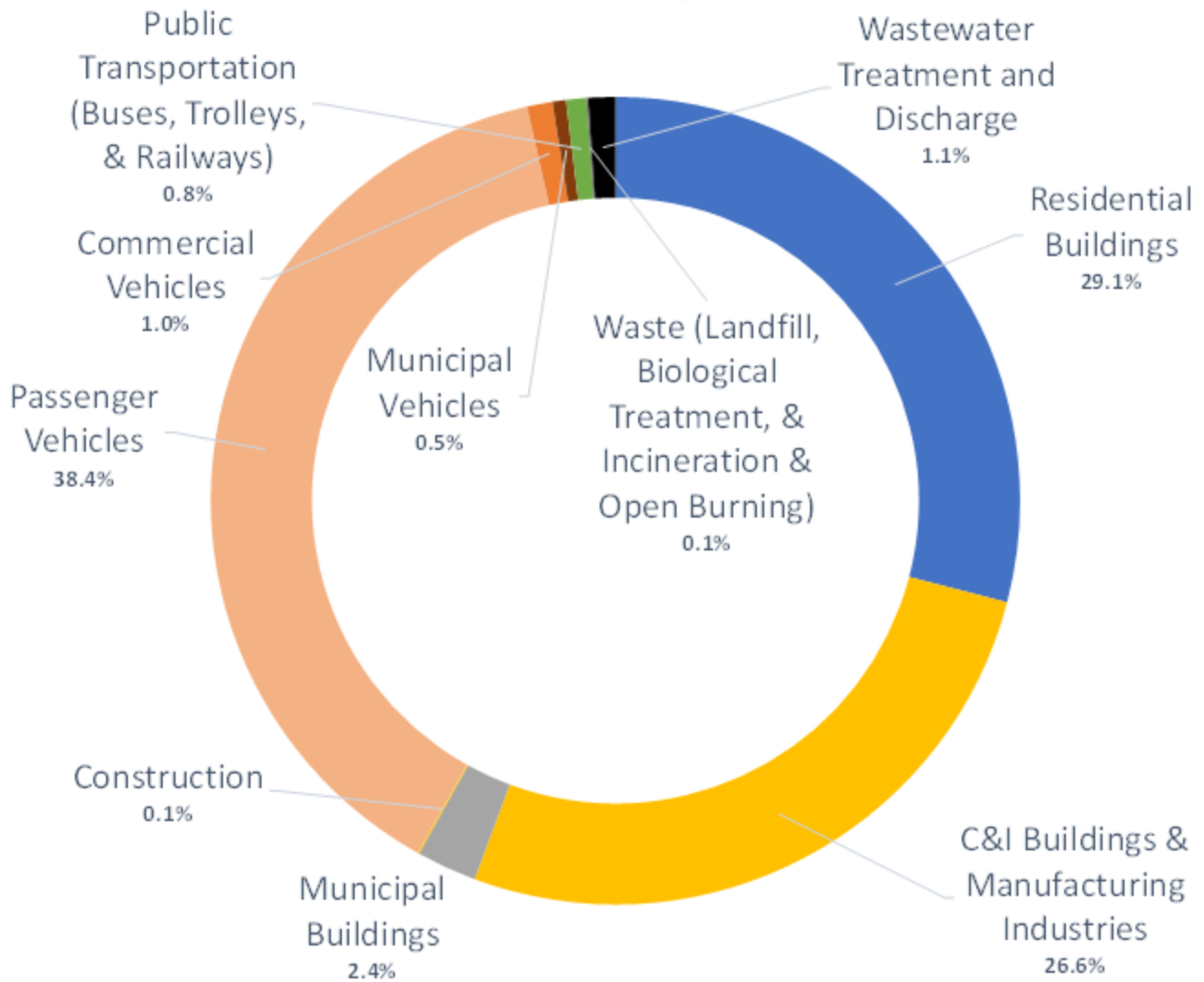
Percentage of Westford's 2017 Building Energy Emissions by Source Type



Percent of Westford's 2017 Building Emissions by Customer and Fuel



Percent of Total Westford's 2017 Emissions by Subsector



In summary, for Westford in 2017:

- Passenger vehicles account for almost 40% of GHG emissions
- Residential buildings electricity and heating are almost 30%
- Commercial and industrial buildings electricity and heating are slightly more than 25%
- Municipal emissions (Town building and schools) are about 3%

Westford's total emissions in 2017 are estimated at 247,000 MT CO₂e (metric ton carbon-dioxide equivalent). That is about 10 MT CO₂e per resident.

What Have We Already Done?

Westford has already taken many steps towards reducing its energy use and GHG emissions and preserving natural land and carbon sequestration.

Clean Energy Supply

Westford implemented community choice aggregation (also known as “municipal aggregation”) for electric service for residents and small businesses in 2016. The 2021-2023 program sets the default option at 10% more renewable energy than the state requirement (dictated by the Renewable Portfolio Standard (RPS)), and includes “opt-up” tiers of 50% and 100% renewable energy. The environmental benefit of the new program is expected to be significant. For example, the program is projected to reduce carbon dioxide emissions by over 1,800 tons per year, which is equivalent to the climate impact of approximately 360 cars. As of August 2021, nearly 8,000 residents and businesses were enrolled, and 108 Westford residents had opted up to the 50% (43) or 100% (65) levels.

As of early 2021, Westford had over 500 installations of solar systems, totaling over 9 MW. Over the past years, groups including Sustainable Westford, Westford Climate Action, and the CEASC have organized events to inform residents of their options regarding going solar.

As for municipal government electricity supply, Westford contracts with solar projects in Hubbardston (1.2 MW, ~15% of Town electricity, for 20 years) and Charlton (2.4 MW, ~\$300,000 savings a year, for 20 years).

There is currently one rooftop solar installation on a municipal/school building in Town. The Stony Brook Middle School installed a 36 kW solar system that started operating in April 2011. Westford staff have considered proposals from solar installers for installing systems on several municipal and school buildings.

Buildings

Westford received Massachusetts Green Communities status, under the Department of Energy Resources (DOER), in December 2013. Since becoming a Green Community, Westford has received six Green Communities grants, totaling over \$1.2 million, targeting various energy efficiency improvements. These improvements include: lighting, heating and cooling equipment, weatherization (insulation and high-performance windows) and energy management systems in municipal and school buildings. The Town has also converted parking lot lights to LED fixtures and converted streetlights to LED.

Town staff use the MassEnergyInsight software tool to monitor and minimize energy use.

Westford adopted the Board of Building Regulations and Standards (BBRS) Stretch Code in October 2013.

In 2021, Westford began to pursue an Energy Management Performance Contract for municipal and school buildings with a goal of receiving a free comprehensive energy audit and no-cost energy efficiency

enhancements. A successful project could see over \$500,000 in yearly utility savings yielding \$10,000,000 worth of upgrades to building systems (lighting, HVAC equipment, plumbing, etc.).

According to Mass Save, in 2019, over 1,000 residential customers participated in energy efficiency programs, including receiving free home energy audits.

Transportation

Westford has ordered three hybrid EV police Interceptors in 2021 to replace gasoline-powered vehicles. Westford has installed 12 dual head level 2 Electric Vehicle Supply Equipment (EVSE), commonly referred to as “charging stations,” at three locations in town: Town Hall, Westford Academy, and Abbot School.

Public data sources show there were over 250 EVs registered in Westford as of the end of 2019.

Westford adopted a Complete Streets Policy in 2016, requiring streets to be designed with the needs of all users in mind (including cyclists and pedestrians). Westford has installed several bike lanes on streets.

The Lowell Regional Transit Authority (LRTA) Route 15 serves Chelmsford and Westford via Rte. 129/110.

Natural Resources

Westford Town government, along with the Recycling Commission, have worked to reduce solid waste and trash, promoting various recycling and diversion programs and activities, including electronics collections and composting education.

Westford has multiple entities working to preserve natural areas, including forests. The Conservation Commission is the Town body responsible for protecting Westford's natural resources. The Commission has over 2,100 acres of town owned land in its care and custody, and is also responsible for overseeing compliance with 67 permanent Conservation Restrictions on over 1,700 acres of land, and also has responsibility for overseeing the management of the facilities at East Boston Camps and the Hill Orchard. The Town Forest Committee is the Town body responsible for the care, custody and management of the town forests. The Westford Conservation Trust is a private, non-profit, non-governmental organization with the purpose of preserving land and other natural resources. The Trust owns over 100 acres and holds conservation restrictions on over 400 acres, ensuring preservation.

Founded in 2001, the Westford Land Preservation Foundation provides local landowners with other options than full development when it is time to think about what will happen to their family-owned land. When feasible, WLPF will work with landowners to achieve their goals, whether it is maximizing a financial return, preserving their land, or a combination of both, while preserving at least a portion of their land forever.

Town Governance

Westford has had a volunteer-led Energy Committee since 2008 to focus on energy issues such as supporting reduction of energy consumption and promoting renewable energy. In 2021, the Energy Committee was reconstituted as the Clean Energy and Sustainability Committee (CEASC) to focus on broader issues, including helping the Town achieve its goal of net zero greenhouse gas emissions by 2050.

In 2019, Westford hired a Facilities Director to focus on the planning, organizing and coordinating of the operations and the operational budget of municipal and school buildings. Maximizing energy efficiency and considering energy options are part of the Facilities Director's job.

Roadmap Goals and Actions

Transform the electric power supply to 100% renewable energy and produce more renewable energy locally

Achieving 100% renewable electricity is key to reducing Westford's baseline emissions from electricity consumption and is also critical because the electrification of cars and home heating and appliances is an important component of Westford's Roadmap. To fully realize the benefits of electrification, Westford should seek opportunities to transition to 100% clean electricity by 2030, while preserving equitable options for those less able to afford increased costs.

E1. Increase the percentage of renewable energy in the Westford Power Options Program (Westford POP), as aggressively as economically feasible, until the default level is 100% renewable with a target of 2030

The 2021-2023 Westford POP contract sets the baseline for electricity supply at 10% more local (New England) renewable energy than the state's Renewable Portfolio Standard (RPS) Class I Compliance Standard and includes "opt-up" tiers of 50% and 100% renewable energy. The current RPS Class I standard is 18%, increasing by 2%-3% each year until it reaches 40% in 2030. The Town should continue to implement this program, increasing the renewable energy content of the default option to achieve 100% combined renewable energy by 2030.

- The Town will have the opportunity to renegotiate its next contract in 2023 (the current contract expires in November of that year). Based on pricing, the Town should increase the percentage of renewable energy in the default contract in 2023, and in future contracts, with the goal of reaching 100% renewable energy in the default contract by 2030.
- The Town should maintain the 50% and 100% "opt-up" provisions for the 2024-2027 contract and should continue to offer a basic level for residents seeking to reduce cost.

- Increase outreach to residents about Westford POP options and encourage them to “opt-up” to 50% or 100% renewable electric power, using social media, direct mail, and events. The target is to double the percentage each year of residents electing to “opt-up.”
- Continue outreach and specifically engage with the business community to promote the Silver (50%) and Gold (100%) options. So far, only Residential customers have enrolled in these options even though they are available (at the same rates) to Small C&I customers, and available to Large C&I customers..

TIMING: The next contract will be negotiated in late 2022/early 2023

STAKEHOLDERS: Select Board, Town Manager, Energy Providers

LEADER: Town Manager

E2. Produce more renewable energy locally

- Partner with residents, businesses, and Town departments to facilitate the installation of rooftop and parking canopy solar arrays
 - Work with our legislators, residents, and businesses to maximize Westford's use of state resources. The Massachusetts Roadmap to 2050 legislation encourages participation in community solar projects, sets up a new grant program to help nonprofits afford solar panels and changes state rules so that businesses or buildings with a large number of solar panels can more easily sell their excess energy back to the grid.
 - The Department of Energy Resources, which oversees the SMART program (Solar Massachusetts Renewable Target Program), is now statutorily required to prioritize solar installation on the roofs of low-income households, and it must make the SMART program — and any future solar incentive program — easier to sign up for.
 - Consider a Solarize Massachusetts (Solarize Mass) program to increase the adoption of small-scale solar electricity by aggregating homeowner buying power to lower installation prices for participants.

TIMING: Can begin immediately

STAKEHOLDERS: Business organizations in town (Rotary, WBA), Residents, Town Management (ESCO), CEASC

LEADERS: Town Manager, CEASC

E3. Increase the percentage of renewable energy in Westford’s municipal electricity contract, as aggressively as economically feasible, until it reaches 100% renewable energy with a target of 2030

- Westford should progressively increase the amount of renewable electricity in its municipal electricity contracts until reaching 100% for municipal operations by 2030. Westford is on a fixed price energy supply contract that ends in December 2023. Following the lead of Westford's POP program, the Town

should prioritize purchases of MA Class I RECs to support local (New England) renewable energy development. At all points of implementing this action, the Town should consider cost impacts to taxpayers in Westford.

TIMING: The next contract will be negotiated in late 2022/early 2023

STAKEHOLDERS: Select Board, Town Manager, Energy Providers

LEADER: Town Manager

E4. Require large commercial building owners to report on energy use and challenge them to set a timetable to reach 100% renewable electricity

- Westford’s businesses use more than twice as much electricity as our residents. Building emissions are the greatest source of GHG emissions in our town, and 32% of building emissions are due to electricity usage by the Commercial and Industrial sector.
- Survey our business community to determine their current climate action goals, including their purchase of renewable energy in their electric contracts.
- Conduct an education and outreach campaign for business owners to commit to 100% renewable electricity. Provide positive publicity for those who make the pledge.
- Strategically engage with the businesses to promote the Silver (50%) and Gold (100%) options, including providing mechanisms for businesses to receive visibility for their participation, such as a window-sticker.
- Utilize resources such as the Massachusetts Clean Energy Center which provides info on resources, incentives, grants and tax credits for businesses.

TIMING: Can begin immediately

STAKEHOLDERS: Businesses and business organizations in town (Rotary, WBA), Town manager, CEASC

LEADER: CEASC, Town Manager

Reducing GHG Emissions from our Buildings

Greenhouse gas (GHG) emissions from the building sector are the largest source of emissions in Westford, at about 58% in 2017. The majority of emissions from heating our homes, municipal buildings and commercial spaces are from the direct burning of natural gas and fuel oil. Heating with these two fuels made up about 31% of our greenhouse gas emissions in 2017. Transitioning away from these fuels to renewable energy will be a key strategy to reducing GHG emissions moving forward.

Residential and commercial buildings each contribute about 29% of Westford’s GHG emissions. Educational and pilot programs, incentives, and policy mechanisms will help to improve energy performance through efficiency, renewable energy generation, energy storage, electrification, and higher-performance building standards.

[The Sierra Club conducted a detailed analysis of our current and future electricity grid and assessed the impact of converting homes heated by gas to electricity in every state.](#) The answer is clear: installing clean, electric heat pumps to replace gas water heaters or furnaces in every corner of the country cuts climate and health pollution. This is even true in states where coal and gas plants still power part of the electricity grid, and the climate benefits of electrification only improve as the grid continues to get cleaner over time.

Standards for new buildings can help to slow growth in this sector. Meeting the net zero goals will require retrofitting the existing building stock for improved energy efficiency.

Westford can lead by example by reducing emissions from municipal buildings. Policies and planning will enable new municipal and school buildings to achieve high sustainability standards, including net zero GHG energy sources, all-electric and resilient designs.

B1. Electrify our buildings including heating, cooling and appliances

Residents

Promote transition to electric heat pumps and appliances when the time comes to replace existing systems and appliances.

- Create an ongoing “Electrify Westford” program and website to increase electrification and conversion to all electric, energy-efficient heating, cooling, water heating and appliances. Include information on rebates and discounts, with a special focus on assistance for low-income residents. Use case studies from residents.
- Provide access to community “efficiency and electrification coach” advisory service who will help participants evaluate options
- Sponsor events and communications to residents promoting solutions
- Publish equipment/installation prices to create price transparency and more competitive prices
- Publish list of qualified installers and seek discounted appliance and HVAC pricing from participating contractors and manufacturers
- Work with contractors and manufacturers to discount HVAC equipment

TIMING: Can begin immediately

STAKEHOLDERS: Town Manager, CEASC, Westford Climate Action, Mass Save, Local HVAC companies

LEADER: CEASC

Town and Schools

Maximize the installation of all electric, energy-efficient heating, cooling, water heating and appliances in existing Town buildings and make new buildings and major renovations fossil fuel-free.

- Implement Energy Management Performance Contract for municipal buildings which includes portfolio wide energy efficiency assessment/audit, including inventory of equipment and building envelope status. Ensure that objectives include greenhouse gas emissions reductions, solar energy installations and electric heating and cooling solutions
- All capital requests for heating and cooling equipment should include electric options
- New buildings and major renovations of existing buildings should be fossil fuel-free
- Support training opportunities for Town departments, boards and committees, as well as developers, on LEED, net zero, Passive House and other high-performance standards

TIMING: Approval of funding for break fee is on the warrant for the 2021 Fall Town Meeting and the target for audit start is winter of 2022

STAKEHOLDERS: Town Manager, ESCO, Capital Planning, Permanent Building Committee, Facilities Manager, School Committee, CEASC

LEADER: Town Manager, Facilities Manager, CEASC

Commercial/Industrial

Transition to electric heat pumps and equipment when the time comes to replace existing systems.

- Implementation of Westford's Roadmap will include online information with local resources for businesses to improve energy efficiency and transition to all electric, energy-efficient heating, cooling, water heating, industrial equipment, and appliances

TIMING: Can begin immediately. Businesses are encouraged to purchase heat pumps when they replace their heating, air conditioning and water heating systems.

STAKEHOLDERS: Local Businesses, Rotary, Westford Business Association, Economic Development Committee, Town Management

LEADER: CEASC, Economic Development Committee

B2. Significantly improve energy efficiency in existing buildings

Residents

Develop and promote streamlined pathways for residents to sign up for Mass Save energy audits and follow through with recommended actions, including facilitating energy assessments, advising services, contractor lists, and information about rebates and incentives.

- Promote and provide education on home energy assessments, home energy efficiency improvements, and electrification through activities, including advice about appliances, materials, siting, and landscaping, distributing information through mailings, presentations, and events, and partnering with schools.
- Require disclosure of energy audits at time of sale for residential properties

TIMING: Can begin immediately

STAKEHOLDERS: Westford Climate Action, CEASC, Community Volunteers, Mass Save, Local HVAC Companies

LEADER: Town Manager, CEASC

Commercial/Industrial

Partner with Westford businesses to increase their energy efficiency and reduce GHG emissions

- Improve energy efficiency and insulation
- Take advantage of incentives and tax credits including Property Assessed Clean Energy (PACE) Massachusetts for energy efficiency improvements
- Use smart thermal-management systems
- Use water and energy use tracking/ monitoring
- Use native and adaptive landscaping that does not need irrigation

TIMING: Can begin immediately

STAKEHOLDERS: Local Businesses, Rotary, Westford Business Association, Economic Development Committee, Town Management

LEADER: CEASC, Economic Development Committee

B3. Change building codes, zoning and other bylaws to increase efficiency and eliminate GHG emissions

- Establish a baseline of sustainable design standards within the Zoning and Planning Board requirements for all new construction and major renovation of both commercial and residential sectors. Reference Somerville's "Sustainable & Resilient Building's Questionnaire"
- Require large, new buildings subject to the Planning Board's review to demonstrate strong environmental performance and an ability to achieve net zero emissions

- Require large commercial building owners to report on energy use, similar to such requirements in Boston and Cambridge. Monitor the success of smaller, local communities, such as Ashland, Wellesley, Natick and Westborough, who have also identified this action in their preliminary net zero plans
- Engage with builders and developers to understand barriers to designing and building net zero, resilient, energy efficient homes. Connect with Mass Save builder programs to educate contractors and subs on Passive House
- Highlight examples of new construction that demonstrate high standards for sustainability and resilient design.
- Leverage existing expertise from building sustainability entities, such as Passive House Institute US, National Renewable Energy Laboratory and LEED Gold.

TIMING: Can begin immediately

STAKEHOLDERS: Land Use Planning, CEASC

LEADER: CEASC

B4. Advocate at state-level for new building codes and policies that will enforce net zero

- Advocate for the new net zero Stretch Energy Code which is due to be approved by the State Board of Building Regulations and Standards in 2022.

TIMING: Can begin immediately

STAKEHOLDERS: Westford Climate Action, CEASC

LEADER: Westford Climate Action

B5. Partner with utilities and others to promote neighborhood-scale shared ground source heat pump projects.

- In suitable neighborhoods, the Town should partner with National Grid to promote low/zero carbon district heating and cooling systems, “geo micro district” or “networked geothermal” projects.
- The Town should partner with other towns and organizations that are currently studying this topic, such as the Home Energy Efficiency Team (HEET).

STAKEHOLDERS: National Grid, neighboring towns, Town Manager, CEASC

LEADER: Town Manager, CEASC

B6. Encourage regulators and utilities to greatly accelerate the repair of gas leaks.

- The Town should advocate for the repair of gas leaks, and coordinate information and data sharing with National Grid. The Town should advocate for additional efforts for detection and mitigation of gas leaks, and work to expedite the repairs.

TIMING: Can begin immediately

STAKEHOLDERS: National Grid, Town Manager, CEASC

Leader: Town Manager, CEASC

Reducing GHG Emissions from Transportation

The recently completed Westford Greenhouse Gas Inventory indicates that more than 40% of Westford's greenhouse gas emissions result from transportation, mostly from vehicles operated by Westford residents, businesses, and municipal/school fleets. Replacing vehicles powered by internal combustion engines (ICE) with electric vehicles (EVs) is one of the most impactful ways to reduce GHG emissions.

In this document, an electric vehicle (EV) is defined as one that operates, partially or exclusively, on electrical energy from an off-board source that is stored on-board for motive purpose, and includes battery electric vehicles (BEV) and plug-in hybrid vehicles (PHEV).

T1: Implement a comprehensive strategy to transition to electric vehicles

Residents

Promote the lease or purchase of Electric Vehicles or Plug-in Hybrid EVs when replacing current vehicle

- Partner with EV information resources, EV advocacy groups, and EV dealerships to assist residents in the investigation and acquisition of EV for personal/family use
- Identify and recruit Westford residents with substantive experience/expertise in EV to serve as "coaches" to other residents interested in considering a change to EV for personal/family use
- Identify and publicize the operating and maintenance advantages and environmental benefits of zero-carbon battery electric vehicles
- Identify and maintain links to opportunities for EV incentives including federal and state tax rebates, manufacturer rebates, and other grants/incentives

TIMING: Can begin immediately

STAKEHOLDERS: Town Manager, CEASC, Westford Climate Action

Leader: CEASC

Town and Schools

- Update Westford policies for town owned/operated vehicles to prioritize EV alternatives in vehicle replacement decisions
 - Establish town owned/operated fleet baseline of current vehicles, identifying mileage, fuel use, duty cycle and age
 - Develop prioritized list of vehicles due for replacement
 - Research EV alternatives that would meet or exceed current and/or anticipated future needs
 - Draft plan for transition to EV vehicles for fleet replacements and/or new acquisitions
- Establish plans and timeline for transition of school bus transportation to use low/zero-carbon vehicles
- Partner with LRTA to transition Senior “Road Runner” transportation service to use low/zero-carbon vehicles
- Develop and implement policies to require or incentivize private contractors that perform work for the Town to use low/zero-carbon vehicles

TIMING: Can begin immediately

STAKEHOLDERS: Town Manager, CEASC, Westford Climate Action, School Committee

Leader: Town Manager

Commercial/Industrial

- Establish plans and timeline to lease or purchase EVs as vehicles are replaced and EV alternatives become available
 - Use EV incentives for businesses including federal/states tax benefit, manufacturer rebates, and other grants/incentives

TIMING: Can begin immediately

STAKEHOLDERS: Local Businesses, Rotary, Westford Business Association, Economic Development Committee, Town Management

LEADER: CEASC, Economic Development Committee

T2: Provide Westford with electric vehicle supply equipment (EVSE), commonly referred to as EV charging station, infrastructure to support transition to electric vehicles

In this document, electric vehicle supply equipment (EVSE) is defined as equipment designed specifically to supply electrical power for charging EV and includes Level 2 (240 VAC) and Level 3 (Fast-DC) supply equipment.

Town and Schools

- Establish plans and timeline to require or incentivize installation of publicly available electric vehicle supply equipment (EVSE), commonly referred to as EV charging stations, to promote the use of low/zero-carbon vehicles
 - Formulate appropriate policies and publicize the availability of new EVSE at Town Hall, Westford Academy, and Abbot/Millennium School and to support management of these and future town owned/operated charging stations as usage grows
 - Identify priority locations for most effective access/convenience to public charging for visitors/patrons/employees and require/incentivize installation and availability of publicly available EVSE
 - Update local zoning regulations to facilitate permitting for publicly available Level II and Fast-DC EVSE
 - Update local zoning regulations to facilitate permitting of Level 2 EVSE for home use
 - Partner with National Grid to assess electric power grid upgrades required to support current and future EV charging demand
- Establish plans and timeline for implementing the charging infrastructure necessary to support town owned/operated EV
 - Explore potential partnerships to encourage shared EVSE infrastructure for medium/heavy-duty vehicles
- Establish plans and timeline for implementing the charging infrastructure necessary to support transition of school bus transportation to use EV
 - Investigate feasibility and infrastructure requirements to support “vehicle-to-grid” functionality for the school bus fleet during idle times; the stored electricity could provide revenue to the town especially during the summer months.

TIMING: Can begin immediately

STAKEHOLDERS: Town Manager, CEASC, Westford Climate Action, School Committee

Leader: Town Manager

Residents

- Partner with EV information resources, EV advocacy groups, and EV charging vendors to assist residents in the investigation and acquisition/installation of Level 2 EVSE of for home use
- Update local zoning regulations, as necessary, to facilitate shared charging infrastructure for multi-family condo/rental properties

TIMING: Can begin immediately

STAKEHOLDERS: Town Manager, CEASC, Westford Climate Action

Leader: CEASC, Westford Climate Action

Commercial Industrial

- Seek to connect with commercial property owners with funding opportunities to install EVSE, e.g Volkswagen Settlement, MassDEP Electric Vehicle Incentive Program (MasseVIP)

TIMING: Can begin immediately

STAKEHOLDERS: Local Businesses, Rotary, Westford Business Association, Economic Development Committee, Town Manager

LEADER: CEASC, Economic Development Committee

Reducing the amount of Solid Waste Being Incinerated

Burning our solid waste, particularly waste that could be reused, recycled or composted, is costly both in carbon and financial terms.

SW1: Reduce residential, Municipal, Corporate and nonprofit solid waste

- In conjunction with the Westford Recycling Commission, the Economic Development Committee and local business associations, like the Westford Rotary and the Westford Business Association, seek to build understanding of the reuse, diversion and recycling opportunities available, as well as the budget and carbon savings associated with changing disposal habits.
- Document the financial savings, in addition to the carbon savings, from a reduction in municipal and corporate solid waste tonnage.
- Assist businesses and households in understanding the out of pocket savings to be achieved through reuse and purchases of recycled and minimally packaged products.
- Develop incentives to inspire new habits, from fun, like contests, to mandatory, like lower barrel limits.
- Work with businesses and nonprofits to help them understand and comply with the MA DEP Waste Bans.
- Meet with Westford businesses and landlords to better understand their purchasing patterns and waste management and supply chain challenges
- Help them align their corporate goals, and employee and customer behavior patterns, with the Town's net zero Goals and then to communicate these targets to their constituents and our community
- Connect businesses with disposal alternatives that meet their needs
- Investigate whether creating greener spaces with onsite composting, internal swaps, freecycling, or repair clinics, and possibly outdoor recreational space for employees and customers might have complementary benefits with regard to health and welfare, training and waste disposal, depending on the sector and location

Timing: Can begin immediately

Stakeholders: Assistant Town Manager, Select Board, Town Committees, Westford Climate Action and Business associations

Leader: CEASC and Recycling Commission for residential, nonprofit and municipal sectors, CEASC and business associations for commercial and industrial sectors

Preserving the Town's Natural Resources

Emissions reduction alone will not get us to netzero. We must preserve and enhance the carbon sequestration potential of our natural resources.

NR1: Preserve and Enhance the health of Westford's forests and wetlands

- Conduct forest inventory and establish carbon sequestration capacity of various land types and parcels throughout town
- Create a Forest Management Plan that includes protecting and enhancing old growth in order to reduce heat effects, absorb CO₂, sequester carbon, and reduce the impact of extreme rain events
- Identify resilient species, preferred land management strategies, and invasive species threats
- Increase acreage of forested areas in town
- Seek to preserve, not just replant trees, as older trees often sequester greater amounts of carbon
- Develop regulations and recommendations for landowners

- Offer workshops to teach boards and property owners how to maximize the carbon and water absorption of their properties through appropriate land management and to understand the linkages between healthy environmental cycles and climate, clean air, water, biodiversity and human health, not least of all because it will save them money through reduced purchases of **energy**, water, lawn and garden products, and possibly even improve their property values.

- Consider shopping in your yard - learn to grow things you might otherwise buy - food and flowers for you, food for birds, food for pollinators, food for wildlife

- Develop and promulgate recommendations and regulations for landowners

TIMING: Can begin immediately

STAKEHOLDERS: Westford Land Use Department, Conservation Commission, , Westford Conservation Trust, Sudbury Valley Trustees, MA Audubon, Westford Land Preservation Trust, CEASC, Westford Climate Action, Community Volunteers

Governance and Lobbying for a Sustainable Energy Future

Implementing Westford's Roadmap to net zero will require a significant commitment by the entire community to challenge status quo approaches as the community strives to achieve very dramatic changes to reduce GHG emissions. Now is the time to lay the groundwork for the green policies we will need in the future. Support begins in the community. Leaders at the Town, state, and national levels must hear calls for planning and change.

This plan will require action by all stakeholders in the community, including residents, businesses and municipal government. Changes to the Roadmap are inevitable and necessary to ensure the Town adjusts the path forward to account for Westford's successes and failures, to take advantage of technical innovation, and to align local action with evolution of the state's strategy for GHG reduction. As such, the implementation of the Roadmap should be flexible and resilient.

G1: Establish a municipal Sustainability Coordinator position in Westford

- The Town needs a variety of people from the Westford community to support successful implementation of this plan, including ongoing leadership to coordinate efforts by a variety of stakeholders. At a management level, the various strategies described in the plan will require administrative leadership and oversight by Town staff. Based on the experience of other Massachusetts cities and towns, a Sustainability Coordinator on Town staff functioning as a Roadmap program manager can significantly improve the efficiency and effectiveness of strategy execution. Acton, Chelmsford, Concord and Lexington have found the sustainability position to be an essential member of their municipal staff. Town leadership needs to determine the specific responsibilities of other Town staff to support Roadmap implementation, including department heads, and Town boards and committees.
- Sustainability coordinators bring in substantially more money than the cost of their salary and benefits. A Cost/Benefit analysis performed by Neal Duffy of MA Green Communities has shown significant Return on Investment (ROI).
- The CEASC must play a lead role to implement this plan in partnership with a Sustainability Coordinator. Community groups, such as Westford Climate Action, will be critical to communicating and implementing actions throughout the residential and businesses sectors.

G2: Work with our legislators, residents and businesses to maximize Westford's use of state resources

- The Massachusetts Roadmap to 2050 legislation encourages participation in community solar projects, sets up a new grant program to help nonprofits afford solar panels and changes state rules so that businesses or buildings with a large number of solar panels can more easily sell their excess energy back to the grid.
- The Department of Energy Resources, which oversees the SMART program (Solar Massachusetts Renewable Target Program), is now statutorily required to prioritize solar installation on the roofs of

low-income households, and it must make the SMART program — and any future solar incentive program — easier to sign up for.

G3: Local-level advocacy

- Officials and committees in the Town of Westford must learn about the goals of net zero 2050, and develop plans to get there.
- Survey residents about their attitudes toward net zero, and their willingness to take action.
- Survey businesses about their current energy use, and their company’s policies toward climate change.
- Publicize this Roadmap to net zero, and the work of the Clean Energy and Sustainability Committee and its allies.
- Encourage boards to adopt new standards, codes, and zoning to support green energy.

G4: State-level advocacy

- Westford must partner with other towns and the state to share ideas, exchange information, and coordinate actions.
- We must lobby legislators and state officials to implement new policies, regulations, and incentives.
- We must coordinate with National Grid and other utilities about adding local power sources (e.g. solar panels), increasing capacity as electrification expands, and making the grid more robust.

G5: National-level advocacy

- We must lobby national legislators and officials to implement new policies, regulations, and tax incentives.
- New large-scale investments are required in infrastructure for clean power generation, electric transmission, and transportation.
- Subsidies must be offered to purchase electric vehicles, install charging stations, convert oil and gas heating to electrical technologies, encourage clean power generation, and improve building efficiency.
- Consumers and shareholders must hold large corporations responsible for their positions on climate change. Fossil fuel companies must transition from suppliers of carbon, to leaders in renewable technologies. Other corporations must commit to minimizing GHG emissions from their operations.
- New technologies for power generation, energy storage, and transportation must be developed. Technologies for carbon sequestration should be explored and fostered.
- Leasing and development of fossil fuel resources must diminish, and eventually cease.

Appendix – Additional Measures to Mitigate Climate Change

There are many conservation measures, individual actions, and consumer choices which will cumulatively affect climate change and sustainability. The GHG reductions from these are difficult to quantify, but nevertheless they are important. Some ideas are listed here.

Additional Natural Resources Actions

NR1: Educate consumers and businesses about petroleum products and persuade them to minimize their consumption in supply chains, maintenance and household use in order to decrease emissions from production and where recycling isn't available, at disposal. A partial list of actions might include:

- Minimize plastics - bags of all kinds, storage, serving, and heating - switch to glass, silicone, paper, textiles or porcelain where possible.
- Minimize petroleum-based textiles (Polyester, fleece, Acrylic, Nylon, Spandex and Acetate) to reduce demand for petrochemicals and to eliminate plastics contamination of air water and soil when these items are washed and ultimately disposed of.
- Eliminate petroleum-based soil amendments for agriculture and garden use - developed in order to create markets for petrochemicals not to enrich the soil - teach organic lawn care and regenerative agricultural practices for truly healthy soils.
- Reduce single use products - lifecycle energy needs, emissions, disposal costs and climate impacts far outweigh convenience in everything but a medical context
- Minimize packaging now, when possible, by seeking out bulk buying and no package /minimally packaged products, by using reusable bags/containers, and by working with producers, stockholders and lawmakers to eliminate packaging when group action is required
- Switch to manual processes where practical, and electric or battery powered, before using small gas engines or electrical appliances.

NR2: Educate residents, procurement officers and other buyers about the impact of their buying choices on GHG emissions and land use globally and persuade them to make changes. Global changes in land use are driving climate change, and these changes are driven by consumer choices right here in Westford.

- Eliminate use of virgin products where recycled counterparts exist (and purchase is necessary) to drive demand for recycling commodities in order to prevent emissions from mining and preserve forests and sequestration capacity
- Purchase rainforest certified and shade grown coffee and chocolate in order to preserve the Amazon rainforest, which drives weather patterns globally.

NR8: Examine opportunities for collaboration with surrounding towns/geographic areas that naturally encompass Westford, like a watershed or a population, adjacent conservation areas, transportation corridors, or economic categories in order to address cross border issues.

GHG Inventory - What is Included, What is not Included

Our GHG inventory used the [Metropolitan Area Planning Council \(MAPC\) Community Greenhouse Gas Inventory Tool and Step-by-Step Guide](#). This GHG Inventory tool and protocol follow the methods put forth by the 2014 Global Protocol for Community-Scale Greenhouse Gas Inventories ("Global Protocol"). The sectors and subsectors included in the tool align most closely with the BASIC level reporting for Global Protocol inventories. The GHG inventory accounts for emissions resulting from Westford's homes, businesses and industries, municipal operations, large energy production facilities, passenger and commercial vehicles, public transportation, natural gas leaks, electricity line losses, municipal solid waste, and wastewater.

The GHG Inventory protocol that we used does not include "scope 3 sources" which are GHG emissions that are embodied in foods, water, products and construction materials. Out of boundary transportation, such as airline travel is also not included.

See the following charts:

Sectors and subsectors included in the Tool

Sector	Sub-sector	Emissions sources	Energy types
Stationary Energy	Residential	Energy use in residential buildings as well as losses from distribution systems	Electricity Natural gas Heating fuel oil Petroleum Products Various - may include natural gas, propane, diesel, and waste-to-energy
	Commercial, Industrial, and Manufacturing	Energy use in commercial, government and institutional buildings, manufacturing and industrial facilities, as well as losses from distribution systems.	
	Construction and Landscaping	Energy use from construction and landscaping equipment and activities.	
	Energy Industries	Stationary combustion of fuel in various equipment, such as boilers and generators.	
Transportation	On-road vehicles	All trips taken by passenger and commercial vehicles registered in the community. Portion of trips taken within the community boundary by on-road buses and trackless trolleys.	Gasoline Diesel CNG Electricity
	Railways	Portion of trips taken within the community boundary by public light and heavy rail.	
Waste	Solid Waste	Municipal solid waste disposed in/by landfills, incineration, composting, and anaerobic digestion	Landfill gas (methane)
	Wastewater	Process and fugitive emissions from treating wastewater	Not applicable

What is not included in the Tool?

Our primary goal for this guide is to simplify the process of developing a GHG inventory by using publicly available data sets, while maintaining high levels of accuracy and relevance in the data used. As such, some sources of GHG emissions that are covered by the BASIC level for Global Protocol inventories are not included in the current version of the Tool. The following subsectors are excluded from the Tool because public statewide data sets were either not available or not robust enough to support a method of estimating GHG emissions from community to community.



Stationary Energy

Agriculture, forestry, and fishing activities: emissions that result from direct fuel combustion to support these activities (e.g., machinery, generators, pumps, etc.)



Transportation

Commercial and national railways: passenger and freight activities associated with commercially owned railways servicing or running through communities

Waterborne navigation and aviation: ships, ferries, and other boats operating within the community boundary, and air travel occurring within the community boundary.

Off-road vehicles: emissions that result from airport equipment, agricultural tractors, chain saws, forklifts, snowmobiles, etc.



Waste

Industrial waste: waste generated from industrial processes and technologies.

For two subsectors, we have provided the option for communities to input local data where it is available. These are GHG emissions from (1) regional transit agencies (outside of the MBTA) and (2) private waste haulers servicing commercial facilities. While a comprehensive data source is not currently available for these subsectors, communities have the flexibility to input this data if they have access.

Citizen Choices

This document provides recommendations for the most effective steps that we can take to reduce GHG emissions in Westford based on the GHG Inventory which provides data on those activities that are producing the highest levels of emissions. Please see "[GHG Inventory: What is Included, What is Not](#)" for further details.

There are many other steps that individuals can take to reduce greenhouse gas emissions. When we consume less – whether less energy, fewer goods, or less energy intensive food – we not only avoid the emissions directly associated with those items, but we can also influence the corporations providing those goods to focus on less energy intensive products. With that in mind, this roadmap includes optional goals for us all to reduce our individual carbon footprints.

Actions for Residents

C1: Choose to use less energy

- Chose more moderate temperatures to reduce heat and air conditioning
- Reduce car idling time
- Elect for lower energy options for getting around town (walking, biking, electric moped)
- Send kids to school on the school bus, rather than in a private auto

- Reduce air travel

C2: Reduce diet-related carbon emissions

- Buy locally grown foods
- Grow your own vegetables, in season
- Waste less food
- Use reusable water bottles and water from tap rather than packaged/transported water
- Eat less meat; for meat eaten, choose local and sustainably raised and grazed meat
- Support regenerative agriculture where possible, both locally and more broadly

C3: Consume less

- Weigh the manufacturing, packaging, transportation, and disposal costs of purchases. Is the item worth it?