



2023 Comprehensive Climate Action Plan

February 1, 2024



Codman Community Farms, Town of Lincoln, MA. Photo credit: Michele Grzenda

TOWN OF LINCOLN

Lincoln Town Offices
16 Lincoln Road
Lincoln, MA 01773
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Jim Hutchinson, Chair
Kim Bodnar
Jennifer Glass
Select Board

Climate Action Plan Letter of Support Select Board & Town Administrator

We are grateful for the work of the Climate Action Planning Committee, Jennifer Curtin our Assistant Director of Planning & Land Use, the Metropolitan Area Planning Committee, and the dozens of Lincoln residents who have taken the time to participate in the process of developing a Climate Action Plan (CAP) for Lincoln. We are also grateful for the funding we received from the state through the Municipal Vulnerability Preparedness program. The \$100,000 grant Lincoln received made this important planning effort possible.

Lincoln has a proud history of environmental stewardship that includes decades of creative land and natural resource protection, planning, and initiatives. Today's Lincoln residents are the beneficiaries of this farsighted thinking and decisive community action. Likewise, as awareness of the threats posed by climate change has increased, Lincoln has again rallied to the cause. Citizen/Town collaborations over the past decade have resulted in an impressive list of projects and programs designed to ensure that Lincoln is doing its share to combat climate change. Included among our collective actions: multiple town and private organizations now exist within Lincoln with climate action as a primary focus (the Lincoln Green Energy Committee, Mothers Out Front, various faith group subcommittees, Zero Waste Lincoln, public school-based student organizations, and our Climate Action Planning Committee); at this year's town meeting, the town voted to adopt the state's specialized stretch energy code, and passed a bylaw that allow Lincoln to participate in a ten-town demonstration plan prohibiting fossil fuels in new construction; multiple student-led initiatives to limit plastics in the environment have been approved by town meeting; volunteers have led educational efforts and supporting programs to decrease consumption and increase reuse of goods and materials that would otherwise end up in the waste stream; the Green Energy Committee has run "solarize Lincoln" and heat-pump installation programs, and established a green electricity aggregation program; the Town approved a net-zero renovation of the Lincoln School; and the Select Board recently awarded a contract for a 1-megawatt landfill solar project—all in furtherance of the emissions reduction targets established by the Commonwealth and endorsed by Lincoln's town meeting.

The Climate Action Plan will be a major contribution to this effort. It provides a framework for us to define the problem, evaluate options, establish priorities, measure progress, and hold ourselves accountable over time. We will urge our boards, committees, and departments to incorporate a climate action mindset when considering programs and policies that have the potential to contribute to or detract from our ability to achieve our shared goals.

We look forward to the opportunity to share the Plan with our residents during the September 30th State of the Town Meeting and in other forums.

Sincerely,

Jim Hutchinson
Chair, Select Board

Jennifer Glass
Select Board

Kim Bodnar
Select Board

Tim Higgins
Town Administrator

Acknowledgements

Funding



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Town of Lincoln

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Agricultural Commission
Bicycle and Pedestrian Advisory Committee
Board of Health
Board of Water Commissioners
Conservation Commission
Green Energy Committee
Historic Commission
Housing Commission
Inclusion, Diversity, Equity, Anti-Racism
Committee
Lincoln School Committee
Planning Board
Roadway and Traffic Committee
Select Board
Zoning Board of Appeals

Participating Town Departments

Building & Engineering
Conservation
Council on Aging and Human Services
Planning and Land Use

Public Works
Public Safety
Town Administration
Water

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Lincoln Community and Resident Groups

Friends of Modern Architecture
Lincoln Common Ground
Lincoln Land Conservation Trust
Lincoln Parent Teacher Organization
Lincoln-Sudbury High School Environmental Club
Mothers Out Front
Rural Land Foundation
The Commons in Lincoln
Zero Waste Lincoln
Welcome, Inclusion, Diversity, Equity Lincoln

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The Town would like to thank the many residents and stakeholders who kindly took the time to participate in the variety of surveys, focus groups, individual interviews, and workshops that were part of this Plan's development. A special thanks to Climate Action Lincoln and the Lincoln Green Energy Committee. This Plan could not have come to fruition without the vision, engagement, and enthusiasm of dedicated Lincoln residents like you.

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Introduction

Developing a Climate Action Plan

The Town of Lincoln is committed to addressing climate change and creating a sustainable and inclusive community. Lincoln believes that global problems need local solutions. As such, the development of this Lincoln Comprehensive Climate Action Plan (L-CAP) established climate actions, described existing and ongoing climate efforts, and developed implementation strategies to advance the Town’s climate priorities. It is intended for the 2023 L-CAP to serve as a living framework to help guide the Town and its community members towards reducing greenhouse gas emissions while also advancing community resilience in equitable and sustainable ways.

Over the last nine months, this L-CAP planning process provided many opportunities to connect with stakeholders in the community through online survey participation, “listening tour” conversations, workshops, and focus groups. Feedback gathered from these engagement activities served as guidance for the development of the Plan. During this time, the Town went through a process of reviewing the community’s climate planning and implementation efforts to date, in addition to identifying current needs in the community and future efforts: setting climate goals, identifying priority strategies, and evaluating and developing implementation blueprints.

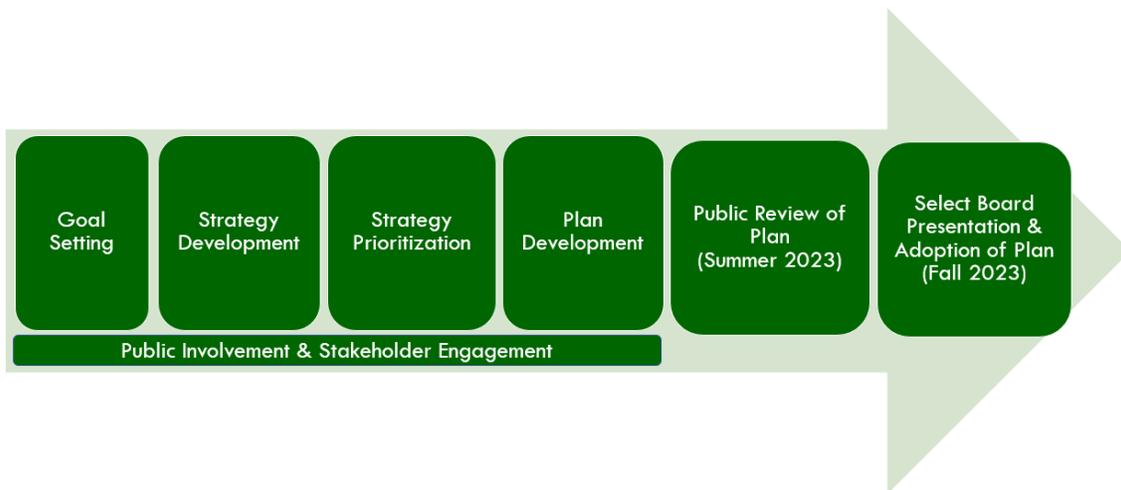


Figure 1: Lincoln’s 2023 Comprehensive Climate Action Plan (L-CAP) process and milestones.



Did you know? Climate Action Lincoln (CAL), a subcommittee of the Town’s Green Energy Committee, has been advocating for the development of a climate action plan for several years. In 2021, CAL conducted extensive outreach to 12 Town Boards and Committees, including presentations at the State of the Town Meeting and at the Annual Town Meeting (March 2, 2022) about the urgency to plan and prepare for climate impacts while also mitigating carbon emissions. Lincoln residents responded by unanimously voting to embark on a process to develop the Town’s first Comprehensive Climate Action Plan.

This plan builds on the Town’s 2019 Community Resilience Building Workshop, which is supported by the State’s Municipal Vulnerability Preparedness (MVP) Planning program, which identified seniors, low-income residents, and people

living alone as being more susceptible to extreme heat and other climate risks. The workshop and corresponding data analysis also identified flooding, severe storms, and droughts as top climate hazards for Lincoln.

Centering Equity and Climate Justice

There are populations in Lincoln that should be centered and prioritized not only to ensure an equitable distribution of resources and benefits, but also to support these groups' participation throughout the L-CAP planning process and with plan implementation later.

According to Massachusetts' definition and designation for Environmental Justice (EJ) populations, one block group in Lincoln meets the criteria that "40% or more of individuals in the block group population belong to a priority population." The designated EJ block group in Lincoln is shown in yellow in Figure 2 below. Most of the EJ area consists of the neighborhoods near the vicinity of the Hanscom Air Force Base area.

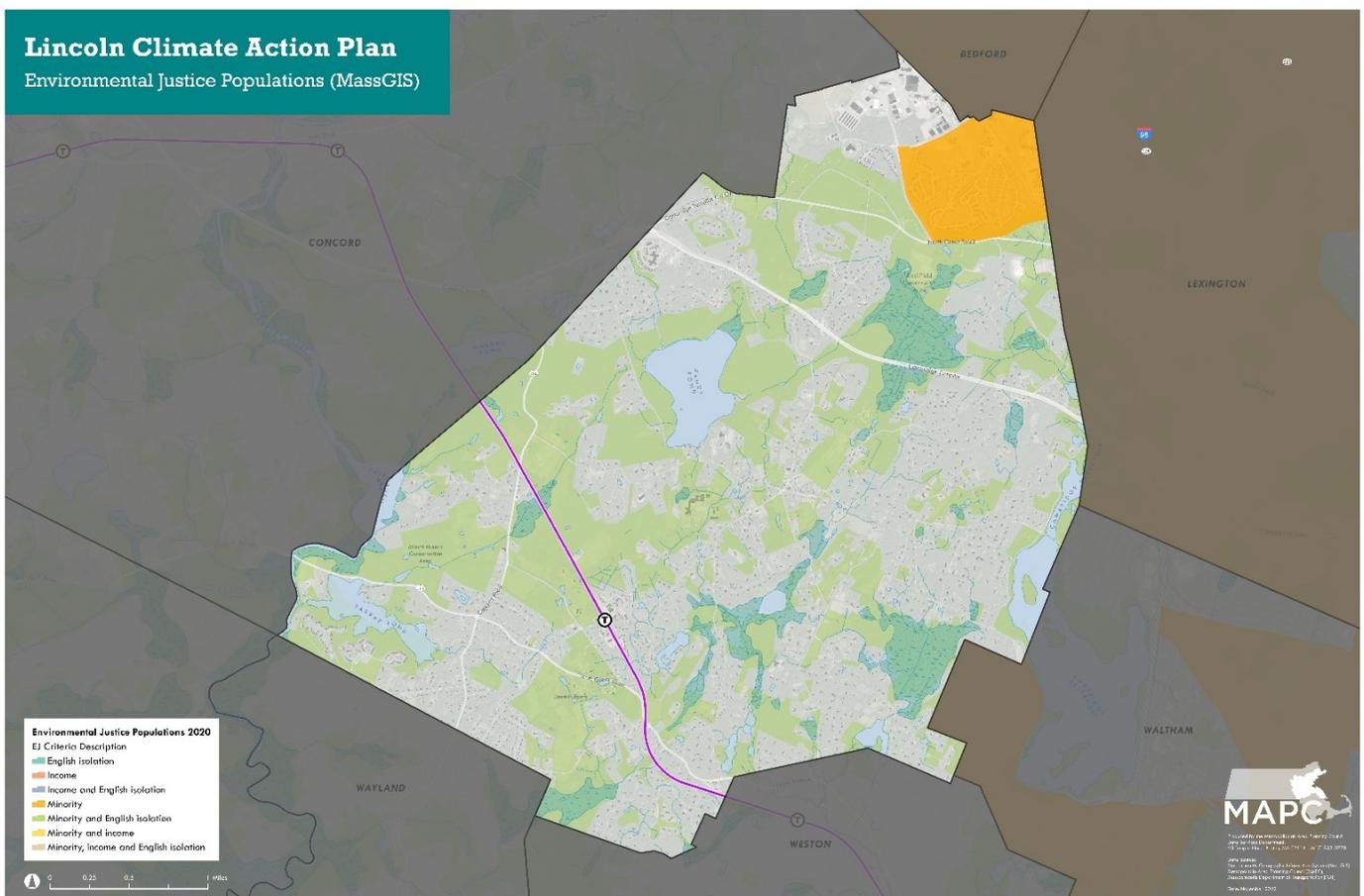


Figure 2: A map of Lincoln's Environmental Justice (EJ) block group.

In addition to reducing its carbon footprint, Lincoln will also need to prepare its community members, businesses, and residents, to adapt to the changing climate. Furthermore, when thinking of these climate risks, it's important to keep in mind those who are and will be impacted first and worst. These communities include those identified as priority populations (from previous climate vulnerability assessment work) and the state-designated Environmental Justice communities. These groups included seniors, youth, renters, residents of multi-family developments and assisted living communities, individuals with disabilities, residents who

primarily speak a language other than English (a focus on Spanish, Mandarin Chinese, and Russian speakers), people of color, and low-income residents.

To center equity in this L-CAP planning process, the following questions were considered, especially when establishing the Town’s climate goals and developing priority strategies for implementation:

- Who has been historically impacted?
- Who will be most impacted by the type of changes to our climate to be expected?
- How will the benefits be distributed?

See **Section 2 - Community Engagement and Feedback for the L-CAP** below for more details on how equity was centered throughout engagement with stakeholders during the L-CAP planning process.

Planning with the Community

Climate action planning in Lincoln means “all hands on deck!” Community members (including businesses, residents, neighborhood groups, non-profit organizations, farms, etc.) were involved in every step of the L-CAP planning process. They shared their lived experiences with climate change impacts, participated in a visioning exercise on what a sustainable, climate resilient Lincoln community could look like, and set goals and priority actions to implement and achieve this shared vision. See **Section 2 - Community Engagement and Feedback for the L-CAP** below for more details about this Plan’s stakeholder engagement activities and key findings.

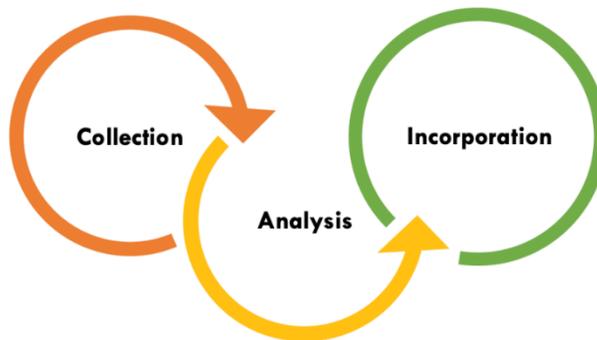


Figure 3: The Metropolitan Area Planning Council (MAPC)’s community engagement process includes three central tenets:

1. Craft standards of engagement, such as prompts that would inform the current phase of the project, and facilitation guides to ensure interviews are consistent and contain the same standards of methodology;
2. Analyze public input by identifying themes in the responses, categorizing them according to these themes, and constructing a narrative about future planning based on feedback received;
- and 3. Share out findings with the public and incorporate themes into the plan for better informed decision-making.

Lincoln’s Climate Efforts to Date

Climate action is not new in Lincoln. The Town has consistently demonstrated a passion for sustainability, natural resource protection, climate action, and equity. Committing to and implementing climate action has been ongoing in the community for nearly two decades. In 2006, the Town established the first iteration of the Green Energy Committee, with members

appointed by the Select Board. The Town has since leveraged many state and regional opportunities, which include technical assistance and financial resources to support energy efficiency and a transition to clean renewable energy for municipal operations, as well as businesses and residents. In 2018, the Town also participated in the statewide Municipal Vulnerability Preparedness (MVP) program to assess potential vulnerabilities and opportunities to prepare community members for climate change impacts, while also determining priority actions to enhance the Town's path towards being resilient. Figure 4 below provides a snapshot of climate efforts and accomplishments in Lincoln to date.

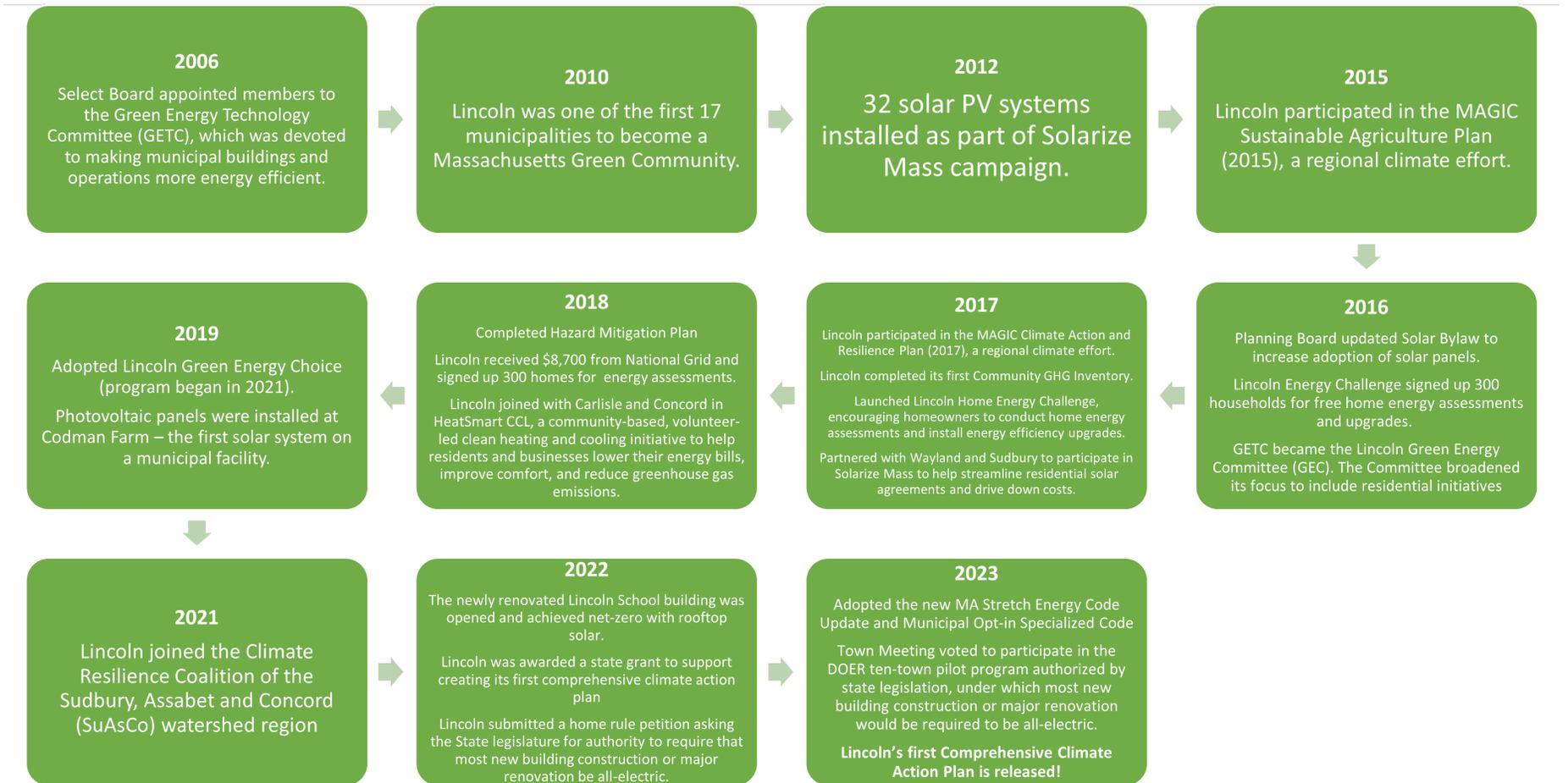


Figure 4: A snapshot of climate efforts and accomplishments in Lincoln to date.

What Does Climate Change Look Like in Lincoln?

Communities across the Commonwealth, including Lincoln, are already experiencing changing climate conditions. Average annual temperatures and the number of hot days per year have increased, and more annual precipitation and extreme precipitation events have been observed. These conditions will likely intensify, along with associated impacts, according to future climate projections.

According to the Massachusetts Climate Change Assessment Regional Report for the Eastern Inland Region, where Lincoln is located, increasing temperatures, more extreme precipitation, and associated flooding are some of the climate change hazards and impacts the region is particularly vulnerable to.¹ Similar findings and concerns were also raised by Lincoln’s community members at the Community Resilience Building Workshop in 2019, as part of the Town’s participation in the statewide Municipal Vulnerability Preparedness (MVP) Planning program; top climate hazards identified by community members are: flooding, severe storms (snow, wind, ice), drought, and extreme heat.

Climate Change

Lincoln and the Charles River Watershed

Our climate is regulated by "greenhouse gases (GHGs)" that trap heat, including carbon dioxide, methane, and nitrous oxide. In the past century, the combustion of fossil fuels, our primary energy source in the age of industrialization, has increased the concentration of GHGs in the atmosphere, which has caused global temperatures to rise. If people stabilize GHG emissions, global temperatures may rise more slowly. If emissions continue increasing at the same rate, we can expect more extreme changes in the climate.

Higher Temperatures

Warmer Average Temperature

Data shown for the Charles River Watershed

More Days Above 90°

Data shown for the Charles River Watershed

Fewer Days Below Freezing

Data shown for the Charles River Watershed

As the climate changes, Lincoln can expect...

More Large Storm Events

In addition to increasing annual precipitation, climate change will bring more large rain and snow events. This will lead to more stormwater flooding, as most stormwater drainage is not sized for larger rain events. 10-year, 24-hour storms refer to the 24-hour rainfall total for the biggest storm expected in a 10-year period.

Expected size of a 10-year, 24-hour storm	
4.5 inches	5.05 inches
1961 Observed Rainfall (NOAA) for Eastern MA	2014 Observed Rainfall (NOAA) for Newton
5.6 inches	6.4 inches
Cambridge Rainfall Projections, 2015 - 2044	Cambridge Rainfall Projections, 2055 - 2084

Storm drains built for 1961 standards will be inadequate as rainfall increases

More Annual Precipitation

But less in the summer and fall...

While total annual rainfall and large rainfall events are projected to increase, summer and fall rain is projected to decrease slightly. Due to the combined effects of earlier snowmelt, less rain, and higher temperatures, summer and fall droughts may become more frequent.

And more frequent droughts...

Due to the combined effects of earlier snowmelt, less rain, and higher temperatures, summer and fall droughts may become more frequent.

Sources: Massachusetts Executive Office of Energy and Environmental Affairs; Northeast Climate Science Center; National Ocean and Atmospheric Administration TP 40; National Ocean and Atmospheric Administration Atlas 14; Cambridge CCVA as cited by Boston Research Advisory Group 2016; Massachusetts Office of Coastal Zone Management, "Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning 2013"

1 MA Executive Office of Energy and Environmental Affairs (EEA), 2022 Massachusetts Climate Change Assessment (2022), <https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-iii-regional-reports/download>.

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Various factors should be considered when thinking about vulnerability, most notably exposure to the climate hazard, sensitivity, and adaptive capacity.²

² MAPC, Climate Vulnerability in Greater Boston: MetroCommon 2050 (2019), <http://climate-vulnerability.mapc.org/>.

A Snapshot of Lincoln 's Carbon Footprint

For this planning process, a review of Lincoln’s 2017 Greenhouse Gas Inventory was conducted. Additional key data used for this review included municipal electricity and natural gas consumption data, amongst other sources, that allowed us to see a more comprehensive perspective of Lincoln’s emissions from various sectors in 2017.³ **Overall, Lincoln ’s total greenhouse gas emissions (GHG) in 2017 were approximately 56,370 metric tons of CO₂e.** Municipal operations and facilities in Lincoln accounted for approximately 8% of total emissions in 2017. Residential buildings and passenger vehicles were responsible for approximately 38.5% and 32.8% of emissions respectively, while commercial and institutional buildings and manufacturing industries in addition to commercial vehicles, were responsible for approximately 20.6% of emissions.

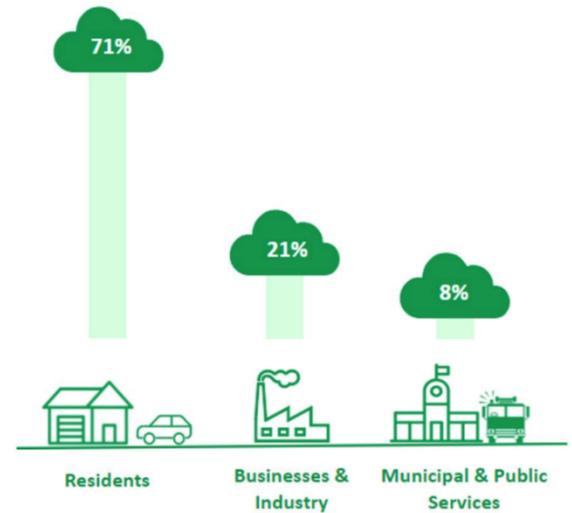


Figure 5 (right) : A summary of Lincoln’s greenhouse gas emission sources. The “Residents” category includes emissions from passenger vehicles and residential homes. The “Businesses & Industry” category includes emissions from C&I (Commercial and Institutional) Buildings and Manufacturing Industries, commercial vehicles, and construction. The “Municipal & Public Services” category includes emissions from municipal vehicles, municipal buildings, public transportation (buses, trolleys, railways), wastewater treatment and discharge, and waste (Landfill, Biological Treatment, and Incineration & Open Burning).

As shown in Figure 6, municipal operations and facilities in Lincoln accounted for approximately 8% of total emissions in 2017. Residential buildings and passenger vehicles are responsible for approximately 38.5% and 32.8% of emissions respectively, while commercial and institutional buildings and manufacturing industries in addition to commercial vehicles, were responsible for approximately 20.6% of emissions.

Percent of Total Community-Wide Emissions by Subsector (with Municipal Emissions Disaggregated)

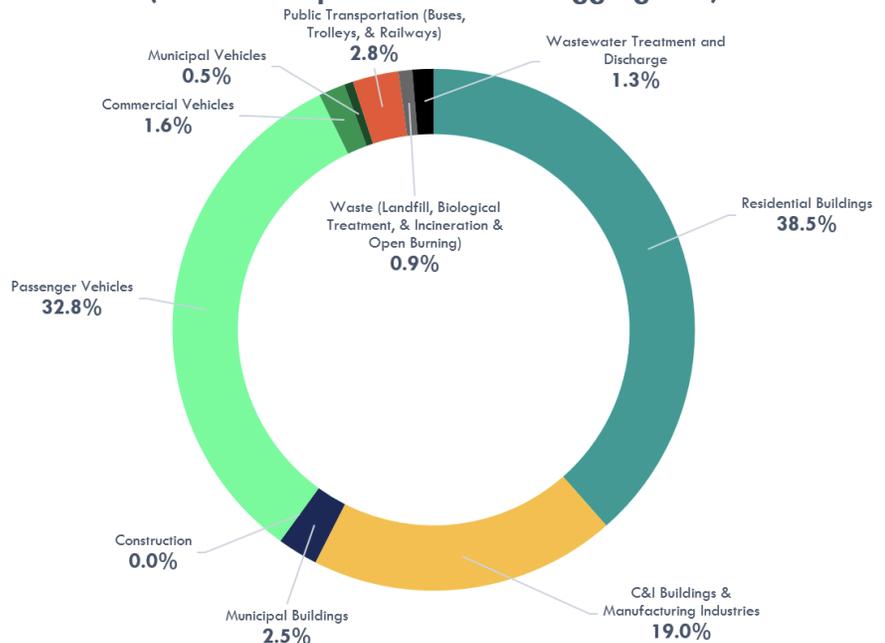


Figure 6 (right): Percent of Total Community-Wide Emissions by Subsector (with Municipal Emissions Disaggregated) for Lincoln in 2017.

Though municipal emissions are lower in comparison to emissions

³ Note: This 2017 Greenhouse Gas Inventory is not able to capture sources of renewable energy in the community however and does not include emissions from aviation.

generated by residential and commercial activity, it is still crucial that the municipality lead by example and make changes to Town buildings and vehicles that will lower the usage of fossil fuels and will reduce emissions. Doing this will support a community-wide transition led by residents, businesses, and the Town to become more energy efficient, sustainable, and climate resilient.

The Green Energy Committee aims to update this Inventory from time to time; for now, it believes the 2017 data remains roughly representative. This review of greenhouse gas emissions in Lincoln is an important component of L-CAP, as it provides a high-level overview of where the major sources of emissions are in Lincoln. Findings from the GHG Inventory can help guide the prioritization of L-CAP strategies for more effective implementation and achievement of GHG emissions reduction. However, a technical analysis should be conducted for a more detailed understanding of, and to gain quantitative data for, L-CAP strategies and their greenhouse gas reduction potential, in addition to lifetime costs and benefits.

Community Engagement & Feedback

The L-CAP milestones of goal setting, evaluation, and strategy development were guided by the Lincoln Climate Action Plan Working Group, which was comprised of a mix of Town staff, residents, and representatives from community organizations as well as from the Lincoln Green Energy Committee and Climate Action Lincoln. Additional stakeholder engagement activities included a community-wide survey, workshops, focus groups, individual interviews, and listening tours. Engagement materials were translated into the three most spoken non-English languages in Lincoln: Spanish, Russian, and Mandarin Chinese. The public workshops also included interpretation services in these languages.

Stakeholder Mapping for the Lincoln Climate Action Plan

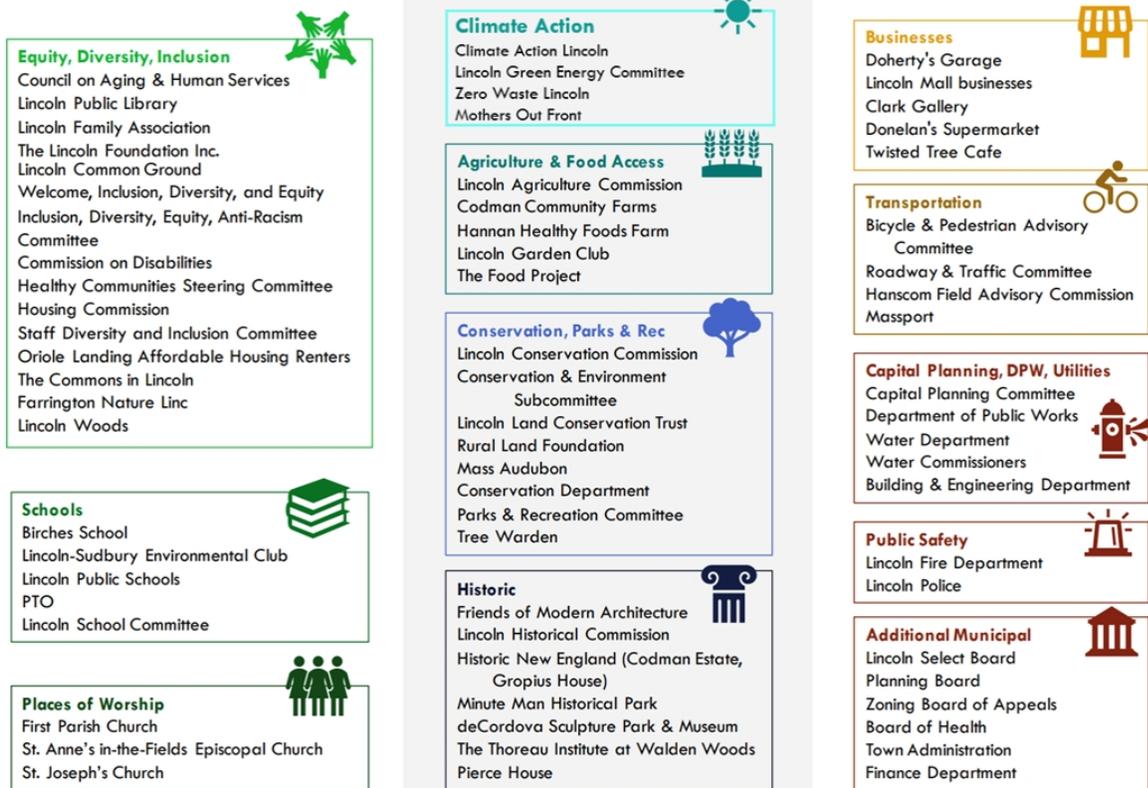


Figure 7: Stakeholder Mapping for the L-CAP. There were twelve main stakeholder groups identified during the planning process for the L-CAP. These various groups brought valuable perspectives to interviews, focus group meetings and community workshops, which ensured a diverse representation of community needs and priorities for climate action planning.

Project Engagement



Figure 8: Summary of engagement activities throughout the L-CAP planning process.

Feedback Themes and Key Findings

Community Workshops

A total of five workshops were held in March (2), April (2), and June (1) as touchpoints to connect with the community, provide updates on the planning process and invite feedback from community members on what they would like to see included as goals and climate strategies in the Plan. These workshops aimed to strengthen relationships among partners and organizations who have already been championing climate action in the community, while also inviting new voices to the table. Collectively, the community can work with municipal staff to determine how the Town can lead by example as well as how individuals, both business owners and residents, can contribute to the climate mitigation and resilience efforts Lincoln is leading.

Figure 9 (right): L-CAP Outreach Postcard. An

Lincoln Climate Action Plan
Questions or comments?
Contact Jennifer Curtin
curtini@lincolntown.org

The Town of Lincoln is planning for a resilient and sustainable future, and **we want to hear from you!**

Visit the project website to register for Community Workshops on **April 12 at 7PM** and **April 14 at 8:30AM**

Take and share the **public survey** to tell us your thoughts on climate action planning
Closes on April 10, 2023

lincolntown.org/1411/Climate-Action-Plan

www.Tinyurl.com/LincolnClimateActionSurvey

THE TOWN OF LINCOLN MASSACHUSETTS | MVP | MAPC

example postcard that was sent out to every household in the community about the Climate Action Plan and various ways community members could participate in the planning process.

Listening Tour and Focus Groups

Throughout the month of March and April, a “strategy listening tour” hit the road and meetings occurred with different stakeholders across town. These events included talking with students at Lincoln-Sudbury High School and Lincoln Public Library and having lunch with seniors at Bemis Hall. A focus group with local farmers and a coffee hour with several residents (renters, condo owners, etc.) living in multi-family housing were also facilitated for more in-depth discussions around appropriate strategies to prioritize in the L-CAP. These meetings enabled community members, who may not be familiar with or involved in a public planning process, to lend their voices and ideas in smaller, more intimate settings. Overall, participants in these various engagement activities contributed **more than 200 strategy ideas** !

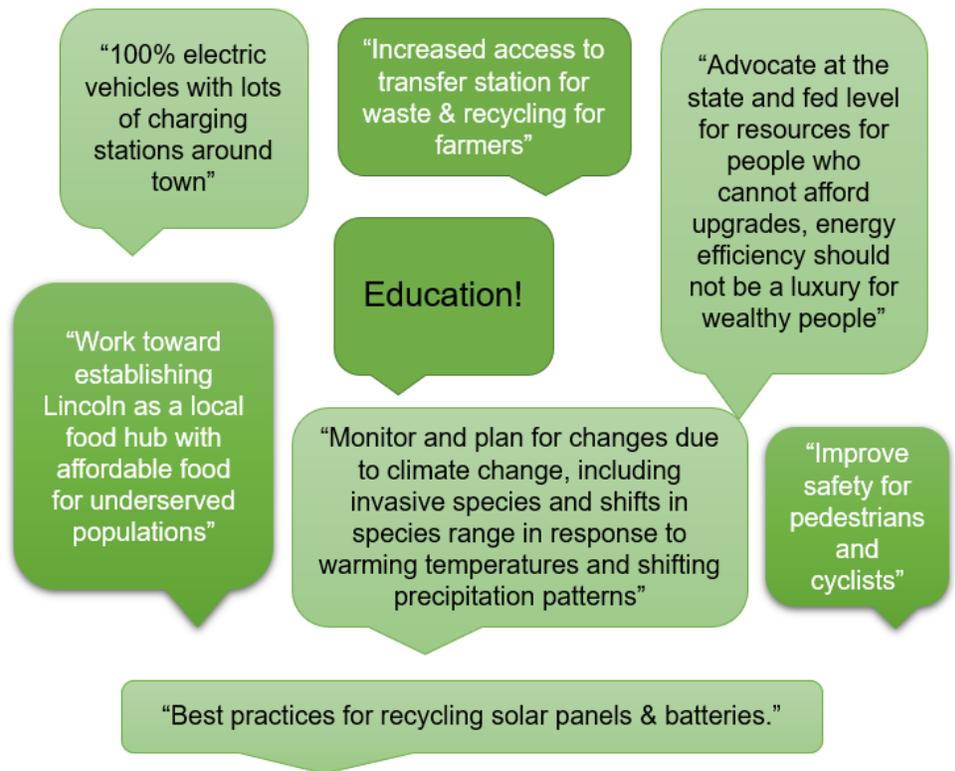


Figure 10: Feedback from community engagement activities. A snapshot of some strategy ideas collected from the listening tour and focus groups during March-April.

Highlighted themes and key trends that emerged from stakeholder feedback included:

Identifying climate vulnerable communities; including seniors, renters, residents of multi-family developments and assisted living communities, Environmental Justice populations, individuals with disabilities, residents who primarily speak a language other than English, youth, people of color, and low-income residents.

Identifying outreach methods that have worked well in Lincoln previously , including an emphasis on mailed or printed materials, as well as reaching residents where they are (for example, physically going to The Commons in Lincoln for engagement).

Climate hazards of concern include flooding, impacts of heat and winter weather on climate vulnerable residents, impacts of drought on farmers and residents with private wells in addition to the Town’s general water supply, and impacts of rising temperatures leading to rise in invasive species.

Public health concerns related to aviation. A large amount of greenhouse gas emissions come from this industry in addition to harmful chemicals (lead, polyfluoroalkyl substances

(PFAS), etc.) that pollute the air those living nearby breathe and nearby soil and waterways. Many stakeholders discussed climate action goals and strategies, but there are concerns about the resulting **cost burden on residents**.

Climate Action Goals & Strategies

It has become more evident that climate change impacts will affect not only the natural and built environment of Lincoln, but also the safety and well-being of the people who live, work, and play in the community. Climate solutions must provide co-benefits, in an equitable manner, and reflect opportunities to reduce individual and community greenhouse gas emissions, protect the existing natural resources and amenities, prepare infrastructure that keeps Lincoln and its economy running, and equip the people to respond and adapt to the changing climate.

Lincoln's Climate Goals

Lincoln's climate goals guide the development and implementation of both short and long-term climate mitigation and resilience efforts in Lincoln.

1. Transition to clean energy technologies to support the Town of Lincoln's path towards carbon neutrality.
2. Prioritize accessibility, walkability, and connectivity to the Town's commercial centers and community spaces, while ensuring that these interconnected multimodal transportation systems are also affordable, reliable, and climate resilient.
3. Protect Lincoln's agricultural, historic, and environmental resources from climate change impacts.
4. Make sure Lincoln residents, especially those who are underserved and underrepresented, are prepared to address major climate hazards related to flooding, drought, severe storms, extreme heat and more.
5. Increase town-wide diversion rate through programs and policies to prevent, reduce, reuse, compost, and recycle waste.
6. Engage and support local business owners and residents in making their buildings and homes more sustainable and resilient, in an equitable, affordable, and accessible way.
7. Align local efforts with the State's climate goals and programs. Connect and share progress of Lincoln's climate actions with others in the region, and advocate for climate solutions at the regional and state level.

Alignment with the Commonwealth's Climate Goals

As the Town of Lincoln develops its own climate goals and strategies, it recognizes the importance of aligning its efforts with the Commonwealth's recently established Act Creating a

Next Generation Roadmap for Massachusetts Climate Policy. This Act required the executive branch to develop plans that would reduce GHG emissions in the state to 50% of the 1990 baseline by 2030, 75% reduction by 2040, and achieve “net zero” by 2050. This historic Act also defines Environmental Justice (EJ) populations for the first time in State statute, requires state agencies to develop more robust, equitable outreach and engagement approaches, in addition to implementing policies and programs that better protect EJ communities across Massachusetts. Other key provisions authorize the Commonwealth to procure an additional 2,400 megawatts (MW) of clean and reliable offshore wind energy by 2027 and require the Administration to implement a new, voluntary energy efficient building code for municipalities, establishing a new opt-in net zero stretch code for municipalities, and consider the social cost of carbon in the Mass Save program’s cost benefit analyses, to name a few.

Strategy Development & Evaluation

Strategies developed for this L-CAP are organized into the following planning areas:

- ❖ Energy
- ❖ Mobility
- ❖ Built Environment
- ❖ Working Land and Natural Resources
- ❖ Water and Solid Waste
- ❖ Social Resilience

Strategy Evaluation and Prioritization

More than 200 strategy ideas were received from community engagement activities! To prioritize the next steps, proposed strategy ideas were consolidated and then evaluated . A set of evaluation criteria was co-developed by the MAPC with input from the Lincoln Climate Action Plan Working Group .

The following strategy evaluation criteria and resulting co-benefits are defined as follows:

- **Greenhouse Gas (GHG) Reduction Potential** - whether a strategy reduces or mitigates GHG emissions, if implemented.
- **Equity Consideration** - whether a strategy may contribute to improving equity.
- **Co-benefit Potential** - whether a strategy has potential co-benefits.
- **Enhance Adaptive Capacity and Resilience** - whether a strategy contributes to improving community resilience.
- **Level of Effort to Implement** - level of effort required from municipal staff involvement to implement the strategy.
- **Cost to Implement** - cost level (either for town or residents) associated with implementing the strategy.

For each of the strategies evaluated, a numerical ranking was given for each of the six evaluation criteria listed above, which were then combined into a single cumulative ‘performance score’ for each strategy. This score was considered along with qualitative considerations from the various engagements throughout this process (focus groups, workshops, etc.) to determine the top priority strategies for each of the six focus areas. MAPC then provided a framework for possible next implementation steps for the top strategies.

This evaluation and prioritization exercise provided only an initial high-level assessment of the strategies and should be viewed as a foundation for further refinement, in part by attempting more accurate quantitative estimates of GHG reduction potential, co-benefits, and costs, while also checking for equitable distribution of costs and benefits, to help the Town set further metrics and goals as desired. In addition, the Town will need to consider adjusting or updating criteria, other considerations, and conclusions, in reaction to changes in conditions, opportunities, and constraints over time.

Navigating the List of Strategies and Implementation Roadmaps

Based on input and feedback from the Lincoln Climate Action Plan Working Group, Town Staff, and other engagement activities, the top strategies in each of the six planning areas were selected for MAPC to develop implementation roadmaps. These implementation efforts will include a mix of necessary actions, such as building capacity for municipal staff, assisting businesses and residents to better understand available resources and technical assistance, and continued advocacy efforts at regional and state levels. A periodic review and evaluation of these strategies will be necessary to reflect changing status (e.g., policies, funding availability, etc.), as well as most current needs and priorities in Lincoln.

For the general lists of recommended strategies, “action types” and “implementation lead” are identified to help organize these strategies.

Action Types :

- **Capacity building:** Strategies under this action type are meant to provide or strengthen the skills, abilities, processes and/or resources that the town, an organization, or an individual needs to support/participate in climate efforts, make decisions, and plan and prepare for the potential impacts of climate change.
- **Technical assistance:** Strategies under this action type are meant to provide targeted support or solutions for a specific topic. (For example, conduct a feasibility assessment to better understand the cost-benefits of implementing a strategy).
- **Policy:** Strategies under this action type identify specific local policy issues, regulations, or requirements that need to be established that will enable more effective implementation of climate action.
- **Advocacy:** Strategies under this action type identify regional and state-level policy issues, regulations, requirements, and opportunities that the Town should participate in to lend support and influence larger-scale changes.

Implementation Lead : This category identifies “who” should be leading the implementation of the strategy. In some instances, it might require both municipal leadership as well as participation or contribution from community members for effective implementation.

Then, the implementation roadmaps provide implementation details for how to execute the identified strategy. Think of these as “recipes” that include the recommended step-by-step process and “ingredients” for successful implementation. The implementation details were developed based on the following guiding questions:

- **Implementation Steps :** What are the major next steps or action items that need to be taken to address this strategy?

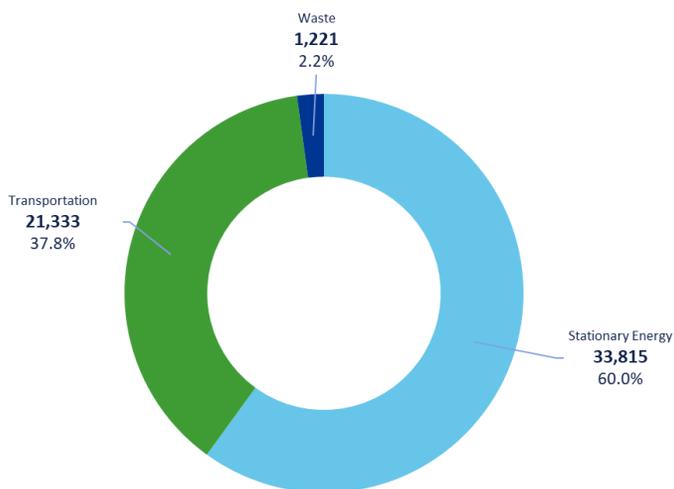
- **Improving Equity** : What are some key considerations to keep in mind to ensure equitable distribution of benefits if the strategy is implemented? What might be a potential unintended consequence if this strategy is implemented?
- **Implementation Partners** : Who are the key players (town departments, community orgs, etc.) to involve in implementing these strategies?
- **Funding Sources** : What funding opportunities can we use to support the implementation?
- **Measures of Success** : What does success in implementing these strategies look like? What are some high-level metrics to track progress and ensure success?

ENERGY

In Lincoln, increasing energy efficiency and transitioning to clean, renewable energy sources will be critical for a drastic reduction of greenhouse gas emissions. Efforts will include a transition to using renewable energy sources for building heating and cooling, electric vehicles (EVs), and buses, as well as continued advocacy for greening the grid. Additionally, as the town (and the region at large) has and will experience increasing climate change impacts such as extreme heat and more intense storm events, the community will face increased threats of power outages, damaged utility infrastructure and equipment, and public health and safety risks. As such, additional measures must be taken to ensure energy resilience, security, and affordability.

Based on Lincoln’s 2017 GHG inventory, stationary energy accounts for approximately 60% of the Town’s total emissions, 37.8% for transportation, and 2.2% for waste. Furthermore, more than 50% of the energy sources in Lincoln are directly from fossil fuels, including more that is derived from similar sources. See Figures 11 and 12.

Community-wide Emissions (MT CO2e) by Sector



Percentage of Building Energy Emissions by Source Energy

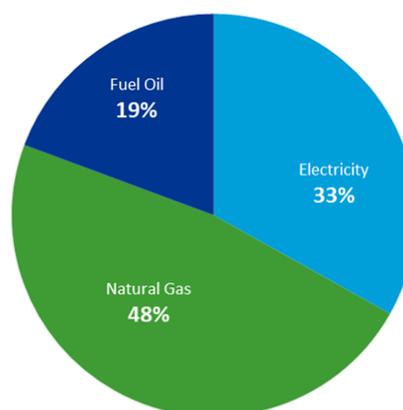


Figure 11 (left) : Lincoln’s 2017 Community-Wide Emissions (Metric Tons of Carbon Dioxide Equivalent) by three key sectors: Stationary Energy, Transportation, and Waste.

Figure 12 (right) : Percentage of Building Energy Emissions by Source. Breakdown of the percentage of Building Energy Emissions by Source Energy stationary energy sources and their GHG emissions in Lincoln in 2017.

What has been done so far?

In addition to being one of the first communities to become a **Massachusetts Green Community** in 2010, Lincoln participated in **Solarize Mass** in 2012 and **Solarize Mass Plus** in 2017. This program was administered by the Massachusetts Clean Energy Center (MassCEC) and supported municipalities with increasing the adoption of small-scale solar electricity, in addition to other energy efficient technologies (such as heat pumps, battery storage, electric vehicles, and solar hot water systems for the Solarize Mass Plus program) through volunteer training, marketing campaigns, and procurement of installers.⁴ To date, a total of 47 systems were contracted in Lincoln for solar electric and solar hot water systems.

Lincoln Green Energy Choice , an electricity aggregation program provides residents and businesses in the community with opportunities to receive electricity from cleaner energy sources, while having stable electricity rates. To date since its launch in early 2021, approximately 73% of all the electric accounts in Lincoln are enrolled in the Lincoln Green Energy Choice program and of those accounts, about 11% have opted for the “100% Green” option.

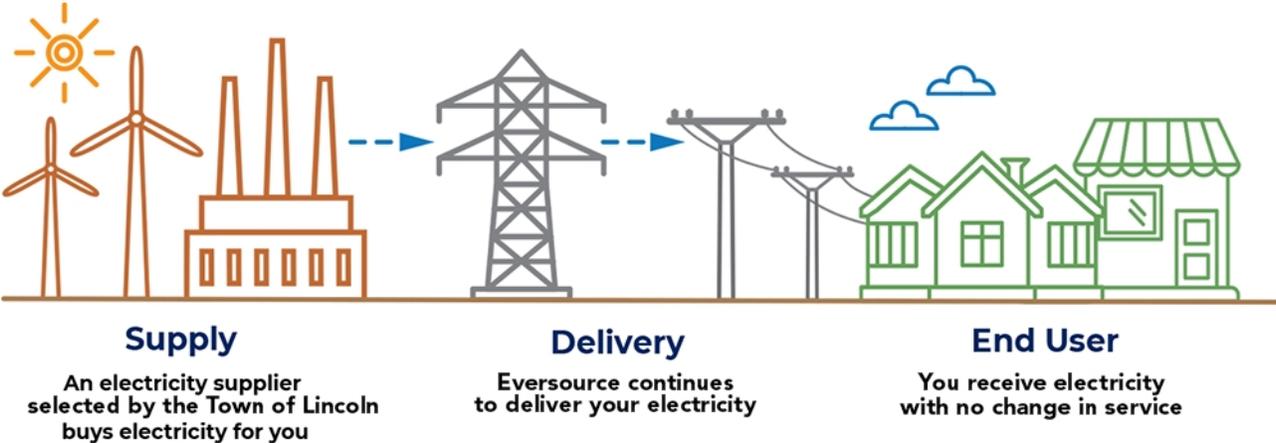


Figure 13 : A depiction of how community electricity aggregation program works. Source: <https://www.masspowerchoice.com/lincoln>.

4 Massachusetts Clean Energy Center, “Solarize Mass,” <https://www.masscec.com/program/solarize-mass>.
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Public Health Co-benefits of Clean Energy

- Transitioning from gas stoves to electric or induction stoves will reduce indoor air pollution and its associated health risks.
- Transitioning to alternative, non-fossil fuel operated vehicles will help mitigate GHG emissions in the transportation sector, which will help reduce air pollution (and its associated public health risks), locally and regionally.
- Increasing local energy resilience will ensure back-up power support to critical infrastructure and operations in town should there be a disruption to the grid, and as such, will increase reliability, especially during emergency events.
- Increasing renewable energy usage will reduce the need for fossil fuel extraction in other communities, both domestically and internationally, which helps phase out hazardous jobs that put life safety at risk and subsequently contributes to the creation of new workforce opportunities in clean energy.

Energy Strategies

The following section presents implementation details for the three strategies in this planning area prioritized to receive detailed implementation planning.

Strategy E1: Identify opportunities for building-mounted and ground-mounted solar installations, while ensuring the protection of local biodiversity and habitats.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Contract with a consultant that can survey the Town and identify the best possible areas for installation, while noting in their feasibility assessments what the impacts will be to the local biodiversity and habitats in each location • Decide what locations to move forward with for future installations
Improving Equity	<ul style="list-style-type: none"> • Engage with local community members, particularly those living in EJ communities, as part of the site assessment and identification process • Ensure that the electricity generated from these installations in the future is equitably distributed to the identified priority populations and residents living in the EJ communities
Potential Co-benefits	<ul style="list-style-type: none"> • Supports “green” workforce development • Improves local energy resilience • Mitigates GHG emissions
Implementation Partners	<ul style="list-style-type: none"> • Town Departments: Planning and Land Use, Conservation, Building and Engineering • Lincoln Land Conservation Trust

	<ul style="list-style-type: none"> • Utility partners
Funding Sources	<ul style="list-style-type: none"> • MassCEC • Executive Office of Energy and Environmental Affairs (EEA) (e.g., EEA Planning Assistance Grant) • MA Department of Energy Resources (DOER) (e.g., Green Communities)
Measures of Success	<ul style="list-style-type: none"> • Increased installation of ground-mount solar systems across town • No loss of biodiversity due to ground-mount solar panels • No ground-mount solar panels installed in wildlife corridors/habitats

Strategy E2: Develop materials and establish a resident ambassador program to educate and assist residents with understanding and accessing available federal and state grant programs for weatherization, building energy retrofits, adoption of solar PV, and battery storage, etc. Ensure access for Environmental Justice (EJ) communities, renters, low/moderate income households, and additional priority populations.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Develop materials to be used and distributed in the community • Secure funding for the resident ambassador program • Create a short application for the resident ambassador program and send it out to the community. Make sure to have a wide reach so the applicant pool is diverse • Focus on capacity building and training for the resident ambassadors and then launch the community program. Prioritize outreach to the populations highlighted in the strategy
Improving Equity	<ul style="list-style-type: none"> • Offer a stipend to those who make up the cohort of the resident ambassador program and/or utilize community volunteers • Make sure representation of the ambassadors includes people of color, low-income, renters, etc. Consider having ambassadors who can speak other priority languages in the community (Spanish, Chinese (Mandarin), Russian) • Ensure any language used in communications, presentations, and other outreach is accessible to residents and is free of jargon. Provide translated materials and interpretation as needed
Potential Co-benefits	<ul style="list-style-type: none"> • Increased communications (especially with residents who speak a language other than English) between the municipality and its residents with the help of the ambassadors

	<ul style="list-style-type: none"> Increased battery storage in various locations in Town contributes to increasing its energy resilience
Implementation Partners	<ul style="list-style-type: none"> Green Energy Committee Condo building managers, landlords Companies servicing weatherization work, retrofits, etc. Town Departments: Planning and Land Use, Council on Aging & Human Services
Funding Sources	<ul style="list-style-type: none"> U.S. Department of Energy (DOE) Energy Efficiency and Conservation Block Grant (EECBG) MassCEC Executive Office of Energy and Environmental Affairs (EEA) (e.g., EEA Planning Assistance Grant) MA Department of Energy Resources (DOER) (e.g., Green Communities)
Measures of Success	<ul style="list-style-type: none"> Percentage of resident reach, at least over 40%, through the ambassador program New adoption of various technologies and energy conservation measures throughout the community due to this outreach

Strategy E3: Promote the Lincoln Green Energy Choice program by encouraging the option to choose 100% green electricity (i.e., Class 1 RECs). Consider the option for schools and other municipal buildings.

Implementation Lead	<ul style="list-style-type: none"> Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> Develop materials for the promotion of the program Host info-sessions and attend events other organizations are holding to educate residents about the program
Improving Equity	<ul style="list-style-type: none"> Engage with populations in Lincoln including, but not limited to, renters, low- and fixed-income residents, people of color, individuals with disabilities, and seniors, to understand any barriers they might have to joining the program Partner with trusted organizations or individuals in the community to provide communications and messaging for this program
Potential Co-benefits	<ul style="list-style-type: none"> Electricity pricing for residents may be more stable Increases the usage of renewable energy in town
Implementation Partners	<ul style="list-style-type: none"> Green Energy Committee

	<ul style="list-style-type: none"> • Town Department: Planning and Land Use
Funding Sources	<ul style="list-style-type: none"> • U.S. Department of Energy (DOE) Energy Efficiency and Conservation Block Grant (EECBG) • MassCEC • Executive Office of Energy and Environmental Affairs (EEA) (e.g., EEA Planning Assistance Grant) • MA Department of Energy Resources (DOER) (e.g., Green Communities)
Measures of Success	<ul style="list-style-type: none"> • Increase in the number of residents, especially those who identify with the populations listed under “improving equity”, that opt-in to the 100% green electricity rate for the program

Additional Recommended Strategies for Energy

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to help Lincoln improve energy efficiency and transition to clean energy sources in upcoming years. These strategies provide a mix of necessary actions, such as building capacity for municipal staff, assisting businesses and residents to better understand available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Implementation Lead
E4: Develop partnerships and collaborate with local utility companies to support the Town's electrification and energy decarbonization plans.	Capacity Building	Municipal
E5: Work with local businesses to support a transition to clean energy technologies and adaptation measures to increase resilience to climate impacts.	Capacity Building	Municipal
E6: Assess the benefits and safety challenges of battery storage systems. Study the development of microgrids.	Technical Assistance	Municipal
E7: Investigate and keep abreast of evolving renewable energy technologies in residential homes, apartments, and condo-complexes, including roof-top and community shared solar.	Technical Assistance	Municipal
E8: Work with utility partners (e.g., National Grid) to track and repair methane leaks in town.	Technical Assistance	Municipal & Community
E9: Advocate for increased educational, technical, and financial support and incentives, at the state level, to increase the adoption of energy efficient appliances and renewable energy technologies in residential homes.	Advocacy	Municipal & Community



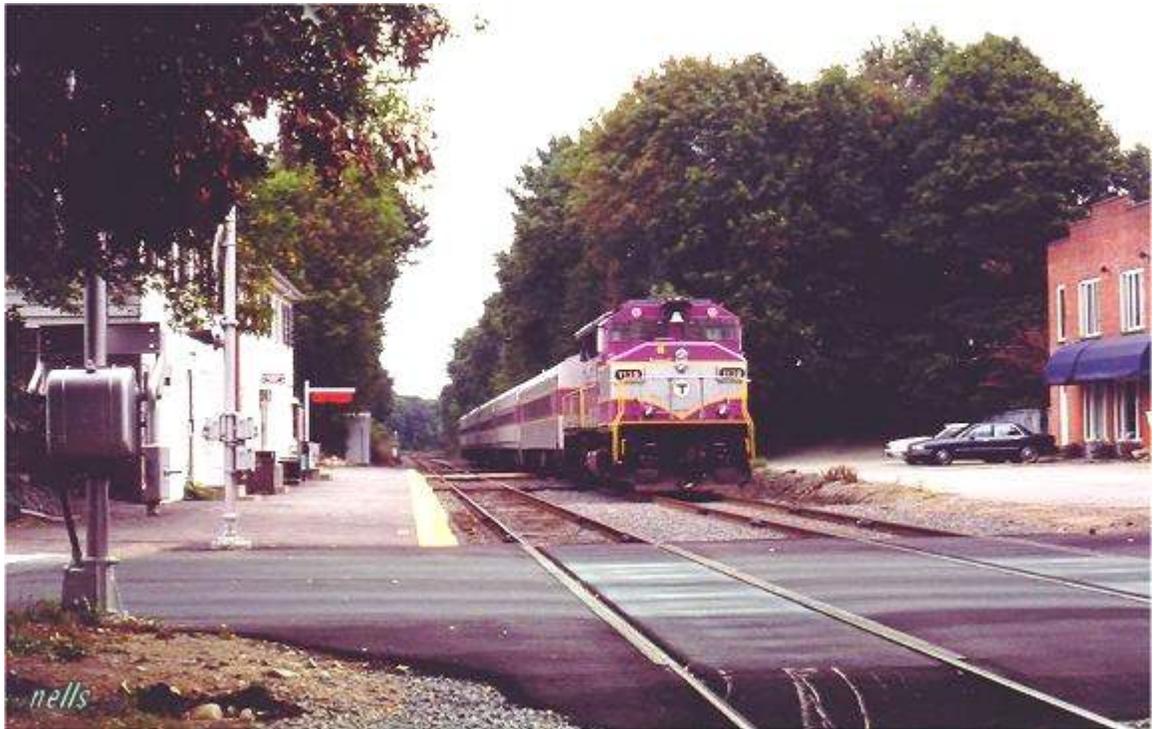
Solar panels installed at Codman Farm in 2019.
Photo credit: <https://www.lincolntown.org/1111/Codman-Community-Farms-Solar-Project>.

MOBILITY

The transportation sector made up approximately 38% of Lincoln’s overall greenhouse gas emissions in 2017 (see Figure 11). Within this sector, most of the emission sources came from private passenger vehicles.

Based on stakeholder feedback, and past climate vulnerability assessment efforts, flooding and severe storms are two climate hazards of greatest concern to Lincoln’s mobility. According to Lincoln’s Community Resilience Building Workshop report (completed as part of the Municipal Vulnerability Preparedness (MVP) Planning grant in 2019), for example, there is major concern about flooding roadways, especially Route 117 crossing over the Sudbury River, Route 2A, and Mill Street at Lexington Road. Furthermore, climate hazards from severe storms such as nor’easters cause travel restrictions from heavy snow accumulation, intense rainfall, and downed tree limbs, impeding roadways and blocking critical access for emergency vehicles. Lincoln’s narrow roadways increase the risks and exacerbate the challenges from climate hazards.

Electrification of the existing transportation system, transitioning from fossil-fuel dependent vehicles to electric vehicles (EVs), increased resident use of public transit, as well as enabling more alternative low-carbon mobility modes (e.g., biking, walking, carpooling, e-bikes, etc.) will all be critical in reducing Lincoln’s community-wide carbon footprint. All these changes highlight the need to strengthen transit systems – making public transit more accessible through education and improved service – making walking and biking safer and more enjoyable through better sidewalks, street trees along the roadside, bike lanes and other amenities – and incentivizing the infrastructure needed for adoption of EVs. These steps lay the groundwork for an inclusive and equitable adoption of low and no-emissions transit options.



MBTA Commuter Rail - Lincoln Station. Photo credit: Town of Lincoln.

What has been done so far?

The Lincoln Bicycle & Pedestrian Advisory Committee (BPAC) advises Lincoln's Select Board on issues of bicycling and pedestrian safety. BPAC is currently working on a Master Plan for cycling and walking in Lincoln and advises MassDOT projects such as Route 2A and Baker Bridge Road. BPAC is committed to the goals of the Lincoln Climate Action Plan by encouraging the shift from vehicle travel to primarily cycling and walking to reduce greenhouse gas emissions and to achieve net zero emissions by 2030. They promote the accessibility, inclusion, and diversity of riders and walkers from both inside and outside of the Town.⁵

Flight Free USA - Lincoln community members are joining the national pledge to fly less. The American Community Survey estimates that average adults in Lincoln fly 2.7 times per year, which is equivalent to 6,478 CO_{2e}.⁶



A Deeper Dive... An Excel-based **Electric Vehicles Impact Tool**, developed for MAPC by Synapse Energy Economics, Inc., was used to model two strategy implementation scenarios to provide projections of potential CO_{2e} emissions reductions from EV adoption in the town. The first was a 'business as usual' scenario and the second scenario is driven by state

⁵ Town of Lincoln, Bicycle & Pedestrian Advisory Committee, <https://www.lincolntown.org/1083/Bicycle-Pedestrian-Advisory-Committee>.

⁶ American Community Survey (2017), [American Community Survey Data \(census.gov\)](https://www.census.gov/data/tables/2017/acs/2017-acs-1.html).

Booth, James, Town of Lincoln Community greenhouse gas emissions report (2020), Lincoln-GHG-inventory-Jan-2020 (lincolntown.org).

level changes outlined in the recent Clean Energy and Climate Plan for 2050, which is the target year for the Commonwealth’s net zero goal.

These analyses provide higher-level data to inform the Town of Lincoln of potential emissions reductions through EV adoption that follows the climate mitigation goals set by the Commonwealth. Accompanying charts included in this section represent the projected effect that Massachusetts state goals may have on vehicles in Lincoln.

The Electric Vehicles Impact Tool estimates changes to CO_{2e} emissions associated with light-duty vehicles for each municipality in a target year based on a user-specified deployment scenario for electric vehicles and several other key assumptions. This model uses 2019 as the baseline year and determines CO₂ emissions for selected target years through 2050. The model incorporates available data on EV efficiency, gasoline vehicle efficiency, vehicle miles traveled, and the percentage of miles that plug-in hybrids drive using electricity versus gasoline. The model estimates the number of miles that EVs and gasoline vehicles will be driven and calculates total electricity and gasoline consumption based on vehicle efficiencies. It then determines emissions both from vehicle tailpipes and from the electric grid (accounting for a greener grid over time), taking into account the CO₂ released due to generating electricity needed to charge EVs. Here are some highlighted findings specific to the Town of Lincoln:

- ❖ Comparing the ‘business-as-usual’ scenarios to the ‘meets MA state goals’ scenarios highlights the impacts of the state goals. Figures 14 and 15 project how many internal combustion engines (ICEV) in light duty vehicles will not be on the road in Lincoln if state goals for EV adoption are met vs the number of ICEV on the road if the business-as-usual approach is taken.

Estimated Light Duty Vehicles on the Road under “Business-As-Usual” Scenario

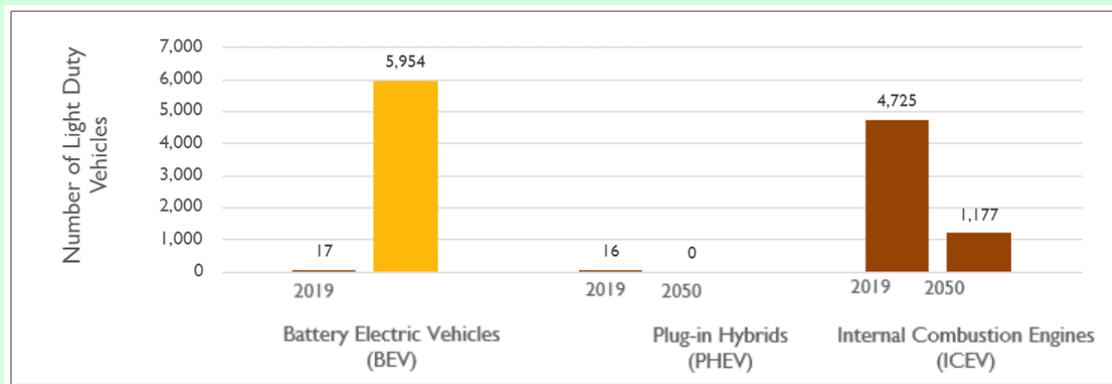


Figure 14 : This graph shows the shift in vehicle type used for target year 2050 if the rate of adoption in Lincoln follows a “business-as-usual” scenario. Note how vehicles are expected to electrify in the future due to Massachusetts’ statewide goals.

Estimated Light Duty Vehicles on the Road under “Meets MA State Goals” Scenario

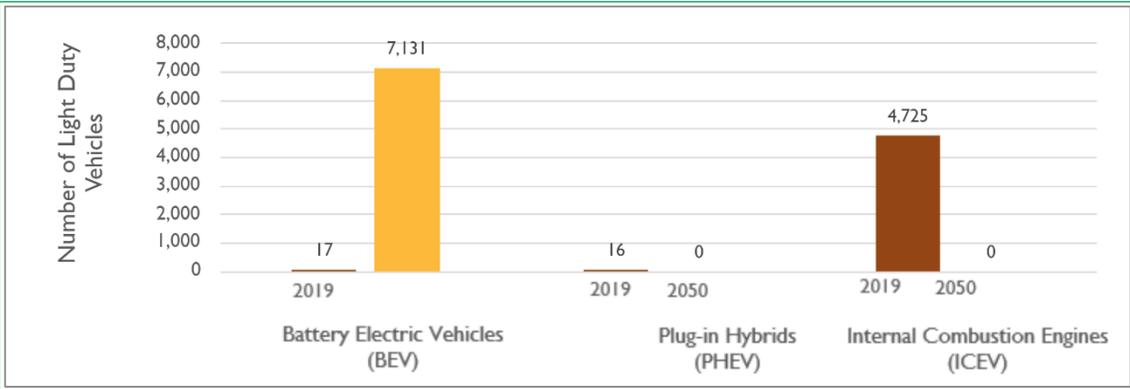


Figure 15 : The projected complete electrification of light duty vehicles on the road in Lincoln by 2050 when MA state goals are met.

Gasoline Consumption by ICEVs and PHEVs under “Business-As-Usual” Scenario

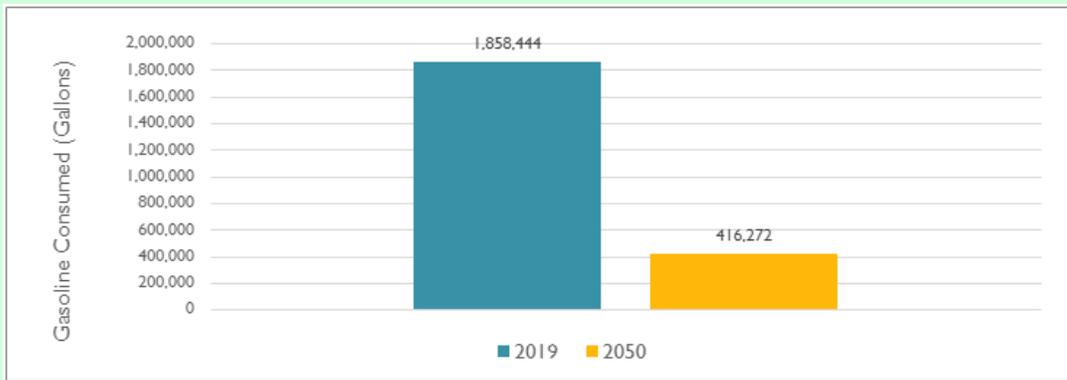


Figure 16 : The difference in gallons of gasoline consumed by light duty vehicles in Lincoln in both 2019 and 2050 under business-as-usual conditions. ICEVs = Internal Combustion Engine Vehicle, PHEVs = Plug-In Hybrid Electric.

Gasoline Consumption by ICEVs and PHEVs under “Meets MA State Goals ” Scenario

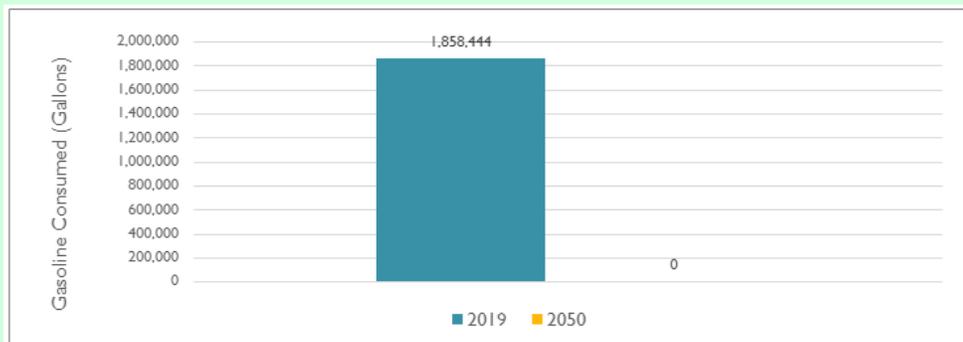


Figure 17 : Modeling results for gasoline (in gallons) consumed in Lincoln by light duty vehicles in 2019 and 2050 under MA State Clean Energy and Climate goals. Note that the number drops to zero by 2050.

Figures 18 through 21 demonstrate modeling results showing electricity consumed by electric vehicles in two scenarios. Note that these amounts are essentially the opposite of the effects that business-as-usual and Massachusetts state goals have in the above two figures.

Overall, as gasoline consumption for vehicles drops, increased renewable electricity is needed to power the higher number of electrified vehicles.

Electricity Consumed by Electric Vehicles under “Business-As-Usual” Scenario

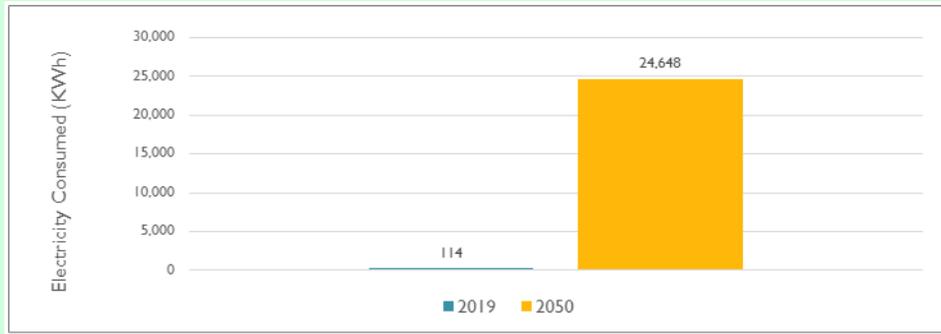


Figure 18 : Electricity consumed by electric vehicles in Lincoln in 2019 and 2050 under business-as-usual conditions.

Electricity Consumed by Electric Vehicles under “Meets MA State Goals” Scenario

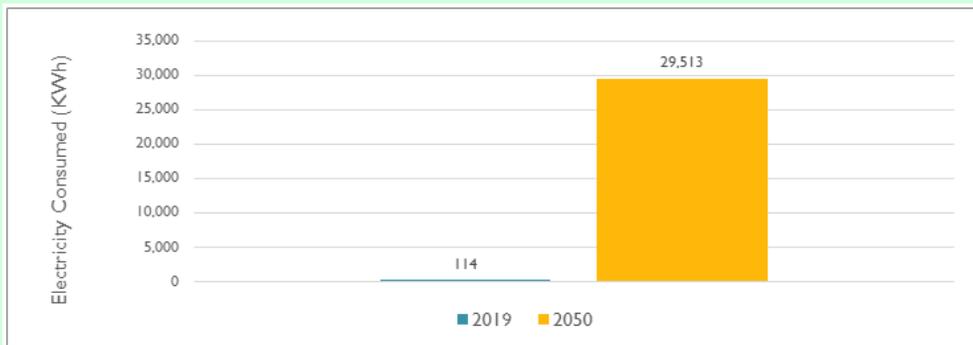


Figure 19 : Electricity consumed by electric vehicles in Lincoln in 2019 and 2050 if MA state goals are met. Note that there is more electricity consumed in this scenario as compared to the business-as-usual scenario in Figure 18 because more electric vehicles are modeled to be on the road.

Emissions from Light Duty Vehicles 2019 vs 2050 under “Business-as-Usual” Scenario

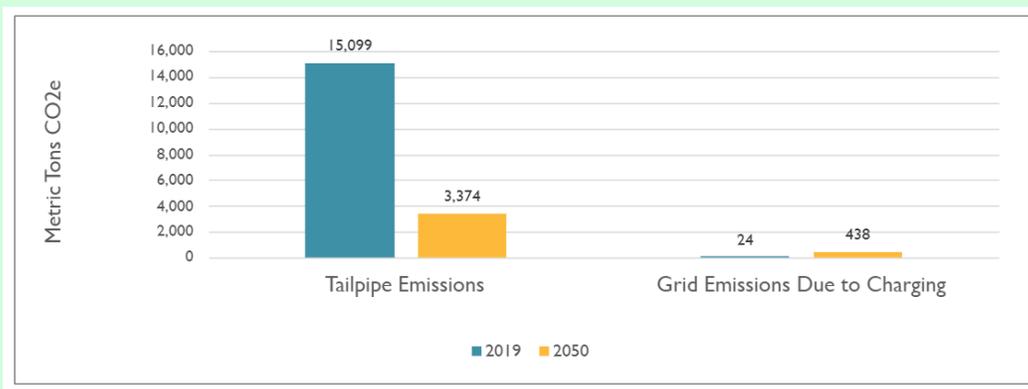


Figure 20 : Modeling results from the Electric Vehicles Impact Tool for Lincoln. There is a 2019 baseline scenario displayed as well as a 2050 scenario that is modeled based on business-as-usual light duty vehicle use. This means that if the current average ratio of combustible engine vehicles sales to electric vehicle sales remains significantly unchanged, the emissions in 2050 will be 3,374 Metric Tons CO2e from tailpipes and 438 Metric Tons CO2e from charging EVs.

Emissions from Light Duty Vehicles 2019 vs 2050 under “Meets MA State Goals” Scenario

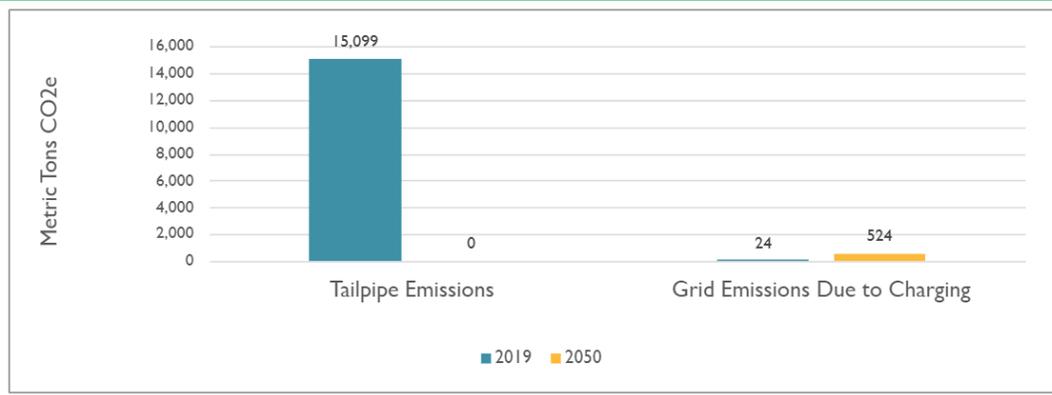


Figure 21: Similar modeling scenario to Figure 20. The only adjustment is that the 2050 scenario now reflects the impacts of Massachusetts state goals on Lincoln’s EV stock. The Massachusetts state goal represents faster EV adoption than the business-as-usual forecast. Note that the 2050 tailpipe emissions now drop to zero coupled with a slight increase in emissions due to EV charging. This scenario also assumes that the Commonwealth meets its goal of a net zero electricity supply by 2050.

Mobility Strategies

The following section presents implementation details for the four strategies in this planning area prioritized to receive detailed implementation planning.

Strategy M1: Increase connectivity among roadways, roadside paths, and conservation trails to ensure walkability, accessibility, and safety for lightweight transportation modes (e.g., pedestrian, bikes, scooters, power chairs, etc.) .

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Facilitate a public discussion to better understand feasibility, opportunities and barriers associated with connectivity, walkability, accessibility, and safety for alternative modes of transportation. It also includes established guidelines to ensure no impact on wildlife, habitat or wildlife corridors, and connected habitats in adjacent conservation lands. • Identify priority areas to promote more biking and walking activities. • Create a user-friendly guide that includes a comprehensive inventory of bikes, scooters, power chairs, and pedestrian networks • Leverage existing mapping platforms to provide interactive access to trail networks • Create resources and/or mechanisms to increase security and safety of pedestrians and bicyclists in mapped areas • Review current efforts and projects that incorporate increased connectivity and identify additional locations for potential expanded pedestrian, bike, and transit infrastructure around major attractions

	<ul style="list-style-type: none"> • Prioritize locations in need of improvements
Improving Equity	<ul style="list-style-type: none"> • Ensure robust engagement of priority populations in the planning processes • Plan for the provision of equitable access to infrastructure investments • Consider the use of new and innovative modes of transportation in road and trail planning • Prioritize improvements in EJ areas
Potential Co-benefits	<ul style="list-style-type: none"> • Increased safety • Increased cardiovascular health from use of active modes of transportation • Reduced air pollution due to the shift from vehicle trips to bike/walk trips
Implementation Partners	<ul style="list-style-type: none"> • Local bicycle and pedestrian advocacy groups • Lincoln Land Conservation Trust • Town Boards and Committees: Climate Action Lincoln, Green Energy Committee, Healthy Communities Steering Committee, Parks & Rec Committee, Lincoln Conservation Commission, Bicycle & Pedestrian Advisory Committee, Roadway & Traffic Committee, Commission on Disabilities • Town Departments: Planning and Land Use, Public Works, Police, Conservation, Council on Aging & Human Services
Funding Sources	<ul style="list-style-type: none"> • Mass In Motion • MassDOT Complete Streets • MA Department of Energy Resources (DOER) Green Communities
Measures of Success	<ul style="list-style-type: none"> • Mileage of newly developed or improved dedicated biking and/or walking trails • Increased percentage of biking and walking mode share (broken down by different demographics when possible) • Decreased number of bike and pedestrian injuries and avoided fatalities • No impact on wildlife habitat, wildlife corridors, and connected habitats in adjacent conservation lands.

Strategy M2: Promote the development of local public transportation services, such as shuttles, buses, and bike shares at businesses, community centers, and other destinations.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
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<p>Key Implementation Next Steps</p>	<ul style="list-style-type: none"> • Facilitate a public discussion to better understand feasibility, opportunities and barriers associated with development of local public transportation services • Identify priority areas of businesses, community centers, and other popular destinations to promote use of local public transportation services • Create a user-friendly guide that includes a comprehensive inventory of routes and timetables of local public transportation services • Prioritize development of local public transportation services connecting EJ communities with the Town’s key locations (commercial areas and businesses, community centers, landmarks, etc.)
<p>Improving Equity</p>	<ul style="list-style-type: none"> • Ensure robust engagement of priority populations in the planning process • Plan for the provision of equitable access to infrastructure investments • Ensure ADA compliance • Prioritize development of transportation services in EJ communities
<p>Potential Co-benefits</p>	<ul style="list-style-type: none"> • Reduced pollution from replaced individual vehicle trips with local transportation services • Improved air quality in the community and greater health benefits for residents • Reduced traffic congestion • Reduced noise pollution
<p>Implementation Partners</p>	<ul style="list-style-type: none"> • Local resident groups and businesses • Town Boards and Committees: Climate Action Lincoln, Green Energy Committee, Roadway & Traffic Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Commission on Disabilities • Town Departments: Planning and Land Use, Public Works
<p>Funding Sources</p>	<ul style="list-style-type: none"> • Mass In Motion • MassDOT Complete Streets • MA Department of Energy Resources (DOER) Green Communities
<p>Measures of Success</p>	<ul style="list-style-type: none"> • Ridership counts to track use of local transportation and bike share programs • Increased percentage of biking and public transportation usage (broken down by different demographics when possible)

Strategy M3: Transition municipal fleets and school buses to all-electric where feasible.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Continue research and discussions with potential EV school bus vendors with Public Works and School Departments • Determine the scale of initial investment in EV charging infrastructure • Develop a request for proposal for EV Buses. Map out potential complementary funding sources (i.e., combine EV charging station incentives and grants for electric buses)
Improving Equity	<ul style="list-style-type: none"> • Ensure that initial adoption of EV in a pilot includes benefits to EJ communities
Potential Co-benefits	<ul style="list-style-type: none"> • Improved air quality • Educational benefits for students
Implementation Partners	<ul style="list-style-type: none"> • Lincoln Family Association • Mothers Out Front • Town Boards and Committees: Climate Action Lincoln, Green Energy Committee, Healthy Communities Steering Committee, Roadway & Traffic Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Commission on Disabilities, Lincoln School Committees • Town Departments: Planning and Land Use, Schools
Funding Sources	<ul style="list-style-type: none"> • U.S. Department of Energy Energy Efficiency and Conservation Block Grant (EECBG) • U.S. EPA Clean School Bus Program
Measures of Success	<ul style="list-style-type: none"> • Percentage of fleet or vehicle miles traveled that are electric • All Lincoln’s school buses are electric • Lincoln’s municipal fleet is completely electric

Strategy M4: Promote adoption and use of electric vehicles through outreach and installation of EV chargers at publicly accessible facilities, while also working with local businesses to identify opportunities on their properties.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Map existing and municipal EV charging stations and determine strategic town-owned and operated properties that would be ideal for EV charging • Identify priority locations for EV charging stations and develop a plan for an EV charging station network • Identify partnership for EV charging station installation

	<ul style="list-style-type: none"> • Facilitate a public discussion to better understand feasibility, opportunities and barriers associated with installing EV charging stations • Engage and partner with potential businesses/business centers and owners of multi-family building complexes to take on ownership of installing EV charging stations on their properties • Consider how zoning and other ordinances can incentivize or require EV charging as part of new development
Improving Equity	<ul style="list-style-type: none"> • Plan for equitable geographic distribution of charging stations across the town and pair with programs and/or financial assistance to reduce economic barriers to EV adoption • Ensure that reserved EV charging parking areas on municipal properties are not prioritized disproportionately in terms of distance and access to municipal facilities • Consider adopting utility pole mounted EV chargers to reduce the strain on parking • Consider locations where high-speed charging could be advantageous. • Ensure that all municipal EV charging stations are equipped with a payment system so that users are charged for the electricity drawn from the grid. This will ensure the ability to scale up in the future and avoid equity concerns • Ensure improved or added EV charging stations do not raise premiums on rent, particularly for low-income households, which can result in affordability and displacement issues
Potential Co-benefits	<ul style="list-style-type: none"> • Improved air quality • Potential vehicle noise reduction
Implementation Partners	<ul style="list-style-type: none"> • Businesses (as potential sites for proposed EV charging stations) • Non-Profits • Lincoln Family Association • Mothers Out Front • Town Boards and Committees: Climate Action Lincoln, Roadway & Traffic Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Commission on Disabilities, Housing Commission, Green Energy Committee • Town Department: Planning and Land Use
Funding Sources	<ul style="list-style-type: none"> • MassDOT • Green Communities

	<ul style="list-style-type: none"> • U.S Department of Transportation (DOT) Federal Highway Administration (FHWA) Charging and Fueling Infrastructure Discretionary Grant Program
Measures of Success	<ul style="list-style-type: none"> • Increased number of EVs registered in Lincoln • An equitable distribution of EV charging stations in public areas • Increased number of EV charging stations in the town • All local businesses, multi-family and rental properties have at minimum ratio of their parking spots equipped with EV charging stations

Additional Recommended Strategies for Mobility

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to help Lincoln reduce GHG emissions from mobility sources as well as to enhance public transit amenities, public safety, and transition away from single-occupancy vehicle use. These strategies provide a mix of necessary actions, such as building capacity for municipal staff, assisting businesses and residents to better understand available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Realm of Influence
M5: Adopt climate-smart parking policies. For example, establish lower parking requirements for new development to maximize efficient use of spaces and reduce use of single occupancy vehicles; prioritize space for ride sharing, etc.	Capacity Building	Municipal
M6: Develop resources and provide education on installation of electric vehicle charging in residential buildings	Capacity Building	Municipal
M7: Improve pedestrian and cyclist safety by lowering speed limits within the Town's jurisdiction and installing enhanced safety measures such as speed bumps and other traffic calming measures	Technical Assistance	Municipal
M8: Support multi-town transportation options to major tourist destinations and popular destinations (school, town offices, MBTA station, etc.) in Lincoln and connections to neighboring towns	Technical Assistance	Municipal
M9: Improve wayfinding signage on trails and continue regular maintenance of the trails to ensure accessibility and encourage usage by both locals and visitors. Ensure educational signage meets accessibility needs, such as related to height and visuals, so that individuals in wheelchairs can	Capacity Building & Technical Assistance	Municipal & Community

access it, as well as residents who have low vision or are blind		
M10: Study the feasibility of an EV car sharing program. Consider developing an income-tiered program in partnership with community organizations and affordable housing developments	Technical Assistance	Municipal
M11: Partner with neighboring communities to expand trails and dedicated bikeways for safe access to critical destinations, such as village districts, town centers, and commercial/office districts, across municipal borders	Advocacy & Technical Assistance	Municipal & Community
M12: Advocate for MBTA improvements to infrastructure and platforms and shelters to ensure ADA compliance, comfort, and protection of users from extreme temperatures and weather events	Advocacy	Municipal & Community
M13: Advocate for electrification of the regional transit system, including the MBTA commuter rail, while ensuring affordability, accessibility, and frequency of services	Advocacy	Municipal & Community
M14: Enforce anti-idling laws in public areas, including the school campus, especially during school pickup hours. Promote increased use of electric school buses, walking and biking where appropriate, and reduction of trips taking by passenger cars.	Advocacy	Municipal & Community

BUILT ENVIRONMENT

Like other communities, buildings in Lincoln represent a considerable source of greenhouse gas emissions, and many aging structures are vulnerable to climate change impacts. While the Town of Lincoln is not a particularly dense community, with nearly 40% of land being permanently protected, there are pockets of built environment that can be addressed. Certain action items include doing updates to and/or renovating buildings the built environment, ensuring the reduction of this sector’s carbon footprint, and protecting residents, businesses, and visitors from the impacts of climate change by means of built infrastructure.



Pierce Park Vista. Photo credit: Town of Lincoln

Example measures to mitigate GHG emissions and increase building resiliency include energy efficiency upgrades, building retrofits, incorporation of renewable energy sources, among others. When considering changes to the built environment, equity must be incorporated into planning and decision making to reduce undesirable impacts. Such impacts include, but are not limited to, increased housing costs, reduced availability of affordable housing, inequitable beneficiaries of upgrade investments, energy burden, and reduced quality of life.

Percentage of Building Energy Emissions by Source Energy

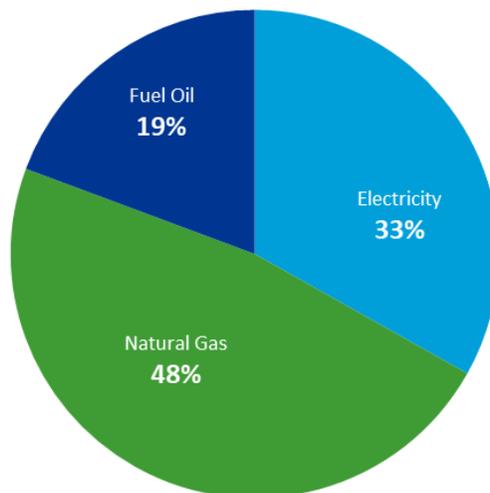


Figure 22: Percentage breakdown of building energy emissions by different sources. Source: Lincoln’s 2017 Community GHG Inventory.

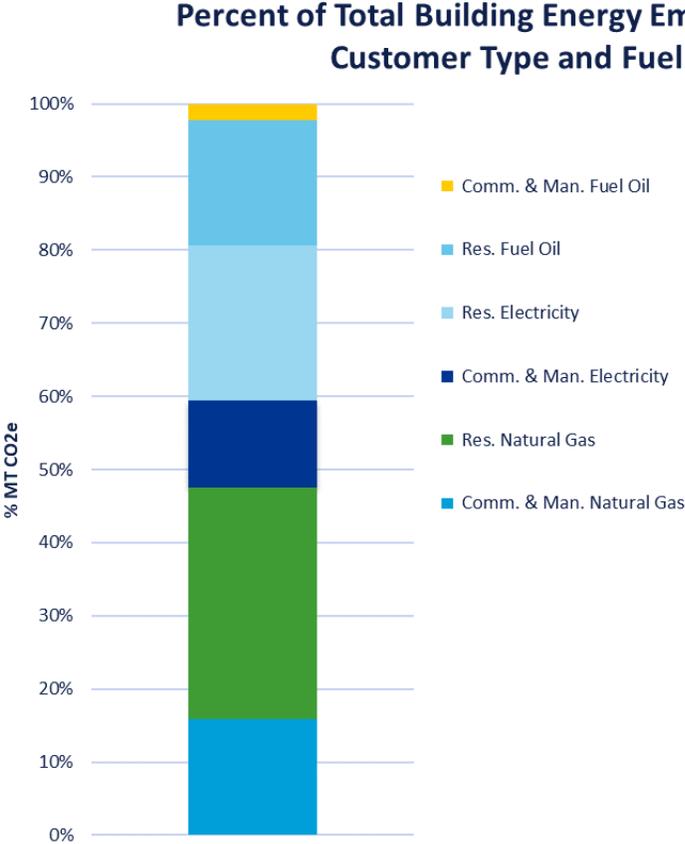


Figure 23: Percentage breakdown of energy emissions by building/facility type and fuel sources in Lincoln. Source: Lincoln’s 2017 Community GHG Inventory.

What has been done so far?

On March 25th, 2023, the Town of Lincoln voted to adopt the new Specialized Municipal Opt-In Code. Supporting the stretch code, which requires new-buildings to be more energy-efficient with incentives to become fully electric, the Specialized Code goes further to increase incentives and shorten the deadline by six months.

The Specialized Code would let Lincoln participate in the state’s Fossil Fuel Free Demonstration Program, requiring new buildings and major renovations to be fossil fuel free for building permits issued starting Jan 1, 2024.

Read more here: <http://www.lincolntown.org/1419/Town-Meeting-2023>

The Town of Lincoln completed its **Hazard Mitigation Plan** in 2018 which assesses and identifies vulnerabilities to the built environment such as critical facilities. The Town identified several mitigation measures that can help reduce the Town’s vulnerability to natural hazard events which often cause property damage.

Green Communities . Lincoln was one of the first 17 towns in the Commonwealth to become a Massachusetts Green Community. By becoming a Green Community, Lincoln has been awarded grants that help fund various energy conservation projects. This means that a 20% energy-use reduction target for municipal buildings was set and since 2010, an estimated of \$750,000 has been invested to make municipal buildings, facilities, and schools more energy efficient.

Partnership with HomeWorks Energy . Greenhouse gas emissions from buildings are a large part of any municipality’s total emissions. The Lincoln Green Energy Committee has partnered with HomeWorks Energy to equip residents with knowledge to take advantage of the state’s **Mass Save® Energy Savings Program**.⁷ This will result in reduced emissions and increased energy efficiency in Lincoln households.



A Deeper Dive... An Excel-based **Building Decarbonization Impact Tool**, developed for MAPC by Synapse Energy Economics, Inc., was used to model strategy implementation scenarios based on state level changes outlined in the recent Clean Energy and Climate Plan for 2050, which is the target year for the Commonwealth’s net zero goal.

These analyses provide higher-level guidance to inform the Town of Lincoln of potential emissions reductions that can be achieved through building decarbonization. Accompanying charts included in this section represent the projected effect that Massachusetts state goals may have on buildings and facilities in Lincoln.

The Building Decarbonization Impact Tool estimates changes to CO₂ emissions associated with residential weatherization and space and water heating electrification. The model allows users to evaluate energy consumption and emissions in a baseline year and a target year based on rates of weatherization and heat pump adoption. The model calculates energy

⁷ HomeWorks Energy, Lincoln Residents, <https://www.homeworksenergy.com/neighbors/lincoln-green-energy/>.
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consumption and emissions associated with space and water heating specifically, and it accounts for both on-site emissions from directly burning fossil fuels and emissions from the generation of electricity for end uses that consume electricity. Here are some highlighted modeling results specific to the Town of Lincoln.

Space Heating Market Share by Fuel

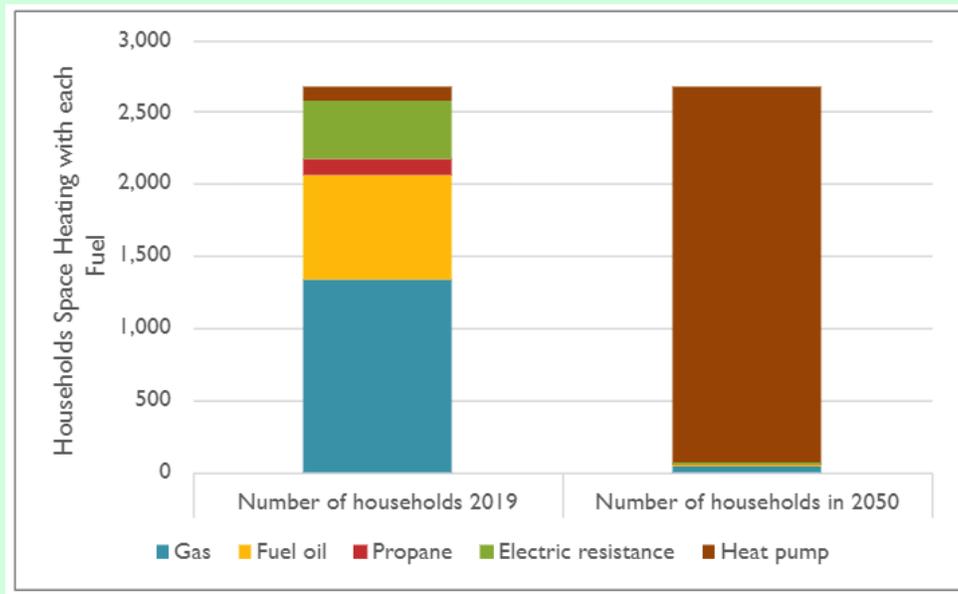


Figure 24 : Modeled space heating source of households in the Town of Lincoln in 2019 and 2050. The energy sources of households in 2019 are diversified as compared to 2050 where the main space heating source is projected to be heat pumps.

Heat Pump and Weatherization Adoption

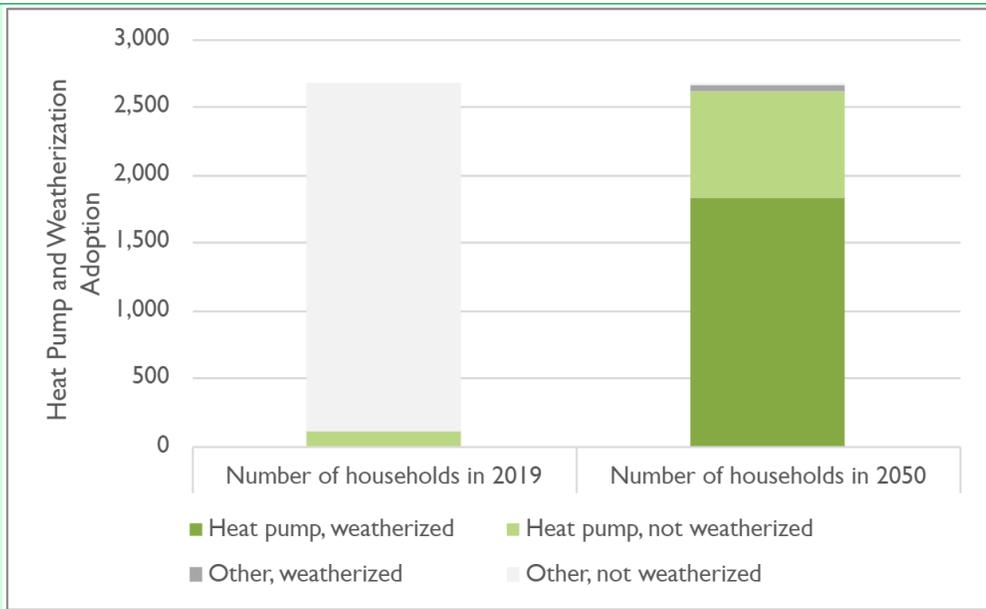


Figure 25 : Modeling the significant heat pump and weatherization adoption in 2050 as compared to 2019.

GHG Emissions from Existing Buildings

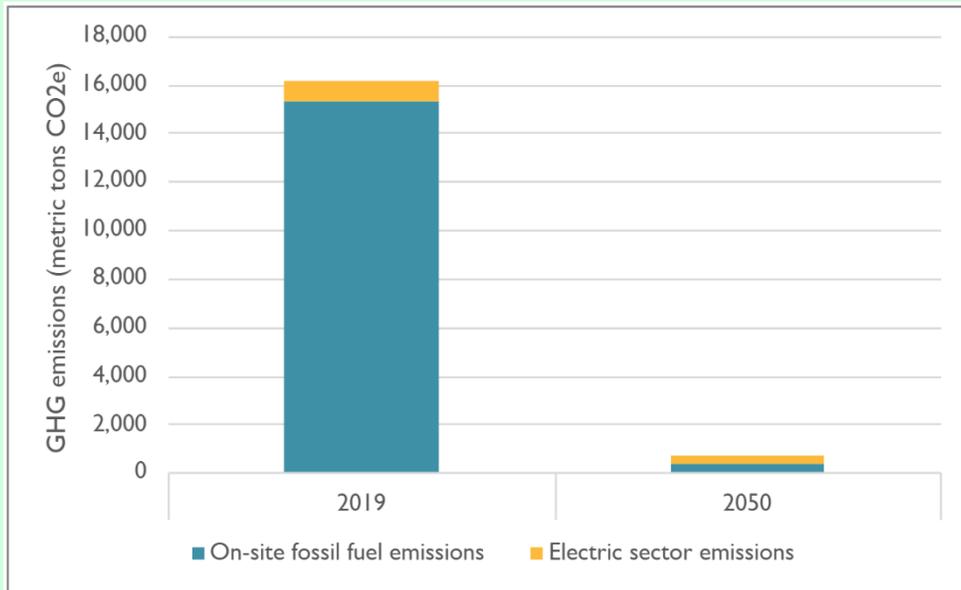


Figure 26: Modeled shift from reliance on on-site fossil fuel sources to energy sources that do not emit significant emissions.

Built Environment Strategies

The following section presents implementation details for the three strategies in this planning area prioritized to receive detailed implementation planning.

Strategy B1: Engage with commercial building owners, multi-family residential property managers, and landlords to discuss opportunities for building retrofits and decarbonization. Advocate for residents who are condo owners, renters and/or living in multi-family buildings to be able to increase energy efficiency.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Identify specific opportunities for updating and/or making recommendations for new resilient infrastructure design standards, for example, energy efficiency, building retrofits, and decarbonization • Consider long term plans for commercial building owners, multi-family residential property managers, and landlords • Consider how renewable sources and energy efficiency technologies can enhance the energy efficiency of buildings and reach Lincoln’s climate action goals • Facilitate a public discussion to better understand feasibility, opportunities, and barriers associated with building energy efficiency • Engage with renters and homeowners about building energy efficiency standards
Improving Equity	<ul style="list-style-type: none"> • Ensure robust engagement to solicit community’s feedback on priorities and needs associated with infrastructure improvements, particularly where decarbonization is involved • Prioritize EJ communities and climate vulnerable areas • Ensure robust engagement to solicit community feedback on priorities and needs associated with infrastructure energy efficiency improvements
Potential Co-benefits	<ul style="list-style-type: none"> • Improved building occupants’ wellbeing, comfort, and safety, and indoor air quality • Reduced long-term operational costs for building owners and occupants in retrofitted or new buildings • Improved building resiliency to extreme weather conditions • Increased access to renewable energy through on-site generation
Implementation Partners	<ul style="list-style-type: none"> • Residents of multi-family/multi-unit buildings, and renters (including but not limited to Oriole Landing Affordable Housing Renters, Lincoln Woods, etc.) • The Lincoln Foundation, Inc. • Lincoln Family Association • Town Boards and Committees: Climate Action Lincoln, Green Energy Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Commission on Disabilities, Housing Commission

	<ul style="list-style-type: none"> • Town Departments: Planning and Land Use, Council on Aging & Human Services
Funding Sources	<ul style="list-style-type: none"> • U.S Department of Housing and Urban Development (HUD) Community Development Block Grant (CBDG) • Department of Energy Resources (DOER) Green Communities; Low- and Moderate-Income Housing Decarbonization Grant Program • Executive Office of Energy and Environmental Affairs (EEA) Planning Assistance Grant • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • Number of new affordable housing units constructed or rehabilitated that incorporate high-performance building methods • Increased adoption of high-performance building design methods

Strategy B2: Analyze best practices for deep retrofitting and other energy efficiency measures for older homes. Consider engaging/recruiting various home types in town to participate as case studies.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Conduct a review of best practices implemented and/or adopted by other municipalities in the region • Convene a focus group of municipal partners to discuss opportunities, constraints, and lessons learned from their experiences • Develop a guidance document of best practices on deep retrofitting and energy efficiency measures applicable to Lincoln • Recruit various home types in town to participate and create case studies
Improving Equity	<ul style="list-style-type: none"> • Consider best practices that center equity outcomes • Convene community members, especially from priority populations and EJ communities, to help review and provide input on the guidance document of best practices

Potential Co-benefits	<ul style="list-style-type: none"> • Increased building resilience • Improved indoor air quality, building occupants’ health and comfort • Reduced long-term building operational costs • Increased access to renewable energy through on-site generation
Implementation Partners	<ul style="list-style-type: none"> • Residents, renters, and building owners • Residents of multi-family/multi-unit buildings (including but not limited to Oriole Landing Affordable Housing Renters, Lincoln Woods, etc.) • The Lincoln Foundation, Inc. • Lincoln Family Association • Town Boards and Committees: Climate Action Lincoln, Green Energy Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Commission on Disabilities, Housing Commission • Town Departments: Planning and Land Use, Council on Aging & Human Services
Funding Sources	<ul style="list-style-type: none"> • U.S Department of Housing and Urban Development (HUD) Community Development Block Grant (CBDG) • Executive Office of Energy and Environmental Affairs (EEA) Planning Assistance Grant • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • All older homes built prior to [TBD] are assessed and retrofitted (this metric can be updated to update the target built year(s) over time).

Strategy B3: Conduct a municipal facility assessment to determine a pathway for clean energy transition (i.e., building retrofitting, phasing out fossil fuel furnaces and appliances, etc.).

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Create an inventory of all municipal facilities and all available information related to the building operations, energy usage, etc. • Work with a consultant to conduct a comprehensive analysis of opportunities and constraints, as well as cost-benefit analysis, to transition to clean energy for each building/facility • Work with town leadership to determine timeline and buildings/facilities to be prioritized for retrofits and upgrades. • Seek funding to support the upgrades

Improving Equity	<ul style="list-style-type: none"> • N/A
Potential Co-benefits	<ul style="list-style-type: none"> • Reduced potential economic loss associated with climate change impacts to the Town (tax revenues) and residents (cost to repair/relocate) • Increased access to renewable energy through on-site generation • Reduced operational costs for retrofitted or new buildings
Implementation Partners	<ul style="list-style-type: none"> • Town Boards and Committees: Climate Action Lincoln, Lincoln Green Energy Committee, Inclusion, Diversity, Equity, Anti-Racism Committee, Housing Commission • Town Department: Planning and Land Use
Funding Sources	<ul style="list-style-type: none"> • MassCEC • Department of Energy Resources (DOER) Green Communities • Executive Office of Energy and Environmental Affairs (EEA) Planning Assistance Grant • U.S. Department of Energy (DOE) (Energy Efficiency and Conservation Block Grant Program, Energy Efficiency Revolving Loan Fund Capitalization Grant Program, Renew America’s Schools Grant Program) • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • All municipal buildings undergo deep retrofits

Additional Recommended Strategies for Built Environment

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to help Lincoln reduce GHG emissions from the built environment sector. These strategies provide a mix of necessary actions, such as building capacity for municipal staff, assisting businesses and residents to better understand available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Realm of Influence
B4: Develop informational materials and a communication plan for residents and developers on the newly adopted Specialized Code and Mass DOER’s Demonstration Project.	Capacity Building	Municipal & Community
B5: Educate property owners and contractors on embodied carbon in building materials and provide ideas for alternatives.	Capacity Building	Municipal & Community

B6: Assess all municipal facilities and infrastructure that are vulnerable to flooding and prioritize critical infrastructure improvements.	Technical Assistance	Municipal
B7: Require all proposed development and major renovation projects to include feasibility assessment and/or cost benefit analysis for implementing renewable energy options (for example, installation of solar PV, energy storage, and/or solar energy storage).	Technical Assistance	Municipal
B8: Consider changes to the zoning bylaw to allow for multifamily housing in all districts.	Technical Assistance	Municipal
B9: Develop a greenhouse gas emission reduction and energy performance standard for municipal facilities and buildings.	Technical Assistance	Municipal
B10: Promote transparency by tracking and publishing municipal buildings' energy use intensity (EUI).	Technical Assistance	Municipal
B11: Maintain existing stormwater infrastructure and improve stormwater drainage on roadways, while considering climate change projections for the region.	Technical Assistance	Municipal
B12: Promote the disclosure of Energy Use Intensity (EUI) in commercial and residential purchases and sales.	Technical Assistance	Municipal & Community
B13: Mitigate stormwater surface runoff by encouraging the use of green infrastructure and low impact development techniques (including rain gardens, porous pavement, right-sizing culverts, etc.).	Technical Assistance	Municipal & Community
B14: Establish a policy to consider embodied carbon emissions in construction materials used in construction or renovation projects for municipal buildings and facilities.	Policy	Municipal
B15: Review zoning regulations to enable more diverse, affordable, and energy efficient housing, such as higher density, multi-family buildings and transit-oriented development (TOD).	Policy	Municipal
B16: Adopt a net zero standard for newly constructed municipally owned and funded buildings.	Policy	Municipal
B17: Adopt a Green Building Code that sets minimum requirements for resiliency and mitigation measures and incentives.	Policy	Municipal



Wild geraniums at Browning's Field. Photo credit: Town of Lincoln

WORKING LANDS AND NATURAL RESOURCES

Lincoln provides many recreational opportunities on permanently protected, public and private conservation lands, which also serve as protected corridors for undisturbed habitat and resource protection.⁸ Different natural communities identified in Lincoln include oak-hemlock-white pine forests, red maple swamps, cultural grasslands, wetlands, and open lands.⁹ Considered a “green sanctuary,” Lincoln has a large amount of protected open space within its town boundaries, comprising of about 40% of the town’s approximately 15 square miles.¹⁰ Lincoln’s present working lands and natural resources management have embraced its agricultural heritage. While Lincoln has considerable green space, the town has a relatively small number of floodplains in comparison to nearby towns. Lincoln has less than 300 parcels in the 1% flood zone, or 100-year floodplain.¹¹

In Lincoln’s 2017 Open Space and Recreation Plan, climate change was noted as a significant threat to the town’s natural resources, given the projected increase in frequency and intensity of severe storms, flooding, drought, and extreme heat. Managing the trees within the town to reduce power outages and mitigate climate change impact on the health and composition of the forests is crucial. For example, since Lincoln has such a high density of trees, the Town is more susceptible to downed limbs and trees, especially with Ash trees dying, making areas more vulnerable to damage. The urban heat island effect, intensified by extreme heat, is also a concern for the neighborhoods surrounding the Lawrence G. Hanscom Field.



Did you know? In early June 2023, the Healey-Driscoll Administration announced a new “Forests as Climate Solutions” Initiative to protect and manage Massachusetts’ forests and optimize carbon sequestration as part of meeting the state’s climate goals. As part of the Clean Energy and Climate Plan (CECP) for 2050, the state established the land conservation goals of protecting 30 percent of the Commonwealth in 2030 and 40 percent in 2050. This initiative will help accelerate progress toward this goal. As more details roll out in the upcoming months, overall, the initiative is established to:

- Develop climate-oriented forestry practices for state lands;
- Create new incentives for private woodland owners and municipalities;
- Convene a forest reserves group to establish statewide goals for forest reserves on public and private lands (based on their potential to absorb carbon and support biodiversity);
- Implement the Executive Office of Energy and Environmental Affairs (EEA)’s Resilient Lands Initiative;
- Update and expand the use of the latest scientific research to inform state lands management;

8 Town of Lincoln, Open Space and Recreation Plan (2017), <https://www.lincolntown.org/1416/Open-Space-and-Recreation-Plan-OSRP>.

9 Town of Lincoln, Open Space and Recreation Plan (2017), <https://www.lincolntown.org/1416/Open-Space-and-Recreation-Plan-OSRP>.

10 Town of Lincoln, Open Space and Recreation Plan (2017), <https://www.lincolntown.org/1416/Open-Space-and-Recreation-Plan-OSRP>.

11 MAPC, MAGIC Climate Change Resilience Plan: Vulnerability Assessment & Response Strategies (2017), https://www.stow-ma.gov/system/files/uploads/pt1_magic_climate_resilience_vulnerabilityassessment_reduced.pdf.

- Provide financial assistance to forestry businesses to reduce carbon loss and environmental impacts through enhanced technology and business practices;
- Incentivize the use of wood from MA forests to sequester carbon and meet local needs for wood products; and
- Expand funding for land conservation and technical assistance to enhance partners' capacity to advance these goals.

What has been done so far?

With nearly 40% of Lincoln's land permanently protected, the Town has been very proactive in conserving and protecting its natural resources. Primary considerations as they relate to open space and recreation include on-going protection and stewardship of natural habitats (conservation land), promotion of ecological building and landscape practices, including reduction of turf grass, reduction of water use, and incorporation of green-building practices and energy-efficiency measures in municipal buildings. To date, the Town has passed:

- ❖ Wetlands Protection Bylaw (2007)
- ❖ Right to Farm Bylaw (2011)
- ❖ Stormwater Bylaw (2021)

In 2016,
the Lincoln Conservation
Commission licensed
nearly 200 acres of
public conservation land
to 15 different farms.

The Town is currently planning and permitting the installation of a solar field to provide clean power to the municipal energy system. Also, Lincoln continues to prioritize and develop alternative forms of non-motorized transportation by expanding its trail and roadside path network.

Lincoln's Conservation Department and Lincoln Land Conservation Trust (LLCT) manage **over 3,100 acres of Conservation Land and Conservation Restrictions** , **80 miles of trails** and all Town Conservation land for wildlife habitat, recreation, & agriculture, habitat management and protection, and wetlands protection. Additionally, the Town of Lincoln works with community volunteers and local schools to restore its wetland wildlife habitats through invasive species removal activities.

In 2020, LLCT launched the **Lincoln Pollinator Action Plan** as an initiative to create and improve pollinator habitat in Lincoln. The project focuses on supporting functional diversity (biodiversity) and connecting habitat. Since the beginning of the project, LLCT has expanded pollinator habitats with planting efforts at seven sites in Lincoln: Chapman Pasture, Pollinator Meadow, Birches School, Lincoln Station, Codman Garden, Codman Island, and Harrington Trailhead. LLCT estimates that at least 60 species of plants (native shrubs, perennials, and trees) have been added to roughly 1.5 acres of total area. Some of these sites are on conservation land, others serve to connect habitat or serve as demonstration gardens for easy public access.

Furthermore, through its pollinator plant sales, LLCT estimates that **about 260 private gardens in Lincoln and surrounding towns have planted pollinator gardens** . LLCT has sold approximately 2,300 shrubs/trees and 5,000 perennials in the past four years.



A Deeper Dive ... Healthy natural and working lands (protected forests, wetlands, healthy farmlands, etc.) are vital contributions to our climate mitigation solutions through **carbon sequestration** - a process of capturing and storing carbon from the atmosphere. According to a 2017 study by the Nature Conservancy, “Globally, natural climate solutions could deliver more than a third of the emission reductions needed by 2030 to avoid the worst impacts of climate change.”¹²

In Lincoln, it is estimated that approximately 20,000 metric tons (MT) of CO₂ are sequestered annually. This is based on calculations using historical data of tree coverage and land use categories (forest, cropland, grassland, wetland, settlement, etc.) defined by the Intergovernmental Panel on Climate Change (IPCC) and the modeling tool “Land Emissions and Removal Navigator (LEARN)” developed by the International Council for Local Environmental Initiatives (ICLEI).¹³ For reference, it is estimated that 20,000 MT of CO₂ is equivalent to a month-worth of emissions from about 60,000 cars. This estimate of carbon being sequestered could increase should the town continue to protect and/or expand its protection of natural assets.¹⁴

Every piece counts! Individual, fragmented green space may not yield large impact on the amount of carbon sequestered, but cumulatively, healthy natural and working lands can contribute as a natural climate solution.

Working Lands & Natural Resources Strategies

The following section presents implementation details for the four strategies in this planning area prioritized to receive detailed implementation planning.

Strategy NR1: Encourage local farmers in Lincoln to participate in the Boston region’s effort in supporting local food systems and increasing food security.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Partner with other farming communities in the region and establish a working group of local farmers to facilitate discussion around food security and best practices

12 The Nature Conservancy, Perspective: Natural Climate Solutions, <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/natural-climate-solutions/>.

13 International Council for Local Environmental Initiatives (ICLEI), Land Emissions and Removal Navigator (LEARN) Tool, <https://iclei.usa.org/LEARN/#:~:text=This%20interactive%20web%20mapping%20tool,of%20their%20forests%20and%20trees.>

14 U.S. Environmental Protection Agency (EPA), Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>.

	<ul style="list-style-type: none"> • Host informational sessions and trainings for farmers, to increase the understanding of sustainable best practices • Create and share local food systems guidelines and potential best practices to support increasing food security locally and regionally • Establish a Farm Fund into which farmers, residents, and businesses can contribute to fund food security
Improving Equity	<ul style="list-style-type: none"> • Ensure robust engagement with residents in EJ communities, to stay updated on their priorities and needs for food security.
Potential Co-benefits	<ul style="list-style-type: none"> • Increased community resilience • Carbon storage in soil and vegetation
Implementation Partners	<ul style="list-style-type: none"> • Residents and farmer advocacy groups • Local farms and garden clubs (including but not limited to: Lincoln Garden Club, Hannan Healthy Foods Farm, Codman Community Farms, Linden Tree Farm, Drumlin Farm, etc.) • The Food Project • Town Boards and Committees: Climate Action Lincoln, Inclusion, Diversity, Equity, Anti-Racism Committee, Lincoln Agriculture Commission • Town Departments: Planning and Land Use, Conservation, Health
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Food Security Infrastructure Grant Program; Municipal Vulnerability Preparedness (MVP) Planning and Action grants • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • Amount of food delivered to EJ communities or hunger-relief providers • Increased ability and rate for carbon sequestration or storage

Strategy NR2: Update Lincoln 's Wetlands Protection Bylaw to ensure incorporation of nature-based solutions, climate resilience, preservation of native species and ecosystem health.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Lincoln Conservation Commission to hold public meetings to discuss best practices for nature-based solutions, climate resilience, preservation, etc. • Host informational sessions and/or trainings for municipal staff and developers to increase understanding

	<ul style="list-style-type: none"> • Expand professional development opportunities (for municipal staff) for climate resiliency and nature-based solutions • Create a guideline for green infrastructure design and low impact development techniques for new development and major renovation projects • Review other municipal bylaws that incorporate climate resilient strategies. • Review existing requirements and/or policies related to managing and protecting wetlands • Strengthen performance standards for permitting work in wetland resource areas and the 100-foot buffer zone
Improving Equity	<ul style="list-style-type: none"> • Ensure sustainable land use practices, access to wetlands • Prioritize wetland locations in EJ areas
Potential Co-benefits	<ul style="list-style-type: none"> • Increased community resilience • Improved stormwater management and flood control
Implementation Partners	<ul style="list-style-type: none"> • Massachusetts Association of Conservation Commissions (MACC) • Mass Audubon and other environmental advocacy groups in the area • Town Boards and Committees: Inclusion, Diversity, Equity, Anti-Racism Committee, Lincoln Conservation Commission, Parks & Recreation Committee • Town Departments: Planning and Land Use, Conservation
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Municipal Vulnerability Preparedness (MVP) Action grant • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • Increased number of new projects with green infrastructure measures incorporated and buffer zone restoration • Reduction of buffer zone conversion in town • Consistent decision making and implementation strategies are relevant and in accordance with the latest available climate information

Strategy NR3: Work with the Agricultural Commission and local farmers to promote climate change adaption strategies for farming such as improving soil quality, diversifying crop rotations, modifying planting schedules, and implementing techniques to avoid the use of pesticides and herbicides.

Implementation lead	<ul style="list-style-type: none"> • Municipal-led
Key Implementation Next Steps	<ul style="list-style-type: none"> • Establish a multi-farm/stakeholder working group to facilitate discussion around climate change adaptation for farming and best practices • Host informational sessions and/or trainings for local farmers in Lincoln to increase the understanding of sustainable best practices • Create a sustainable farming guideline for improving soil quality, diversifying crop rotations, modifying planting schedules, and implementing techniques to avoid the use of pesticides and herbicides
Improving Equity	<ul style="list-style-type: none"> • Ensure robust engagement with residents in EJ communities • Ensure sustainable land use practices
Potential Co-benefits	<ul style="list-style-type: none"> • Increased community resilience • Increased food security
Implementation Partners	<ul style="list-style-type: none"> • Resident and farmer advocacy groups • Local farms and garden clubs (including but not limited to: Lincoln Garden Club, Hannan Healthy Foods Farm, Codman Community Farms, Linden Tree Farm, Drumlin Farm, etc.) • The Food Project • Town Boards and Committees: Lincoln Agriculture Commission • Town Departments: Planning and Land Use, Conservation
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Food Security Infrastructure Grant Program; Municipal Vulnerability Preparedness (MVP) Planning and Action grants • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP) • U.S EPA New England’s Healthy Communities Grant Program
Measures of Success	<ul style="list-style-type: none"> • Elimination of pesticide and herbicide use • All farms in Lincoln incorporate and/or transition to sustainable and climate adaptable strategies

Strategy NR4: Work with homeowners to promote sustainable landscaping practices. This includes, for example, prioritizing the planting of climate resilient species to withstand anticipated climate change impacts (such as extreme temperatures, drought, flooding, extreme weather events, etc.).

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led and Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Review existing requirements and/or policies related to managing and protecting native species • Propose to formalize native species plantings and replacement requirements • Create a town-wide climate resilience native planting program • Establish guidance or requirement for native tree/plant plantings as part of site plan approvals • Partner with local conservation groups to develop and circulate outreach materials (to residents and landscaping companies) promoting sustainable landscaping practices (such as reducing lawn size, planting drought tolerant species, controlling invasive species, promoting natural buffer strips, information on the established guidance around native tree/plantings as part of site plan approvals, etc.) • Create demonstration areas on a town property where residents can view examples (such as pollinator gardens, lawn reduction areas, etc.)
Improving Equity	<ul style="list-style-type: none"> • Prioritize climate resilient species planting locations in “hot spot” areas in town
Potential Co-benefits	<ul style="list-style-type: none"> • Increased beautification and walkability in public spaces • Improved stormwater management and flood control • Improved air quality and reduced urban heat island effect
Implementation Partners	<ul style="list-style-type: none"> • Lincoln Land Conservation Trust • Mass Audubon and other local environmental advocacy groups • Town Boards and Committees: Lincoln Conservation Commission, Town Departments: Planning, Conservation, Tree Warden
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Food Security Infrastructure Grant Program; Municipal Vulnerability Preparedness (MVP) Planning and Action grants • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • Increased climate resilient native species planted in town

Additional Recommended Strategies for Working Lands and Natural Resources

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to help enhance and prepare working lands and natural resources in Lincoln for the changing climate. These strategies provide a mix of necessary actions such as building capacity for municipal staff, better understanding of available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Realm of Influence
NR5: Provide educational resources to residents and landscaping companies on sustainable lawn maintenance practices, including electric lawn equipment and use of climate resilient native plants for landscaping and restoration projects.	Capacity Building & Technical Assistance	Municipal & Community
NR6: Partner with local conservation groups to provide outreach on sustainability and climate preparedness best practices.	Capacity Building	Municipal & Community
NR7: Support the expansion of local agriculture to increase local food production. Ensure healthy ecosystems and soil quality in Town to support ecological soundness.	Capacity Building & Technical Assistance	Municipal & Community
NR8: Continue protecting and preserving areas that provide carbon sequestration, such as forests, wetlands, and meadows. Develop mechanisms to capture data and track progress of carbon sequestration by natural resources in town.	Capacity Building & Technical Assistance	Municipal
NR9: Coordinate with local farmers to discuss climate change impacts on local agriculture and vice versa, e.g., methane emissions from farm animals.”.	Capacity Building & Technical Assistance	Municipal & Community
NR10: Encourage school children to learn about native planting, carbon storage and habitat restoration.	Capacity Building	Municipal & Community
NR11: Identify priority sites to manage invasive plants that threaten unique or sensitive habitats.	Technical Assistance	Municipal
NR12: Identify land protection opportunities in flood-prone areas.	Technical Assistance	Municipal
NR13: Collaborate with DPW to reduce the use of road salt and consider alternative products that have less environmental impact.	Technical Assistance	Municipal
NR14: Consider deer control measures to improve forest health by allowing native tree seedlings to thrive.	Technical Assistance	Municipal
NR15: Enhance wildlife corridors and natural shelters by increasing habitat connectivity.	Technical Assistance	Municipal

NR16: Explore regenerative agriculture (e.g., no-till and permaculture), promote composting and ecosystem health, and explore options for "climate-smart" agricultural practices.	Technical Assistance	Municipal & Community
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SOCIAL RESILIENCE AND EDUCATION

Educating residents on Town happenings is a way to keep them engaged and informed and ultimately bolsters the Town’s social resilience. Social resilience looks like strong neighborhood networks, prioritizing accessibility and inclusion in town infrastructure and resources, maintaining comprehensive emergency management protocols, and prioritizing residents’ health and well-being, to name a few.

What has been done so far?

Established in 2021, Lincoln’s **Inclusion, Diversity, Equity, & Anti-Racism (IDEA) Committee** is developing a plan to help Lincoln achieve its vision of being a community that supports and embraces diversity. The Committee holds round-tables, training sessions, and public forums to increase community engagement in pursuit of a more inclusive and equitable community.¹⁵

Lincoln participated in the statewide Municipal Vulnerability Preparedness (MVP) Planning program in 2019. As part of the grant, the town convened community stakeholders for a **Community Resilience Building workshop** to conduct a town-wide climate vulnerability assessment and identify priority climate resilience actions. This allowed Lincoln to become eligible to apply for state grants to address climate risks in the Town. Funding for the Lincoln Climate Action Plan planning process was received from the MVP program.¹⁶

In 2017, Lincoln participated in the planning process for the **“Climate Change Resilience Plan: Vulnerability Assessment & Response Strategies,”** developed by the Minuteman Advisory Group on Interlocal Coordination (MAGIC), a regional council of which Lincoln is a member. This regional plan aimed to help communities build their resilience in the face of climate change impacts.¹⁷



Pulling invasive water chestnut on the Sudbury River. Photo credit: Lincoln Conservation Department



A Conservation Trail Walk event. Photo credit: Town of Lincoln.

15 Town of Lincoln, Inclusion, Diversity, Equity, & Anti-Racism Committee, <https://www.lincolntown.org/1221/IDEA>.

16 Town of Lincoln, Town of Lincoln Community Resilience Building Workshop Summary of Findings (2019), <https://www.lincolntown.org/DocumentCenter/View/65324/Lincoln-MVP>.

17 MAGIC, MAGIC Climate Change Resilience Plan: Vulnerability Assessment & Response Strategies (2017), https://www.mapc.org/wp-content/uploads/2017/11/MAGIC-Climate-Resilience-Plan_VA-and-Strategies_112017.pdf.

Social Resilience and Education Strategies

The following section presents implementation details for the two strategies in this planning area prioritized to receive detailed implementation planning.

Strategy SE1: Evaluate Lincoln ’s preparedness to address major climate hazards. Establish a neighborhood response and management program, such as a “buddy system, ” to account for all residents in the event of extreme weather and emergencies. Ensure information on disaster preparedness is available and accessible for all residents.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Review the Town’s current emergency preparedness and response procedures to identify strengths and gaps • Collaborate with relevant municipal departments, including Public Works, Police, and Fire, to update the emergency preparedness plan, with incorporation of climate change considerations • Collaborate with local neighborhood groups and community-based organizations to identify and recruit community members for the neighborhood response and management program. Conduct outreach for volunteer sign-ups (youth included!) and provide informational sessions/webinars for training. Establish lines of communication and frequency of check-in meetings with the program volunteers • Work with municipal staff and community members to create outreach and communications materials for disaster preparedness • Reach out to residents before an emergency as part of the neighborhood response and management program to inventory the various types of resources that may be needed. For example, during an evacuation, a power chair user might need access to a paratransit van and accessible housing would need to be available
Improving Equity	<ul style="list-style-type: none"> • Make sure participating “buddies” represent different neighborhoods, languages, and demographics in tow • Ensure fair stipends/compensation for volunteers • Translate all materials created into other languages

Potential Co-benefits	<ul style="list-style-type: none"> • Reduced social isolation during emergency events (such as heat waves and other extreme events, pandemic outbreaks, etc.) • Improved community connectivity, which can lead to greater resilience within Town
Implementation Partners	<ul style="list-style-type: none"> • Town Library • Boston Center for Independent Living • Town Departments: Police, Fire, Public Works, Schools, Council on Aging & Human Services
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Food Security Infrastructure Grant Program; Municipal Vulnerability Preparedness (MVP) Planning and Action grants • Metropolitan Area Planning Council (MAPC) District Local Technical Assistance/Technical Assistance Program (DLTA/TAP)
Measures of Success	<ul style="list-style-type: none"> • Development of a program volunteer cohort in every Lincoln neighborhood, including a lead volunteer to assist with management • A broad reach to most, if not all, residents on emergency preparedness through various outreach and communications methods

Strategy SE2: Educate residents on incorporating climate-smart practices into their daily lives. Promote the Town ’s climate resilience actions through educational signage. Ensure signage meets accessibility needs, such as height and visuals. Coordinate with local schools to teach students about energy efficiency, net zero buildings, and resilience efforts in Town.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Develop an education campaign, through partnerships with the schools, businesses, etc., that provides examples on how residents can incorporate climate-smart practices into their day-to-day activities. Reference various levels (such as starting small, scaling up if residents are already doing this, etc.) • Consider partnering with local artists and/or youth to create engaging and educational signage to place around Town (parks, trails, at the library, etc.). Create a scavenger hunt to evaluate impact

	<ul style="list-style-type: none"> • Create a simple curriculum with support from a small cohort of teachers in Lincoln to distribute to schools for teaching to students
Improving Equity	<ul style="list-style-type: none"> • Provide funds or incentives to low- and fixed-income individuals so they can participate in practices that may present financial barriers
Potential Co-benefits	<ul style="list-style-type: none"> • Increased waste reduction in Town and more utilization of the transfer stations' compost and recycling stations • Increased adoption of clean energy technologies in households
Implementation Partners	<ul style="list-style-type: none"> • Local artists • Youth • Lincoln Schools (including teachers and students) • Town Library • Council on Aging & Human Services • Boston Center for Independent Living
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Food Security Infrastructure Grant Program; Municipal Vulnerability Preparedness (MVP) Planning and Action grants
Measures of Success	<ul style="list-style-type: none"> • Tracking the number of students and grade levels engaged through the created curriculum

Additional Recommended Strategies for Social Resilience and Education

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to enhance Lincoln's quality of life and prepare businesses, residents, and especially the priority populations, for the anticipated impacts of climate change. These strategies provide a mix of necessary actions; such as building capacity for municipal staff, better understanding of available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Realm of Influence
SE3: Establish a diverse and inclusive Town committee to continue the work of the L-CAP. Ensure this work is seen through an equity lens. This group will be comprised of individuals from priority populations, various income levels, backgrounds, and experiences.	Capacity Building	Municipal & Community

SE4: Work together with neighboring towns and schools to create a coalition of environmental youth advocates.	Capacity Building	Municipal & Community
SE5: Promote mental health programs and integrate climate considerations.	Capacity Building	Municipal & Community
SE6: Maintain an emergency response and evacuation plan, including providing access to emergency shelters, food, and essential supplies. Ensure priority populations are supported.	Technical Assistance	Municipal
SE7: Educate residents on Indigenous rights and build relationships with Indigenous peoples to support their climate concerns and listen to their lived experiences.	Capacity Building & Advocacy	Municipal & Community
SE8: Partner with neighboring municipalities to advocate for air quality and public health concerns related to aviation activities and future development at Hanscom.	Capacity Building & Advocacy	Municipal & Community
SE9: Provide schools with educational resources and tools to encourage students to make sustainable decisions and behavioral changes.	Capacity Building & Advocacy	Municipal & Community
SE10: Encourage all land-based organizations in Lincoln to participate in diversity, equity, inclusion, and belonging centered education, conversations, and planning.	Capacity Building & Advocacy	Municipal & Community
SE11: Promote and support the sale of locally sourced goods and products.	Advocacy	Municipal & Community

WATER AND SOLID WASTE MANAGEMENT

Flint's Pond in Lincoln is where the Town primarily gets its year-round supply of water.¹⁸ There are protections in place for the watershed surrounding the pond to maintain good water quality and a healthy water supply for the community. Various residents have private wells that they utilize for their water usage. Therefore, it is important to put measures in place throughout Town to make sure waterways are free of chemical and trash pollution to maintain public health. Continual monitoring of the water supply and treatment of the water, when necessary, will be pertinent. Due to climate change, droughts are a concern in relation to the Town's water supply. It will be crucial to think about regional approaches to water that can increase the Town's drought tolerance and secure more water resources for the municipality.

Examples of public health co-benefits are:

- Maintaining the Town's stormwater and overall water infrastructure, and making it more resilient to extreme precipitation events, can help reduce potential exposure to pathogens and spread of sewage.
- Making sure the Town has a sufficient water supply, especially during drought, can decrease the risk of infections and diarrheal diseases caused by contaminated water.

Efforts to improve solid waste management in Town will also be essential, as it can help reduce emissions and trash pollution, which can have various co-benefits. Access to the transfer station can be increased and composting, recycling, reusing, and reducing waste should be encouraged over generating trash.

What has been done so far?

Catch Basin Management Plan (2019) provides updates to Lincoln's catch basin inspection and maintenance procedures, which include the development of a prioritization schedule for the cleaning of catch basins at more frequent times in the year.

Illicit Discharge Detection and Elimination (IDDE) Plan (2019) supports efforts to reduce the occurrence of illicit discharge (such as household products for example) getting into the sewer system which helps maintain good water quality in Town. The implementation of this plan supports the protection of Lincoln's water supply.

Lincoln Transfer Station is open to all residents - though not open to commercial entities - and it is where individuals can go to drop off their trash, recyclables, and eligible food waste for composting.^{19,20} The Town's Transfer Station has a Swap Shed where residents can donate and/or take gently used items (such as books, small furniture, dishware, etc.).²¹ These items are free of cost and the swap shed helps reduce items that may become waste otherwise.

18 Town of Lincoln, Water Sources and Protection, <http://lincolntown.org/224/Water-Sources-Protection>.

19 Town of Lincoln, Transfer Station/Recycling/Brush Collection, <http://lincolntown.org/405/Transfer-StationRecyclingBrush-Collectio>.

20 Town of Lincoln, Food Waste Collection Guide, <http://lincolntown.org/DocumentCenter/View/58549/Food-Waste-Collection->.

21 Town of Lincoln, Swap Shop Rules, <http://lincolntown.org/DocumentCenter/View/44799/Swap-Shop-Rules>.

Water and Solid Waste Management Strategies

The following section presents implementation details for the three strategies in this planning area prioritized to receive detailed implementation planning.

Strategy WW1: Carefully track water pollutants to develop water treatment solutions that target these hazards. Consider joining the Massachusetts Water Resources Authority (MWRA) services in the future.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Develop a monitoring schedule and task a certain department or individual to oversee its implementation and routine usage • Create materials and host info-sessions for residents • Connect with the Massachusetts Water Resources Authority (MWRA) to facilitate discussion and assess feasibility of expanding MWRA services to Lincoln
Improving Equity	<ul style="list-style-type: none"> • Explain to residents, especially priority populations noted previously, about the harms of water hazards • Consider equity benefits for joining the MWRA • Encourage and offer internships and educational opportunities for priority populations to learn, engage, and create water treatment solutions
Potential Co-benefits	<ul style="list-style-type: none"> • Maintain public health by reducing exposure • Benefits to local biodiversity • Implementation of green infrastructure throughout Town
Implementation Partners	<ul style="list-style-type: none"> • Town Departments: Water, Public Works • MassDEP • Massachusetts Water Resources Authority • Local watershed organizations/water advocacy groups
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) Division of Conservation Services • MassDEP Drinking Water Supply Protection Grant Program; Watersheds & Water Quality Grants and Financial Assistance; MS4 Municipal Assistance Grant
Measures of Success	<ul style="list-style-type: none"> • Elimination of cyanobacteria blue/green algae found in the Town’s surface water • Decreased level of water pollutants

	<ul style="list-style-type: none"> • Established and effective water treatment solutions
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Strategy WW2: Implement sustainable solid waste disposal methods in Town. Consider allowing farmers access to the transfer station. Create municipal and school composting programs. Educate and encourage zero waste habits and promote waste reduction.

Implementation Lead	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Identify the sustainable solid waste disposal methods that will best serve the Town • Decide whether it's feasible for farmers to utilize the Transfer Station. • Work with the schools to set up a pilot composting program and create a community-wide program to increase composting • Create materials and a communications campaign to encourage waste reduction and zero waste habits in commercial and residential areas
Improving Equity	<ul style="list-style-type: none"> • Reach out to understand and identify any potential challenges related to encouraging zero waste for disproportionately impacted residents, especially those living in multi-family buildings
Potential Co-benefits	<ul style="list-style-type: none"> • Improved air quality (through reduced waste) • Creation of a circular economy (through reuse and recycle best practices)
Implementation Partners	<ul style="list-style-type: none"> • Farmers, businesses • Town Boards and Committee: Lincoln School Committee • Town Departments: Schools, Public Works
Funding Sources	<ul style="list-style-type: none"> • MassDEP Sustainable Materials Recovery Program (SMRP) Municipal Grant
Measures of Success	<ul style="list-style-type: none"> • Measured reduction in waste generation • Increased usage of the Transfer Stations' recycling, composting, and swap shed sections • Access to the transfer station for farmers in town • Increased waste diversion from landfills

Strategy WW3: Promote water conservation efforts by encouraging the use of rain barrels and grey water systems. Educate residents who use well water about water conservation and efficiency measures.

Realm of Influence	<ul style="list-style-type: none"> • Municipal-led & Community Participation
Key Implementation Next Steps	<ul style="list-style-type: none"> • Engage residents and businesses on the usage of rain barrels and grey water systems. For example: Include information about how to best take care of standing water, so that it does not create conditions for mosquitoes • Create incentives to increase the adoption of these systems • Find a resident volunteer with a well, so that the town can provide an on-site private well tour for residents. The tour will serve as a demonstration for water conservation and efficiency measures that can be put in place
Improving Equity	<ul style="list-style-type: none"> • Reach out to priority populations to provide additional support on how these systems could work well in their homes • Think of rain barrels of various heights and sizes to accommodate accessibility needs
Potential Co-benefits	<ul style="list-style-type: none"> • Potential decreased water utility bills for residents
Implementation Partners	<ul style="list-style-type: none"> • Lincoln Land Conservation Trust • Town Departments: Water, Conservation
Funding Sources	<ul style="list-style-type: none"> • Executive Office of Energy and Environmental Affairs (EEA) - Division of Conservation Services • MassDEP Drinking Water Supply Protection Grant Program; Watersheds & Water Quality Grants and Financial Assistance; MS4 Municipal Assistance Grant
Measures of Success	<ul style="list-style-type: none"> • Reduction in water usage (from the Town’s water supply)

Additional Recommended Strategies for Water and Solid Waste

The following list represents the additional recommended strategies, developed in collaboration with municipal staff and community stakeholders, to help Lincoln improve water and solid waste management. These strategies provide a mix of necessary actions; such as building capacity for municipal staff, better understanding of available resources and technical assistance, and continued advocacy efforts at regional and state levels.

Strategy	Action Type	Realm of Influence
WW4: Encourage the Agricultural Commission to negotiate agreements with the Water Department to regulate water usage in times of drought or low water table.	Technical Assistance	Municipal
WW5: Pursue state and federal technical and financial assistance to treat per- and polyfluoroalkyl substances (PFAS, also known as the forever chemicals) from the Town's water supply, including private wells. Look for alternative water supplies free of PFAS.	Technical Assistance	Municipal
WW6: Monitor regulations on best practices for recycling solar panels and batteries.	Technical Assistance	Municipal
WW7: Monitor cyanobacteria blue/green algae in surface water and provide information to residents to mitigate growth and improve water quality.	Technical Assistance	Municipal
WW8: Continue to monitor the distribution of clean drinking water and reduce water leaks.	Technical Assistance	Municipal
WW9: Investigate ways to keep septic systems healthy, including treatment by an anaerobic digester.	Technical Assistance	Municipal
WW10: Control pet waste near surface water to reduce nutrient loading.	Advocacy	Municipal & Community



Muster Field. Photo credit: Town of Lincoln

ADDITIONAL IMPLEMENTATION SUPPORT STRATEGIES

The strategies below do not pertain to any particular planning area organized in sections above but are still critical to support the implementation of the Lincoln Climate Action plan overall. These supporting strategies represent overarching actions that ensure monitoring and tracking of climate action and implementation progress, setting up operational structures, as well as building capacity and expertise to advance L-CAP goals and strategies overtime. Successful establishment of these supporting strategies will support a smooth transition and a more effective implementation of the rest of the L-CAP strategies.

Strategy	Action Type	Realm of Influence
Designate a department in Town to be responsible for pursuing state and federal grants and programs that can help make clean energy technology adoption and other greenhouse gas reducing strategies more affordable to residents.	Capacity Building	Municipal
Fundraise to create an implementation fund that can help subsidize costs associated with climate actions for lower-income residents.	Technical Assistance	Municipal
Establish a Town committee to ensure the implementation of the Town's Climate Action Plan, especially through the lens of equity to prevent or minimize unintended consequences on the priority populations as well as those whose lives may be already severely impacted by climate change. Focus on engaging and supporting priority populations such as people of color, elders, youth, environmental justice populations, families with young children, diverse residents, and low-income families.	Capacity Building	Municipal & Community
Ensure climate change consideration and best practices are integrated into town policies and projects for alignment and consistency. This should include the Town choosing an appropriate “social cost of carbon” and considering it in making major decisions (for example, capital planning).”	Technical Assistance	Municipal
Hire a Climate and Sustainability Director to support the L-CAP goals, implementation, and next steps.	Capacity Building & Technical Assistance	Municipal
Use universal language and jargon-free vocabulary for all climate action outreach. As needed, include American Sign Language (or CART - Communications Access Real Time Translation), as well as translation and interpretation of materials for the Town's three top non-English languages.	Capacity Building & Technical Assistance	Municipal

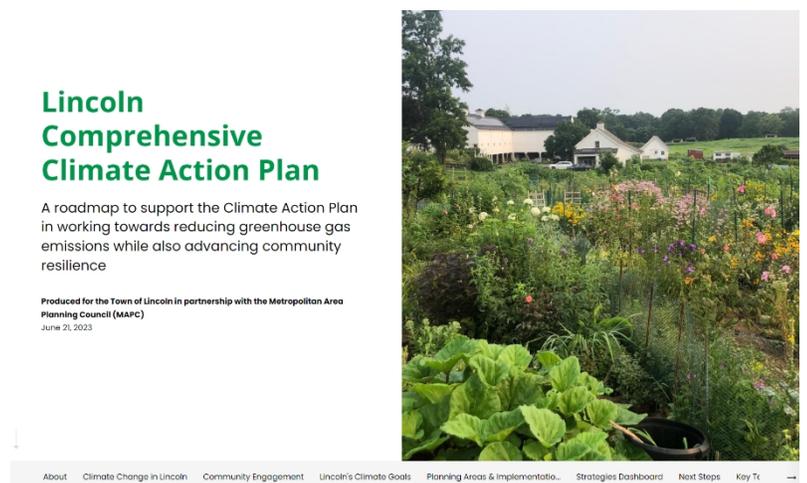
Conduct regular town-wide greenhouse gas inventory updates to track emissions sources and report on mitigation progress.	Technical Assistance	Municipal
Develop an online dashboard that showcases Lincoln's climate goals, implementation strategies, and metrics to measure progress, gaps, and opportunities for improvement.	Technical Assistance	Municipal
Conduct a voluntary Town census to gather data on household vehicle usage, residential heating systems, and clean energy technologies	Technical Assistance	Municipal & Community
Sponsor training by residents or outside experts on how to access the wide range of rebates, loans, and tax credits available from the State and the Federal government. Provide jargon-free resources and toolkits that are accessible to all.	Technical Assistance	Municipal & Community
Develop a detailed technical analysis of the Climate Action Plan strategies to better understand the emission reduction potential, costs of implementation, and feasibility to prioritize short- and long-term L-CAP implementation.	Technical Assistance	Municipal
Review and update the Climate Action Plan every 3-5 years.	Technical Assistance	Municipal

PLAN MAINTENANCE

Lincoln's Comprehensive Climate Action Plan (L-CAP) is a living document, a roadmap for how the Town of Lincoln will tackle climate action in a comprehensive and impactful way. The creation of this plan represents a commitment to climate solutions and will require municipal leadership and community participation by everyone. Municipal staff, elected officials, local community partners, businesses, and residents all have a role to play in this plan.

The L-CAP should be reviewed and updated every five years to reflect the latest climate change data, state and local policy updates, and available financial and technical resources for implementation.

Visit



Snapshot of the L-CAP Online Dashboard

<http://lincolntown.org/1411/Climate-Action-Plan> for all L-CAP documents, including an online dashboard with strategy implementation progress.

Additional Information

Glossary

Carbon Emissions: Carbon dioxide (CO₂) is emitted when fossil fuels are burned in vehicles, buildings, and other industrial processes (such as in factories).

Carbon Neutral: Achieving net zero greenhouse gas emissions by balancing those emissions so they are equal (or less than) the emissions that get removed through the planet's natural absorption; in basic terms it means we reduce our emissions through climate action.

Carbon Sequestration: Achieving net zero greenhouse gas emissions by balancing those emissions so they are equal (or less than) the emissions that get removed through the planet's natural absorption; in basic terms it means we reduce our emissions through climate action.

CO₂e: Carbon dioxide equivalent, or CO₂e, indicates the number of metric tons of CO₂ emissions with the same global warming potential as one metric ton of another greenhouse gas. Source: U.S. EPA

Clean Energy: Sources of electricity or heating/cooling derived from non-fossil fuel-based technologies including solar photovoltaics, solar hot water, wind, geothermal, air source heat pumps, as well as other emerging technologies such as waste energy recovery from sewers, data centers and the like. These sources are known as clean energy or renewable energy, because they are not from limited resources like coal, gas, and oil.

Climate Change : Describes the long-term changes in average weather patterns, temperatures, and precipitation across the world due to the warming of the earth's atmosphere. Scientific consensus shows that current climate change is caused by human activity, specifically the burning of fossil fuels that release greenhouse gases into the atmosphere causing global temperatures to increase. While global average temperatures are rising, the local impact to weather may include both increases and decreases in temperature, as well as changes in precipitation (rain and snow), increased risk of severe weather events, sea level rise, and other changes to weather systems. In addition to extreme weather impacts, climate change affects the world around us including shifts in agricultural and growing seasons, pollen and air quality changes, tourism, insect borne diseases, pests, and other impacts to the environment.

Decarbonization : Reducing the use of carbon-emitting energy sources, usually in the energy, buildings, and transportation sectors.

Electric Vehicle : A vehicle that is powered fully or mostly by electricity.

Electrification : Converting a machine or system to the use of electrical power.

Energy Burden : Energy burden is defined as the percentage of a household's income spent on home energy bills. In Massachusetts, the average energy burden is about 3%. However, the average energy burden for low-income populations is about 10%, and, in certain neighborhoods, energy burden is as high as 31%. This means that some low-income families are spending close to a third of their income on energy bills alone, sometimes forcing them to

choose between paying their utility bills and spending money on essentials like food, rent, or medicine.

Energy Efficiency : The use of less energy to perform the same task or produce the same result. Energy-efficient homes and buildings use less energy to heat, cool, and run appliances and electronics, and energy-efficient manufacturing facilities use less energy to produce goods.

Energy Insecurity : People who are unable to pay for basic energy needs such as heating, cooling, and lighting in their homes live in a state of energy insecurity. This is often the case when a household has a very high energy burden and may be at risk of having utilities shut off due to non-payment.

Environmental Justice : The principle that all people have a right to be protected from environmental hazards and to live in and enjoy a clean and healthful environment regardless of race, color, national origin, income, or English language proficiency.

Equity: Equity is the principle of fairness in burden sharing. With respect to climate change, it is how the impacts and responses to the issue, including costs and benefits, are distributed in and by society in more or less equitable ways. One example of including equity in climate work is being aware of who participates in the conversations and controls the processes of decision-making related to the topic.

Fossil Fuels : Carbon based fuels that are mined or drilled from the earth such as coal, oil, natural gas/methane gas, gasoline. When processed and burned, fossil fuels emit greenhouse gases and other harmful pollutants.

Green Infrastructure : Using nature -based solutions to help protect against flooding, extreme heat, and improve air and water quality. Some green infrastructure methods are the use of rain gardens, green roofs, and trees.

Greenhouse Gases: Gases that trap heat in the atmosphere.

Greenhouse Gas Inventory : A greenhouse gas (GHG) inventory accounts for the emissions resulting from a geographic boundary in a given year. GHG emissions can be accounted for through different methods, the most common of which is to look at emissions that result from activities occurring within the city or town boundary. GHG emissions are expressed in Metric Tons Equivalent of Carbon, even though there are many types of GHGs.

Nature Based Solutions: Describes projects that use ecosystems to provide services and benefits through the preservation, conservation, restoration, or creation of natural systems such as wetlands. These projects may provide additional co-benefits such as outdoor space and recreation, wildlife habitat, carbon reduction or sequestration.

Net Zero: Net zero is when the greenhouse gases going into the atmosphere are balanced by the removal of the same amount of greenhouse gases out of the atmosphere (such as through carbon sequestration).

Renewable Energy : Energy produced from sources like the sun and wind that are naturally replenished and do not run out. Renewable energy can be used for electricity generation, space and water heating and cooling, and transportation.

Resilience : The ability to withstand, recover, and bounce back from climate change impacts such as flooding, extreme heat, or extreme storms. This includes the ability of a community to address the needs of its built, social, and natural environment in order to anticipate, be prepared for, and recover stronger from events related to climate change.

Sustainability : Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment and what Earth can provide us with. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in harmony to support present and future generations.

Sources

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- <https://unfccc.int/blog/a-beginner-s-guide-to-climate-neutrality>
- <https://www.ipcc.ch/sr15/chapter/glossary/>
- <https://www.mapc.org/planning101/reducing-energy-burden-resources-for-low-income-residents/>
- <https://www.energy.gov/eere/energy-efficiency>
- <https://www.seealliance.org/blog/what-is-energy-insecurity-versus-energy-burden/>
- <https://www.mass.gov/doc/environmental-justice-policy6242021-update/download>
- <https://www.mapc.org/resource-library/climate-resilient-land-use-glossary/>
- <https://education.nationalgeographic.org/resource/fossil-fuels>
- <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>
- <https://netzeroclimate.org/what-is-net-zero/>
- <https://www.energy.gov/eere/renewable-energy>
- <https://www.c2es.org/document/what-is-climate-resilience-and-why-does-it-matter/>
- <https://www.epa.gov/sustainability/learn-about-sustainability>

Acronyms

L-CAP	Lincoln Climate Action Plan
EOEEA/EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EJ	Environmental Justice
EV	Electric Vehicle
FAA	Federal Aviation Administration
FOMA	Friends of Modern Architecture
GHG	Greenhouse Gas
HFAC	Hanscom Field Advisory Commission
HMP	Hazard Mitigation Program
IDEA	Inclusion, Diversity, Equity and Anti-Racism
LID	Low Impact Development
LincFam	Lincoln Family Association
LLCT	Lincoln Land Conservation Trust
MAPC	Metropolitan Area Planning Council

MCAC	Massport Community Action Committee
MBTA	Massachusetts Bay Transportation Authority
MOF	Mothers Out Front
MVP	Municipal Vulnerability Preparedness (statewide climate resilience program)
MWRA	Massachusetts Water Resources Authority
NBS	Nature-based solutions
NPS	National Park Service
PTO	Parent-Teacher Organization
RPA	Regional Planning Agency
WIDE	Welcome, Inclusion, Diversity, Equity