Town of Lexington – Sustainable Action Plan

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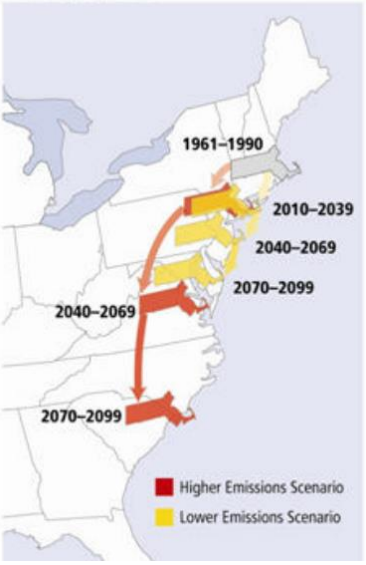
Introduction

The goal of the Sustainable Action Plan is to improve the ongoing quality of life and desirability of living and working in Lexington by addressing long-term sustainability and economic viability while responding to the impacts of climate change. Sustainable initiatives to date have demonstrated the ability to deliver millions of dollars in savings, revenue and other benefits to the Town while substantially reducing Lexington's greenhouse gas emissions. This plan provides a structured approach to identify, prioritize, and implement future opportunities for similar actions.

Climate Change is Here!



In March 2014, the Intergovernmental Panel on Climate Change issued its Fifth Assessment Report and found that the effects of climate change are already being felt on all continents and across all oceans. Furthermore, our world is ill-prepared to deal with the risks posed by a changing climate. The report confirms that global warming is indisputable and unprecedented change is occurring in our atmosphere, oceans, weather patterns, and ecosystems. Each of the last three decades has been successively warmer than any other decade for the past 150 years.[1]

By the end of the 21st Century, Massachusetts summers may feel more like South Carolina today. Source: NECIA 2007

The Northeast has recently experienced a greater increase in extreme precipitation than any other region in the United States. Between 1958 and 2010, the Northeast saw more than a 70% increase in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events).[2] Since 1970, the average annual temperature rose by 2° Fahrenheit and the average winter temperature increased by 4° Fahrenheit. For the region as a whole, the majority of winter precipitation now falls as rain—not snow. Climate scientists project that these trends will continue.

As seen in the map, Massachusetts' summers could be as warm as South Carolina's by the end of this century.[3] Over the same period, Boston is projected to experience an increase in the number of days reaching 100° Fahrenheit, from an average of one per year to as many as twenty-four days per year by 2100.[4]

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[1] http://www.ipcc.ch/report/ar5/wg1/; http://www.epa.gov/climatechange/impacts-adaptation/northeast.html.

[2] The National Climate Assessment summarizes the impacts of climate change on the United States, now and in the future. A team of more than 300 experts guided by a 60-member Federal Advisory Committee produced the report, which was extensively reviewed by the public and experts, including federal agencies and a panel of the National Academy of Sciences. http://nca2014.globalchange.gov/report/regions/northeast.

[3] Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions, a report of the Northeast Climate Impacts Assessment (NECIA, 2007) & (UCS Summary).

[4] http://www.epa.gov/climatechange/impacts-adaptation/northeast.html.

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Background and Purpose for Lexington's Sustainability and Climate Action Plan

In March 2013, the Town of Lexington adopted Warrant Article 33 that states that the Town will "(a) consider climate change in all appropriate decisions and planning processes; (b) take action to prepare for the impacts of a changing climate; (c) reduce greenhouse gas emissions; (d) develop and implement a comprehensive climate action plan; all with the goal of making Lexington a truly sustainable community."

The Town of Lexington, only eleven miles west of Boston, has a unique place in history as the "birthplace of American Liberty." Lexington is a town of about 32,000 residents, noted for its excellent schools, thriving downtown, technology and bio-pharmaceutical industries, and mix of modern life and historic heritage. Lexington is widely recognized as a community engaged in Green initiatives and has embraced strategies that promote awareness of sustainability and energy efficiency. For example, Lexington was one of the first municipalities designated a Green Community in Massachusetts in 2010, has received more than $745,000 in grants from the state for energy efficient lighting upgrades and other projects,[5] has adopted the Stretch Energy Code,[6]and has installed 3.3 MW of solar on the Town's municipal rooftops and landfill which generates 45% of Lexington's municipal electricity demand, and enjoyed extraordinary success through its Solarize program[7] - just to name a few. The Town of Lexington implemented a highly successful Community Choice electricity aggregation program[8], providing over 10,000 customers with 100% renewable electricity for less money than our utility's Basic Service offering. This program will result in the reduction of 44,750 metric tons of CO_2 per year and $1.5 million in energy savings for our residents over the first twelve months of the program. Lexington also has many established boards, committees and associations that promote activities and initiatives that are relevant and important stakeholders in determining how Lexington responds to the challenges of climate change.[9] Lexington won the Leading by Example award from the Commonwealth of Massachusetts for outstanding clean energy and sustainability achievements in 2017.

The Board of Selectmen voted unanimously to become the first Town in Massachusetts (joining a number cities like Boston, Cambridge, and Somerville) in joining the US Compact of Mayors in our commitment to the actions required to reduce/mitigate climate change consistent with the Paris Climate Accord. By joining the US Compact of Mayors, Lexington has agreed to develop an energy and emissions baseline (Done), conduct a climate vulnerability analysis (Done), set emissions targets (Done), adopt a climate action plan (this is what you are reading now – but is not formally adopted yet), and perhaps most importantly to take the actions necessary to achieve our emissions targets (Ongoing).

While no one city, community, state, or country can mitigate the impacts of climate change alone, taking action as a Town to model behavior, encouraging more of the successful initiatives already being

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[5] http://www.mass.gov/eea/docs/doer/green-communities/grant-program/map-summary-green-communities.pdf
[6] http://ecode360.com/10535264 providing for enforceable minimum energy efficiency requirements for new construction and existing buildings.
[7] http://www.lexingtonma.gov/solar/ The Solarize Lexington-Bedford program ended in 2014. The program was a great success and exceeded our goal of 100 houses, ultimately installing 1.1 MW of solar on 164 Lexington homes.
[8] http://lexingtonma.gov/communitychoice & http://www.masspowerchoice.com/lexington
[9] Relevant Lexington Committees, Boards and associations include, but are not limited to the stakeholder groups listed in Appendix 2.

embraced throughout the Town, and developing cohesive plans to help prepare for disasters and extreme weather are critically important to Lexington's future. This Sustainability Action Plan has been developed by the Sustainable Lexington Committee and serves as a framework for broader community engagement and decision-making about existing activities and projects that support long-term sustainability goals.

The plan provides a holistic view of the many aspects of our community that impact Lexington's sustainability and defines an approach for identifying new programs/ investments to support sustainability improvements based on careful analysis of the potential impact and likelihood of success of the investment.

The overall goal is to improve the quality of life for Lexington residents: ensuring a prosperous, healthy and productive community; improving the desirability of living and working in Lexington; and improving the Town's resilience to the effects of climate change, while reducing greenhouse gas and other fossil fuel emissions.

Strategy and Stretch Goals

To address the challenges of climate change, this plan considers the two major dimensions of the challenge: **mitigation** (reducing Greenhouse Gas (GHG) emissions that cause climate change) and **adaptation** (ensuring the resilience of the Town to the effects of climate change, including plans and infrastructure needed to secure the property, health and safety of its residents). The Town's performance in these two areas will be based on the achievement of goals and objectives associated with multiple sectors of Lexington activities.

Mitigation Stretch Goal: Make Lexington a Net Zero Emissions Community

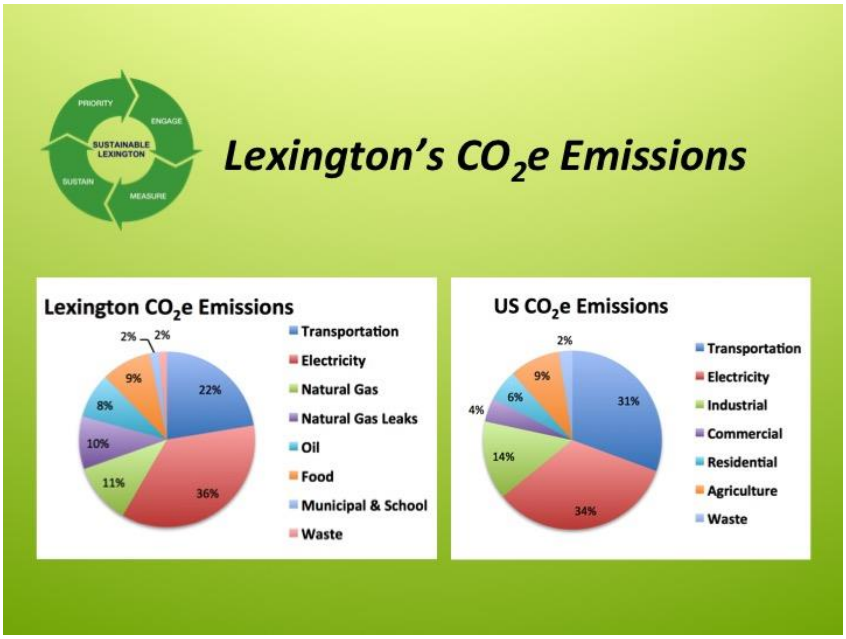
The aspirational or stretch goal for the mitigation strategy is to make Lexington a Net Zero community.[10] A Net Zero emissions building or community maximizes all energy efficiency opportunities to reduce energy consumption while at the same time utilizing renewable energy to meet remaining energy needs.[11] According to the Institute for Building Efficiency, communities that move to Net Zero often do so because they want to be Green, but also because of the increased real estate value, improved building comfort, greater energy self-reliance, and lower energy and maintenance costs that often result from moving to Net Zero.

Lexington's carbon dioxide (CO_2) emissions resemble that of the national average in most sectors. While these graphs omit smaller sources of CO_2 emissions, they are helpful to gain a general view of the sectors responsible for the majority of our emissions, as well as where Lexington differs from the nation as a whole.

The Town of Lexington has chartered the Getting to Net Zero Emissions Task Force to develop a 25-year plan with the goal of eliminating all emissions from Lexington's residential, commercial, and municipal buildings. The task force expects to present the Getting to Net Zero Roadmap and Recommendations Report in 2018.

[10]http://www.institutebe.com/InstituteBE/media/Library/Resources/Existing%20Building%20Retrofits/Issue-Brief-Net-Zero-Communities.pdf.

[11] Torcellini et al. 2006.



Given the age of Lexington's building stock, and the limited public transit options available to service the town, achieving Net Zero Emissions may seem like an audacious goal.

However, we believe Net Zero Emissions is achievable and that there are many ongoing activities and future opportunities identified in this plan that will bring Lexington incrementally closer each year toward the ultimate goal of Net Zero Emissions.

Adaptation Stretch Goal: Improve Community Resilience

Community resilience is the ability of communities to withstand and recover from disasters and to learn from past disasters to strengthen future response and recovery efforts.[12] In the past ten years, Lexington has experienced many major storm events resulting in flooding, power outages, missed school days, business closures, and other major losses and inconveniences. With the increased frequency and severity of natural disasters caused by climate change, the Town needs to be better prepared to deal with and recover from these events. The aspirational goal of the resilience strategy is to establish the capability of the town to provide essential services for 10 days following an extreme weather event.

Approach

Roles and Responsibilities

The Town of Lexington Board of Selectmen (BOS) has overall responsibility for the content of this plan and the implementation of approved actions. On an annual basis, the Board will review and approve the adequacy of the plan's goals, identify priority actions, and ensure that adequate resources are provided to complete approved actions.

The Sustainable Lexington Committee has responsibility for maintaining the plan on behalf of the Board of Selectmen until such time that the responsibility is assigned to the appropriate Town staff (e.g., Director of Sustainability). In this role, the Sustainable Lexington Committee will work with the Town's staff, committees, and external stakeholders to:

- Develop measurement techniques, define the scope and establish a baseline for the plan

[12] http://www.rand.org/pubs/infographics/IG119.html.

- Establish goals for each sector considered in the plan
- Identify existing activities aligned with those goals
- Identify opportunities to improve performance to achieve goals
- Assign responsibilities for implementing approved programs
- Monitor and report performance against the established goals and objectives

The Town's staff and committees are responsible for supporting the development of goals specific to their areas of responsibility and identifying activities to help achieve these goals. As appropriate, these groups will incorporate goals and activities approved by the Board of Selectmen into plans and programs under their direct control.

Key Sectors (Supported by Stakeholder Groups)

Lexington's ability to achieve its mitigation and adaptation goals will depend on its ability to focus and coordinate actions across a broad range of activities. To support this effort, this plan breaks the Town's activities into ten sectors: Public Safety and Emergency Preparedness, Buildings, Energy, Water, Transportation, Food, Toxics and Waste, Land Use and Natural Environment, Public Health, and Economy. Table 1 identifies the mitigation and adaptation goals for each of the sectors. When considered together, these goals represent Lexington's definition of sustainability and the goals of this plan.

Table 1: Sectors and Goals

Sector	Goals
Public Safety and Emergency Preparedness	Ensure the health and safety of residents during extreme temperatures and weather conditions, with the goal of being able to provide essential services to residents throughout a 10-day disruption.
Buildings	Build and maintain municipal, residential, and commercial buildings to achieve low GHG emissions, energy efficiency, resilience to extreme weather, and healthy indoor environments.
Energy	Source and generate energy from zero or low GHG emission sources and encourage energy efficiency with the ultimate goal of zero net GHG emissions.
Water	Ensure continued access to potable water and establish storm water infrastructure to limit the impact of extreme weather.
Transportation	Establish infrastructure and programs to support walking, biking, and public transportation within the Town and support the use of low-GHG emission vehicles.
Food	Ensure continued access to nutritious food for residents and promote foods with a low carbon footprint. Support education efforts about the benefits of growing local and organic food and sequestering carbon in our soils. Promote programs to reduce food waste and support the adoption of curbside composting programs.

Sector	Goals
Toxics and Waste	Establish programs to reduce the use of toxic materials and the generation of waste, and to dispose of waste using low-GHG emission methods. Reduce the use of pesticides, herbicides and fertilizer that pollute our waterways and damage the microbial heath of our soils.
Land Use and Natural Environment	Maintain and expand the Town's conservation lands and natural areas to provide a carbon-sink, control flooding, and provide residents with a healthy environment in which to live.
Public Health	Ensure that risks to public health associated with rising temperatures and extreme weather are identified and mitigated.
Economy	Establish policies and programs to promote a diversified local economy that is more resilient to economic downturns and retain and expand business to provide local sources of goods and employment opportunities to residents and non-residents, including policies and programs that consider the Town's position as a neighbor to towns and cities that are facing the effects of climate change. Create new models to finance improvements and manage risks. Protect the community from energy price shocks.

Planning Approach

The Sustainable Lexington Committee will work with stakeholders in each of these sectors to confirm the goals and establish specific short-term actions (i.e., focused projects that can be completed within three-years) to achieve longer-term measurable objectives (i.e., target levels of performance to be achieved within a 10-year timeframe). For each sector, the Sustainable Lexington Committee will lead the development of a prioritized list of actions to meet the objectives for the sector. In some cases there may be only a few stakeholder groups, in others there may be a large, diverse group of stakeholders. The specific role that the Sustainable Lexington Committee performs to facilitate activities in each sector will depend on the needs of the individual sectors.

The flow from the overall goals, to sector goals and objectives, and then to specific actions plans is illustrated in Figure 1. The figure also identifies roles of key groups in each part of the process.

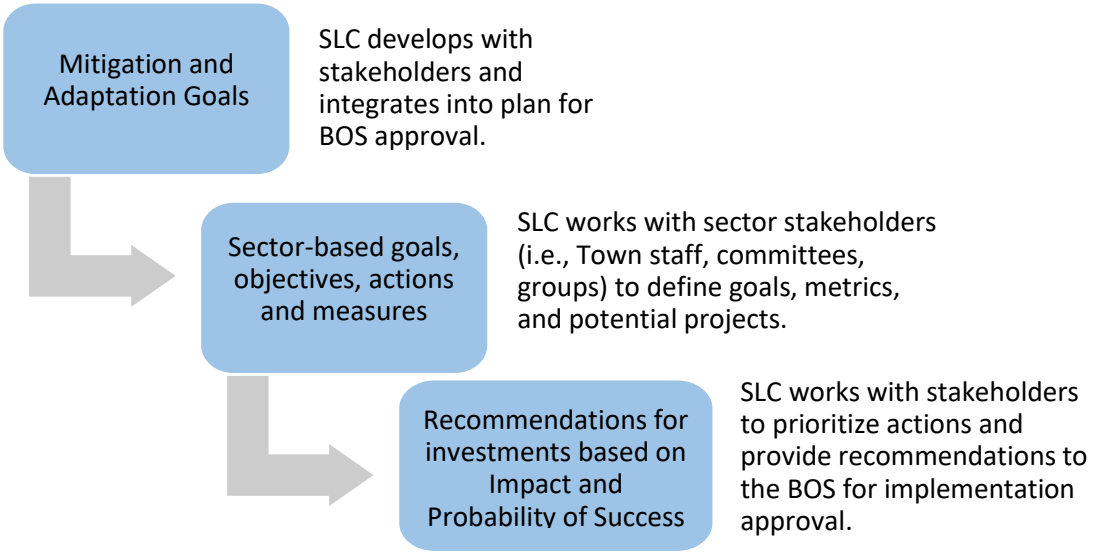


Figure 1: Approach to Establish Goals, Objectives, and Actions

Appendix 2 provides a list of the stakeholders associated with each sector. The list is not intended to be exclusive; rather, the list is intended to be a starting point to identify groups that are focused on issues that affect the sector. The involvement of other/additional groups is encouraged.

Identifying, Evaluating and Assessing Programs

Introduction

The Sustainable Action Plan provides a framework for identifying and prioritizing the implementation of programs designed to improve the quality of life for Lexington residents, ensure a prosperous, healthy and productive community, improve the Town's resilience to the effects of climate change, all while reducing greenhouse gas and other fossil fuel emissions.

Programs intended to achieve the established goals and objectives of this plan will be identified on an ongoing basis [Note: this plan addresses both "Programs" (like Mass Save that require ongoing management) and "Projects" (like a building project that has a defined end date) – the word "Program" is used in this plan for simplicity] . Recommendations for programs may come from a variety of sources including stakeholder groups and other members of the community. The Sustainable Lexington Committee will lead the evaluation of these recommendations to identify high priority programs (with regard to the potential impact of the program and the likelihood of success). The list of potential programs/actions and evaluation results will be maintained by the Sustainable Lexington Committee.

High priority programs identified under the Sustainable Action Plan will be evaluated to determine the potential benefits of each proposed program, the likelihood of success, and any financial investments required to successfully implement the program. For significant investments, the evaluation will be conducted by an evaluation team recommended by the Board of Selectmen and Town Manager selected from the stakeholders identified in Appendix 2 of the Sustainable Action Plan. The evaluation team will follow the guidelines and recommendations outlined below, in consultation with the appropriate stakeholders identified in Appendix 2 of the Sustainable Action Plan. As appropriate, the committee will work with sector stakeholders to develop implementation plans and business cases for these programs.

The proposed programs will then be presented to the Board of Selectmen for their review and approval. In the event any proposed program requires additional approvals, (e.g., Town Meeting, School Committee) those approvals will be pursued as needed.

Program Evaluation

Prior to initiating a program, it is important to understand the benefits and costs of the effort – but the scope of the evaluation should be appropriate to the size of the program. Some recommended programs may have low enough costs that a detailed analysis is not appropriate. In other cases (e.g., constructing a building that will cost millions of dollars and operate for 50+ years), a thorough analysis is required. The following describes an approach for conducting a thorough analysis. For small programs, elements of this approach should be used as appropriate.

The evaluation process will compare the initial and ongoing costs, benefits and risks of the proposed program over the expected lifetime of the program to a baseline scenario where the proposed program is not implemented.

The evaluation team will consider several scenarios in each of the following areas:

1. Capital investments;
2. Ongoing operational & maintenance costs;
3. Cost savings, tax or other revenue, incentives, or other monetary benefits;
4. Synergistic benefits (e.g. geo-thermal, solar, and storage combination).
5. Health and climate benefits;
6. Potential risks (e.g. toxics, financial, new technology, inaction, opportunity cost);
7. Potential benefits (e.g. noise reduction, resilience, productivity, traffic);

The evaluation team will also consider reasonably probable scenarios for assumptions that will have a material impact on the evaluation. The evaluation team should consider baseline and proposed differences for energy, health, climate, toxic substances, waste, natural resources, financing costs, material and labor costs, climate change trends, and regulatory requirements. The evaluation team will consider today's costs, benefits, or interest rates, as well as an independent third party determination of reasonably probable scenarios ranging from 95% probability low costs, benefits or interest rates, to 95% probability high costs, benefits or interest rates over the expected life of the project.

Natural resources include land use, trees, storm water and similar resources. While it may be difficult to monetize the value of the Town's natural resources, the evaluation team would be expected to consider whether the proposed project would have a negative or positive effect on the Town's natural resources, in consultation with appropriate stakeholders, such as the Conservation Commission.

The evaluation team will consider climate change trends in determining whether the building or infrastructure project is designed to operate effectively in response to expected changes in climate over the life of the project, including increased extreme storms, flooding events, power outages and extreme temperatures.

As one example, consider the process used to evaluate the proposal to install solar energy systems. The financial expectations for the system were reviewed by considering three energy cost scenarios; a scenario of zero increase in utility rates over the life of the system, utility escalation rates at historical averages, and a scenario where utility rates increased at greater than historical averages. The evaluation team also reviewed the value of the health benefits derived from generating renewable energy. The team reviewed potential operating and maintenance impacts of increased roof repair costs, as well as

opportunity costs and potential risks if the Town decided to move forward with a new High School during the life of the solar array.

All the risks and rewards were considered under multiple scenarios in a transparent process with all stakeholders represented.

Another example considers the type of analysis that is recommended when designing a new school to achieve the goals outlined in the Sustainable Action Plan.

During the Town's Hastings School design process, the Town considered a baseline design that met both MSBA and LEED Silver standards and then considered several options for meeting the Town's goals of providing a healthy indoor environment, high performance energy efficiency targets, low or zero greenhouse gas emissions, maximizing onsite renewable energy production, all while providing safety and resilience in the event of power outages or extreme weather.

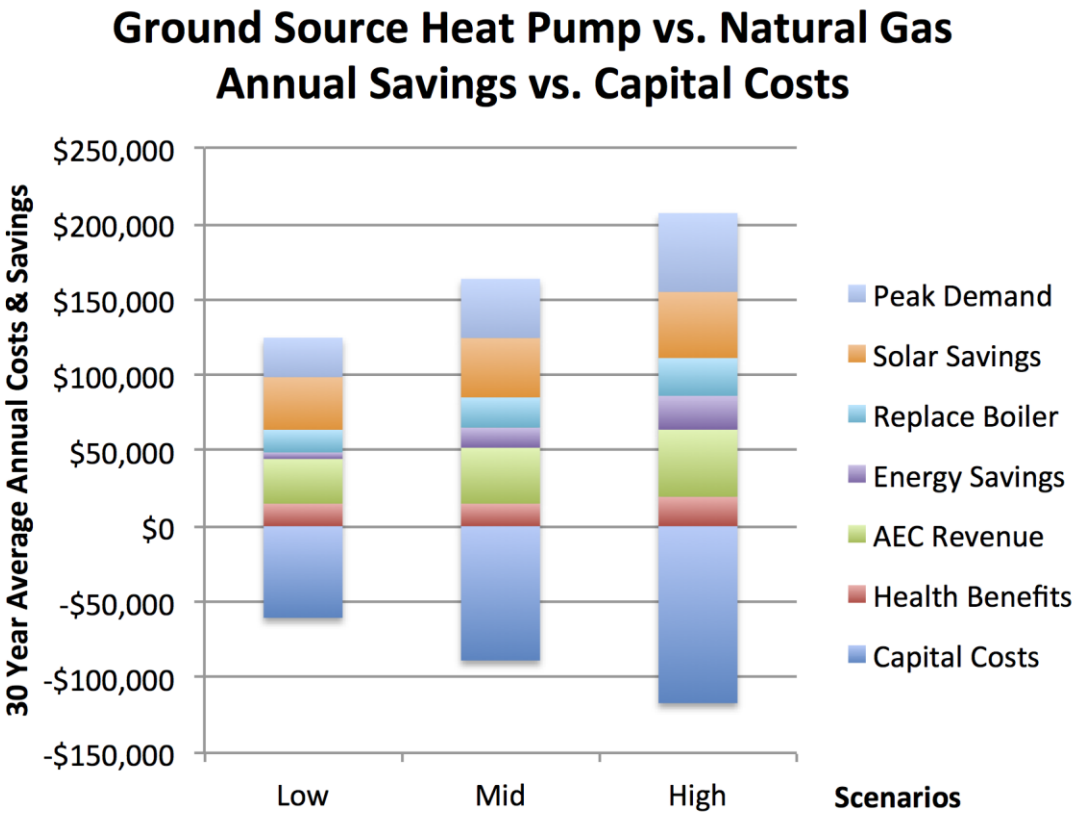
The evaluation considered the upfront capital costs of each option as well as the ongoing operations and maintenance costs over the expected lifetime of the building and equipment under several scenarios.

Capital costs were considered by looking at expected bond payments for each option compared to the expected operations and maintenance costs under several scenarios, including expected interest rates and low, medium, and high energy cost escalation scenarios.

All available incentives and grants were considered for meeting MSBA green building and commissioning standards, installing air source or ground source heat pumps, achieving net zero energy standards, as well as state programs for encouraging the installation of solar energy and energy storage systems.

The evaluation considered synergistic benefits. For example, combining a solar plus energy storage system with a high efficiency ground source heat pump, lowered energy demands to the point where it was possible to install a solar energy system that could meet nearly all of the building's modeled energy demand. In turn, the solar plus energy storage system provided electricity at dramatically lower cost than our utility's costs. In addition, the state provides production incentives for operating ground source heat pumps and additional incentives for solar+energy storage systems that will allow our schools to actually produce revenue for the Town.

Health and climate benefits of reduced greenhouse gas emissions and other air pollution compared to the baseline were calculated using established federal guidelines.



The evaluation team considered whether the HVAC system had enough capacity to cool the building if our climate warmed to a climate similar to Baltimore's today - as is projected to occur by 2050. In this case, the design team determined that the baseline design was more than sufficient to provide adequate cooling without any modifications.

Potential risks and benefits that were not quantifiable were presented to a broad group of stakeholders including the School Committee, Board of Selectmen, finance committees, Permanent Building Committee, and Sustainable Lexington Committee.

Finally, the recommended building design was presented to Town Meeting for funding approval. These two examples are considered to be good models for evaluating future Sustainable Action Plan proposals.

Program Evaluation and Selection

Public engagement is a critical aspect of the process. The scope of the engagement activities will vary depending on the scope of the planned actions (e.g., actions that only affect municipal buildings may not require as much engagement as actions that affect residential buildings); however, efforts to collect input from stakeholders and communicate action plans should be considered for all planned actions.

When comparing programs from different sectors, the programs should be evaluated based on the following criteria:

- **Environment**: the impact on the Town's GHG emissions and/or potential to provide other environmental benefits.
- **Resilience**: the impact on the Town's ability to avoid and/or recover from the effects of a changing climate and severe weather events or natural disasters.

- **Health/Wellness**: the impact on the health and wellness of Town residents and those who work in or are visitors to Lexington.
- **Economy**: the impact on the Town's economic performance – considering both new revenues or reduced costs to the Town, businesses, or residents; and the cost of implementing and maintaining the program.

Table 2 provides some criteria to be considered when assessing Sustainable Action Plan programs.

Table 2: Program Impact

Criteria:	Program Impact		
	High	**Moderate**	**Low**
Environment	Program would reduce the Town's total CO_2e GHG emissions by more than 3%.	Program would reduce the Town's total CO_2e GHG emissions by less than 3%.	Program would have little or no impact on reducing the Town's total GHG emissions.
Resilience	Program would prevent the loss of essential services or the occurrence of negative impacts from climate change and severe weather.	Program will improve the ability of the Town to provide essential services or recover from negative impacts from climate change and severe weather.	Program has little to no impact on the Town's ability to respond to the negative impacts from climate change and severe weather.
Health and Wellness	Program's primary goal is to improve the health and wellbeing of residents, staff, and visitors.	Program provides additional health benefits for the health and wellbeing of residents, staff, and visitors.	Program has little to no impact on the health and wellbeing of residents, staff, and visitors.
Economics	The program represents a net overall economic benefit to the town.	The program has no signification economic impact (i.e., no net benefit or cost).	The program represents a net overall economic cost to the town.

Note: Where the impact of a program can be quantified (e.g., GHG emissions and economic impacts), it is expected that those specific impacts will be calculated and identified. Where impacts are less easily calculated, the anticipated benefits of the program should be described in as much detail as possible.

In addition to the potential impact of the program, it is also important to assess the probability that a given program will succeed. Table 3 identifies some criteria that can be used to assess the probability of success for a program.

Table 3: Probability of Success

Criteria:	Probability of Success		
	High	**Moderate**	**Low**
Town Control	The Town has full control over the implementation of the program.	The Town will work with stakeholders to implement the program.	The Town has little to no control over the implementation of the program.
Implementation	Once the program is implemented, the objective will be achieved (little to no maintenance of the program is required).	Once the program is implemented, it will require a moderate level of effort/resources to achieve the objective on an ongoing basis.	Once the program is implemented, it will require a high level of effort/resources to achieve the objective on an ongoing basis.
Effectiveness	There is little doubt that the program will achieve its objectives once implemented.	While there is little doubt that some program objectives will be achieved, the overall effectiveness of the program is uncertain.	It is uncertain whether the program objectives will be achieved following implementation.

The output of this process will be the development of a portfolio of programs intended to meet the overall mitigation and adaptation goals, and the specific sector goals and objectives. The intent is to promote those initiatives that are aligned with the goals and objectives of this plan, identify where there are significant gaps between the goals/objectives and planned activities, and – where there are gaps – identify how best to close those gaps.

On at least an annual basis, the proposed programs will be assessed and presented to the Board of Selectmen for consideration. Any programs approved by the Selectmen will be included in the schedule of current programs and other required approvals (e.g., Town Meeting, School Committee, etc.) will be pursued as needed. When appropriate, separate plans for the implementation of the program will be established, including responsibility for implementation, project tasks, objectives, and schedules.

In addition to programs addressing the goals of individual sectors, programs may also be proposed to improve the management of this plan. Other programs may apply across all, or many, of the identified sectors and, therefore, will not fit cleanly within any one sector.

Reporting

At least once a year, the Town's performance against this plan will be assessed and a report prepared for the Board of Selectmen. This report will include the following elements:

- Performance against the mitigation, adaptation, and sector goals and objectives
- Status of approved actions for each sector
- Recommendations for updates to overall goals and sector objectives
- Recommendations to improve the management of the planning and reporting process
- A record of changes to the plan

Current and Completed Programs

Table 4 identifies examples of current programs and planned results for each sector where specific programs have been initiated. Table 5 summarizes the results of completed programs.

Table 4: Current Programs and Planned Results

Current Programs by Sector		
Sector	**Current Programs** (Description and Due Date)	**Planned Results**
Public Safety	Town Manager Emergency Services	Improved Resilience
Buildings	Mass Save Home Energy Assessments Lexington Energy Challenge (Ongoing)	Annually updated targets for number of HEAs, air sealing projects, and high efficiency HVAC system upgrades needed to reduce GHG emissions by 500 tons CO_2e a year.
	Sustainable Building Design Process and Performance Policy	Establish clear guidelines for the design and performance of municipal buildings with regard to health, energy efficiency, on-site renewable energy production and resilience.

Town of Lexington – Sustainable Action Plan

Current Programs by Sector		
Sector	**Current Programs** (Description and Due Date)	**Planned Results**
Buildings	Getting to Net Zero Emissions Planning Ongoing Final report expected Spring 2018	Establish a roadmap for transitioning Lexington residential, commercial and municipal buildings to a Net Zero emissions community over the next 25 years. Our emissions baseline identifies 338,650 metric tons of CO_2e greenhouse gas emissions from our building stock – that would be eliminated when we achieve this objective.
Water	Department of Public Works	Develop Conservation Plan Municipal Commercial / Residential Update Storm water standards
Transportation	Lex Drive Electric program Launched November 2017 Ongoing	Encourage transition to higher efficiency and alternate energy vehicles and a reduction in vehicle miles traveled. Lex Drive Electric program goal is to double the sales of electric cars in 2018.
Food	Composting of food waste in Town schools Residential curbside compost pick up program	Reduce food waste, food waste incineration and provide educational opportunities for students to understand the food waste cycle
Toxics and Solid Waste	Toxics use reduction	Develop standards in cooperation with Board of Health
Environment	LexFarm Open Space and Recreation Plan	Preserve existing farmland Maintain and enhance open spaces, trees and natural resources Preserve important unprotected open space
Public Health	Better Buildings National Grid Super Emitter Leak Plugging Pilot Program Quiet Communities – Electric Lawn Care equipment	Recommended Air Quality Standards Assess and Reduce Natural Gas Leaks Target 50% reduction in methane leaks per year DPW pilot program using electric lawn care equipment
Economy	Getting to Net Zero Task Force	Engage Business Partners in Getting to Net Zero

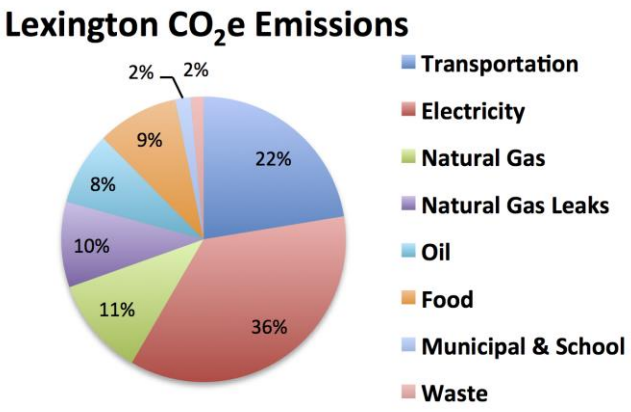
Table 5: Completed Programs

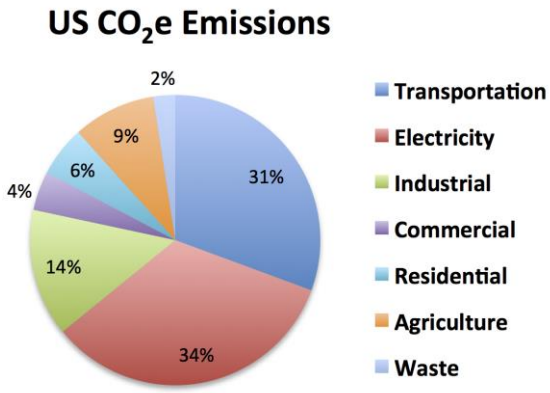
Completed Programs				
Name (Sector) **Completion Date**	**Leader**	**Description and Impact**	**Annual Impact**	**Reference Plan**
Municipal Rooftop Solar (Energy) 2014	Solar Energy Task Force	1.1 MW Solar Energy System capable of producing 15% of Town's municipal electricity demand, providing annual energy savings of $150K, $6 million in energy savings, $4.4 million in health benefits and 14,500 tons of CO_2e greenhouse gas reductions over the 25 year expected life of the system.	Reduce CO_2e emissions by 725 metric tons Annual energy savings of $150K	Solar Task Force Plan
Hartwell Solar Installation (Energy) 2017	Solar Energy Task Force	2.2 MW ground mount and canopy Solar Energy System capable of producing 30% of Town's municipal electricity demand, providing annual energy savings of $350K, $16 million in energy savings, $9.5 million in health benefits and 31,500 tons of CO_2e greenhouse gas reductions over the 25 year expected life of the system.	Reduce CO_2e emissions by 1,575 metric tons Annual energy savings of $350K	Solar Task Force Plan
Solarize Lexington (Energy) 2015	Solarize Lexington	A total of 1.14MW of solar capacity was added to 162 homes resulting in GHG emission reduction of 14,500 tons of CO_2e over the expected life of systems.	Reduce CO_2e emissions by 725 metric tons	Solarize Lexington Proposal
Community Choice (Energy) 2017	Community Choice Task Force	Transition electricity sources from default Basic Service Eversource generation sources to 100% renewable electricity content. 44,750 tons of CO_2e greenhouse gas reductions annually or 9% of Lexington's total emissions and $2.7 million in health benefits.	Reduce CO_2e emissions by 44,750 metric tons	Community Choice Program Plan
Natural Gas Super Emitter Leak Plugging	HEET & Mothers Out Front	Participated with National Grid and HEET to identify and plug the largest natural gas leaks with the goal for reducing methane emissions by 50% per year. The pilot program identified the top 15 leaks. The	Evaluation Ongoing	Sustainable Action Plan

Completed Programs				
Name (Sector) **Completion Date**	**Leader**	**Description and Impact**	**Annual Impact**	**Reference Plan**
Pilot Program 2017		goal was to reduce methane emissions by 30,000 metric tons of CO_2e per year.		
Lexington Energy Challenge (Buildings) Ongoing	Sustainable Lexington and Home Works Energy	As of 2016, over 1,300 no-cost Home Energy Assessments and over 540 weatherization projects were completed through the Mass Save program saving Lexington residents an estimated $420,000 in annual utility costs and eliminating 1,300 metric tons of greenhouse gas emissions.	Reduce CO_2e emissions by 1,300 metric tons (modeled)	National Grid Grant Program

Appendix 1: Lexington Profile

Overview



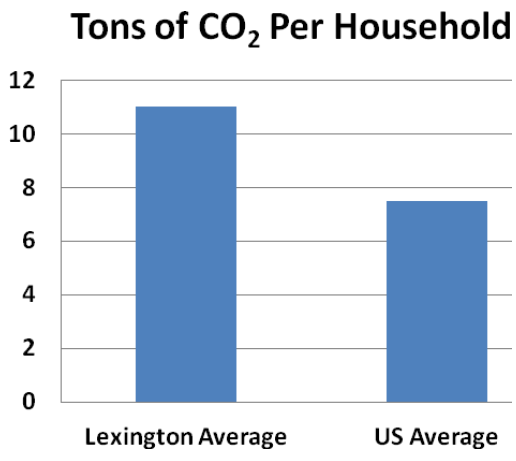


Lexington's carbon dioxide equivalent emissions resemble that of the national average in most sectors. While these graphs omit many smaller sources of carbon, they are helpful to gain a general view of the sectors responsible for the majority of emissions, as well as where Lexington differs from the nation as a whole.

Transportation: Lexington's transportation emissions are lower then the national average due to the purchasing of fuel efficient and electric vehicles. For more info see below.

Commercial & Industry: Emissions from commercial businesses are high in Lexington due to office and industrial districts, including energy intensive pharmaceutical manufacturing.

Residential: Household emissions in Lexington are high from the high number of large households as well as energy intensive heating in the winter.



Agriculture: Lexington does not differ from the national average substantially.

Municipal & School: A small portion of the town's emissions come from municipal and school activity. However, the town's high degree of control over this sector makes it worthy of efforts to further reduce its emissions.

Waste: Lexington's waste emissions are slightly lower than the national average due to our use of

an incineration plan that diverts waste from landfills, which release methane, a very powerful greenhouse gas.

On average Lexington households produce 11 tons of CO_2e per year compared to the national average of 7.5 tons. This increase is due to a number of factors. A high number of large households results in more energy consumption for lighting as well as heating and cooling. Being in the Northeast, Lexington households also have to use more energy to heat homes during the winter, contributing to the higher average.

The majority of emissions from the municipal and school sector come from electricity consumption. Efforts such as the installation of high efficiency LED lighting and DPW solar panels have helped to greatly reduce energy consumption in this sector. Natural gas makes up the second largest slice of emissions from the heating of buildings. While this is harder to reduce than emissions from electricity, options remain to green our heating systems with new technology like ductless mini-split heat pumps, a high efficiency heating and cooling system that runs off electricity.

Transportation Emissions

Lexington's emissions from transportation fall below the national average, mainly due to low average annual miles traveled per vehicle of 9,400 miles, and due to the purchasing of fuel efficient vehicles, hybrids and electric vehicles. The average vehicle miles per gallon in Lexington, adjusted for performance degradation as vehicles age, is 19.35 MPG, putting Lexington in the 96th percentile for fuel efficiency. Lexington does even better when it comes to the purchasing of hybrid or electric vehicles. Over 7% of Lexington households own a hybrid, plugin hybrid or electric vehicle, putting Lexington in the 98th percentile. In addition, Lexington is a leader in electric vehicle adoption with 6.4 times the number of electric cars per capita compared to the rest of the Commonwealth based on RMV and MOR-EV data.

Sources:

Massachusetts Vehicle Census

Lexington Annual Report Data

Data provided by NSTAR

Appendix 2: Stakeholder Groups

Note: The following table provides a list of stakeholder groups that are directly involved in working in each of the sectors identified in this plan. The intent is to identify the Town groups that should be engaged in programs focused on the specific sectors, as appropriate. This list provides a starting point for engagement activities. Outreach should not be limited to the identified groups.

Sector	Relevant Departments/ Committees/ Town Groups
1) Safety	**Town Departments:** • Fire Department (Emergency Management, Emergency Medical Services) • Police Department • Health Department **Town Boards/Committees:** • School Committee • Local Emergency Planning (Ad Hoc) Committee • Communications Advisory Committee
2a) Buildings – Residential	**Town Departments:** • Building Inspection • Office Community Development • Planning Department **Town Boards/Committees:** • Historical Commission • Historic Districts Commission • Housing Partnership Board • Lexington Housing Assistance Board (LexHAB) • Planning Board
2b) Buildings – Commercial	**Town Departments:** • Office Community Development • Planning Department **Town Boards/Committees:** • Planning Board • Zoning Board of Appeals
2c) Buildings - Municipal	**Town Departments:** • Office Community Development • Planning Department • Department of Public Facilities • Lexington Public Schools **Town Boards/Committees:** • Energy Conservation Committee • Permanent Building Committee

Appendix 2: Stakeholder Groups

Sector	Relevant Departments/ Committees/ Town Groups
	• Historical Commission • Solar Energy Task Force • Planning Board • Zoning Board of Appeals • School Committee • Recreation Committee
3) Energy	**Town Departments:** • Office Community Development • Planning Department • Department. of Public Facilities **Town Boards/Committees:** • Local Emergency Planning (Ad Hoc) Committee • Energy Conservation Committee • Electric Utility Ad Hoc Committee • Permanent Buildings Committee • Community Choice Energy Task Force • Solar Energy Task Force **Other Town Groups** • LexGWAC (Global Warming Action Coalition)
4) Water	**Town Departments:** • Public Works Department • Water and Sewer • Engineering • Highway Department • Fire **Town Boards/Committees:** • Conservation Commission • Public Health Board • Health Division • Stream Team
5) Transportation	**Town Departments:** • Office Community Development • DPW: Engineering – Highway Division (streets, sidewalks, traffic engineering) • Planning Department • Transportation Services and Lexpress (and school buses) **Town Boards/Committees:** • Transportation Safety Group

Appendix 2: Stakeholder Groups

Sector	Relevant Departments/ Committees/ Town Groups
	• Transportation Advisory Committee • Planning Department • Sidewalk Committee (Safe Routes to School) • Bicycle Advisory Committee • Center Committee • Greenways Corridor Committee • Commission on Disability • Parking Management Group
6) Food	**Town Boards/Committees:** • Lexington Community Farm • School Committee/Lexington Public Schools **Other Town Groups** • Lexington Farmer's Market
7) Toxics and Waste	**Town Departments:** • DPW Environmental Services: Garbage, Recycling, Compost & Hazardous Waste • Fire Department • Health Department (Hazardous Waste and Toxic Use Reduction, Medical Waste)
8) Environment	**Town Departments:** • Office Community Development • Planning Department • The Conservation Division • Public Grounds Division **Town Boards/Committees:** • Conservation Commission • Community Preservation Committee • HATS: Environmental Subcommittee • Planning Board • Greenways Corridor Committee • Tree Committee • Noise Advisory Committee • Department of Public Works: Town Parks & Open Space • Recreation Committee
9) Health	**Town Departments:** • Health Department • Office of Community Development • Lexington Human Services Department

Appendix 2: Stakeholder Groups

Sector	Relevant Departments/ Committees/ Town Groups
	Town Boards/Committees: • Board of Health ○ Bio Safety Committee
10) Economy	**Town Departments:** • Office of Community Development • Economic Development Department • Planning Department **Town Boards/Committees:** • Economic Development Advisory Committee • Hanscom Area Towns Committee (HATS) • HATS: Development of Regional Impact (DRI) Committee • Hanscom Field Advisory Commission **Other Town Groups** • Lexington Chamber of Commerce • Lexington Retailer's Association