Town of Medfield

CLIMATE ACTION PLAN

Town of Medfield
CLIMATE ACTION PLAN
TOMCAP@medfield.net

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Abbreviations and Definitions

ASHP	Air-Source heat pump
BEV	Battery Electric Vehicle
Carbon Footprint	Used as a benchmarking tool to measure the total amount of the GHG emissions produced over a defined period of time. Can relate to an individual, household, building, town, goods, or a process.
COA	Council on Aging
Embodied carbon	Sum of all the GHG emissions released during the life cycle of a product or process: raw material extraction, transportation, manufacturing, construction, maintenance, renovation and end-of-life.[1]
EV	Electric Vehicle
DOER	Department of Energy Resources
GHG	Greenhouse Gas
GSHP	Ground-source Heat Pump
High-priority homes	Rentals and homes using oil or propane, or build before 1983
HP	Heat Pump
ICE	Internal Combustion Engine
MAPC	Metropolitan Area Planning Council
MEC	Medfield Energy Committee
MUD	Multi-unit dwelling
Municipal GHG Inventory	A comprehensive, quantified list of the GHG emissions emanating from a municipality and their sources
Natural transition points	The time when one is looking to replace, upgrade or purchase a new car, heating or cooling equipment, or appliance is the best time to transition to low or zero carbon technology ('decarbonize')
Net-zero emissions	The balancing of gross emissions with removals of greenhouse gases from the atmosphere.
Net Zero 2050 Goal	Medfield supports Massachusetts commitment to reduce statewide GHG emissions by 85% or more and to reach net zero emissions by 2050 by offsetting the remainder,
PACE	Property Assessed Clean Energy Massachusetts[2]
ZEV	Zero Emissions Vehicle (such as electric or hydrogen fuel powered)

[1] https://se2050.org/resources-overview/embodied-carbon/what-is-embodied-carbon/

[2] https://www.massdevelopment.com/what-we-offer/key-initiatives/pace/

Acknowledgements

Thank you to the many members of the community who participated in public input opportunities throughout the Plan's development.

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Board of Selectmen

School Committee

Planning Board

Conservation Commission

Board of Health

Council on Aging

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Thank you to the many volunteers and town officials from multiple Massachusetts towns for all the support and ideas they shared, in particular Jillian Shaw, Sustainability Director for the Town of Natick; Ken Pruitt, Author of the Arlington Climate Action Plan and now Sustainability Director for the Town of Winchester, and Marybeth Martillo, Sustainability Director for the Town of Wellesley

Letter from the Future Sustainability Committee

Medfield residents living in the year 2022, your fellow residents living in 2050 are grateful for your bold foresight and leadership.

As we approach our town's 400-year anniversary, the community is coming together to reflect on our history and achievements, and to celebrate our town in numerous festive events. One of our most important and meaningful achievements in recent decades, starting in 2022, has been Medfield's participation in a rapid transition to limit greenhouse gas pollution.

Congratulations to you, our foresightful elders, on adopting an ambitious, achievable plan to reach net zero greenhouse gas emissions by 2050. We are writing to thank you and tell you about the positive consequences of the actions you took in 2022.

Your pursuit [illegible] gas pollution has bettered [illegible] ur world, and, nearly 30 ye[illegible] Sustainability Committee is pleased to report your success. Both our power generation and storage are cheaper, more decentralized, and resilient than 30 years ago, without use of any fossil fuels. Most private homes, now electrified, are more comfortable and efficient as improvements installed during renovations continue to reduce energy needs and increase comfort. Passive house standards are routinely used for new construction as the benefits have become apparent. While most residents still rely on individual transportation, there are many more options for getting around, for both young and old, without the use of internal combustion engines – although we still see some vintage cars that aficionados keep as relics of a by-gone era.

Looking back on this transformation, it is clear that you acted at a pivotal moment. In 2022, the challenge was great, but the escalating cost of inaction could not be ignored. Medfield, you rose to the challenge!

After the Net Zero Action Plan was adopted, implementation became an all-out effort, driven by members of the Energy Committee, who drew on the expertise and participation of diverse boards, departments, committees, and civic organizations. They soon took charge of tasks under their purview, and the Sustainability Director coordinated and guided the efforts. Volunteers and community groups assembled under the Sustainable Medfield networking umbrella shared responsibility for educating residents, providing resources, and creating momentum.

Together you sought to fulfill the vision of plans, including the Medfield Master Plan, Massachusetts 2050 Decarbonization Roadmap and the Clean Energy and Climate Plan for 2030. Energetic, creative partnerships with like-minded neighboring communities helped accelerate momentum. Frequent updates of the TOMCAP have allowed for adjustments as needs and opportunities changed and created opportunity to pursue environmental justice and stewardship of our natural resources.

With your contribution, Massachusetts has continued to lead the nation on her journey to eliminating greenhouse gas pollution. Thank you for embarking on the town-wide, all-hands-on-deck effort to reach net zero GHG emissions at a critical momer

Statements from Elected Officials

Board of Selectmen Members Thoughts on the Town of Medfield's 2022 Climate Action Plan

2022 was a fraught time in the Town of Medfield, just as it was in the entire United States. There were deep divisions among people over the role of government in solving problems for the people.

It is in this context that we Medfield residents had gradually both come to understand and generally accept that climate change is indeed both man-made and an existential threat to humanity, that required dramatic action. However, it had taken a long time for our world, and us in the United States and us in Medfield, to come to this agreement about those essential facts. It is a conclusion none of us wanted as fossil fuels are essential to the way we live our lives in 2022.

The good news is that we now have generally come to understand and agree that we humans are causing the climate to warm too quickly, because of our long term and extensive use of fossil fuels, and that we need to take action to stop the use of fossil fuels. We have used fossil fuels to do almost everything, and fossil fuels have done it well for over a hundred years, in most every aspect of our lives. However, we now know that we need to live in ways that limit and control future increases in the temperature of the world, and that we can only do so by stopping our dependency on fossil fuels.

It is with this background that the Town of Medfield in 2021 enacted at our annual town meeting a warrant article calling for the town to decarbonize so as to get to net zero by the year 2050. After that town meeting action last year, the Medfield Energy Committee undertook to prepare a Climate Action Plan (known as TOMCAP, an acronym for "Town of Medfield Climate Action Plan") for the town, that would lay out a road map on how the town could get to net zero by 2050.

It is my understanding that currently most of our climate impacts in Medfield come from our use of our gas cars and from heating our homes with natural gas and oil. Fossil fuels are long standing ways of heating our homes and driving our cars. Changing those two things will not be either easy or inexpensive, as we all grew up using fossil fuels and count on the benefits we have enjoyed that they have provided. However, we now recognize that our future must be electric cars and heat pumps, but the reality is that at this moment in history, we have very few electric cars and even fewer heat pumps - our buying habits and attitudes will have to change.

The price differential to purchase an electric vehicle is still such that many people buy gasoline powered cars based on the cost alone. Similarly, the current cost for a heat pump that runs on electricity to heat our homes, is more expensive than a fossil fuel based natural gas boiler. For that cost savings reason most of us still have gasoline powered cars and either oil or natural gas burners. The good news is that the price differential is rapidly narrowing, and the environmental choices will soon also be the economic choices too.

I have benefited from being on the Medfield Energy Committee since its inception in 2008, and I have hugely benefited from attending the Medfield Energy Committee and TOMCAP meetings where I have been able to hear the energy experts of Medfield explain the ways in which we will be able to decarbonize and get our town to net zero.

We will have to have everybody eventually switch to electric cars and electric heat. At the moment the advice is that when the lifecycle of your current car or heating system is up, you should seriously look at any replacement car being electric and an

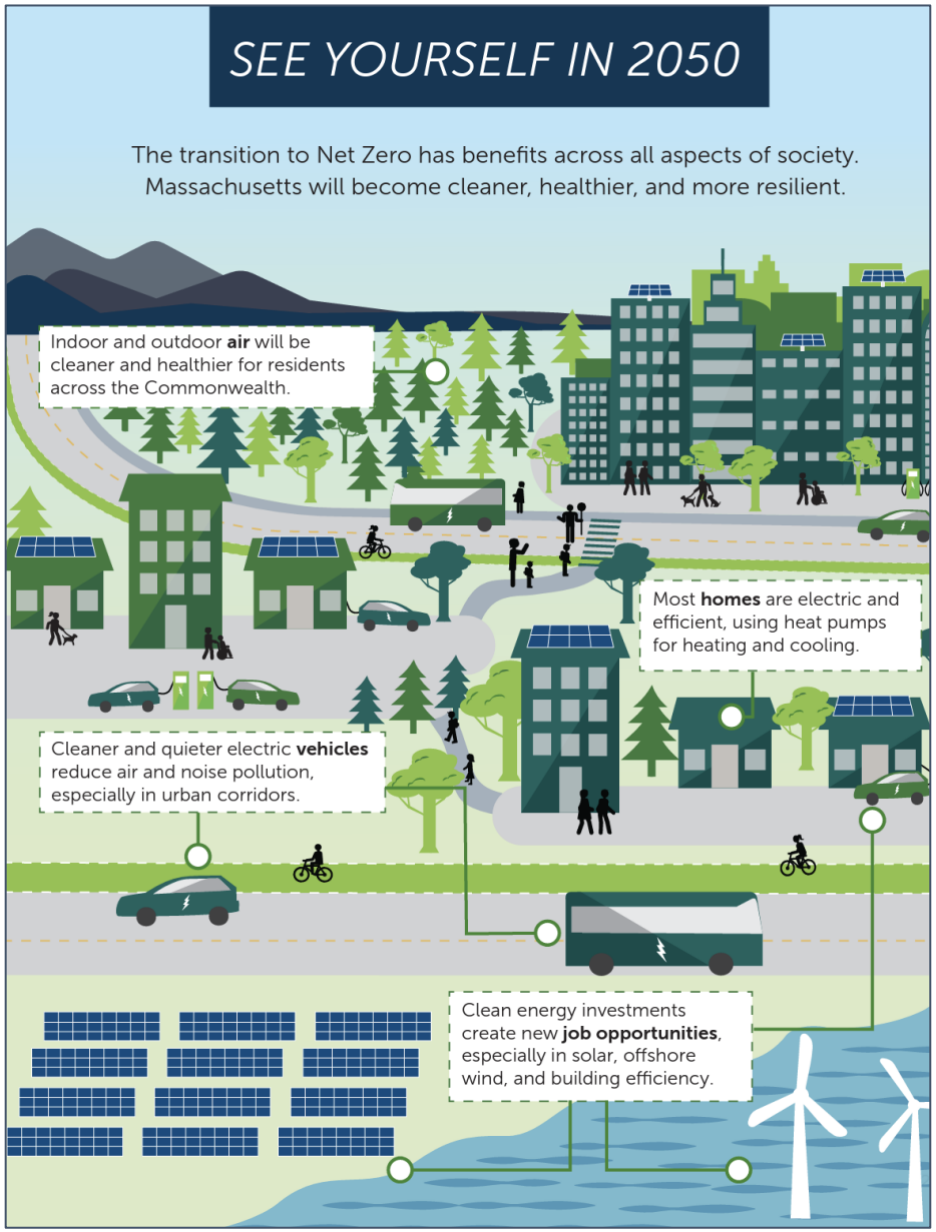
replacement heating system being a heat pump – climate friendly alternative solutions.

For years we have been hearing that the climate changes that we have caused are in fact likely to cause dire consequences for our world, so it was with great delight that at a recent Medfield Energy Committee meeting, I heard Penni Conner quote former Vice President Al Gore, as saying in a meeting she attended, that if we proceed on the trajectories that the United states is embarked upon and meet the goals that we are seeking to meet, that we can in fact control the causes of the climate change and even reverse the temperature increases that we humans have caused. For me that was an epiphany to hear good news from the environmental and climate action world, as for a long time now we have been used to hearing only dire predictions resulting from our inaction and having ignored the issue, the problems, and the needed solutions for decades.

I think by 2050 the net zero town of Medfield will look back at its Medfield Energy Committee of 2022 with great fondness and pride for the sage, informed efforts that the men and women of the Medfield Energy Committee and TOMCAP undertook in 2021 and 2022 to study and write the Climate Action Plan for the town, that will hopefully have guided our small town to being net zero by 2050.

I hope that the residents of Medfield in 2050 will also look back at us today in 2022 and say, it is too bad those people did not know in 2022 just how much the technological discoveries allowed the world to get to net zero so much faster and more easily. [3]

Osler L. Peterson, Board of Selectmen
September 20, 2022



[3] Image from the Massachusetts 2050 Decarbonization Roadmap
https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download

Statements from Elected Officials

The Chair of the Planning Board's thoughts on the Town of Medfield's 2022 Climate Action Plan

Speaking as a historian and engaged citizen, rather than in any capacity as a town volunteer, I am quite heartened by the initial efforts and focus of Medfield's climate action plan.

Historical moments of change -- as well as those moments that did not change but seemed ripe or necessary to do so -- fascinate me. With my students, we consider how a single action or decision, no matter how large or small, initiated a cascade of consequences. And we also consider why change might not have occurred in hindsight. We examine the actors' motivations and contexts, strengths and limitations.

It is from that perspective that I view the drafted climate action plan.

As it takes shape, the plan has the potential to orientate the town in a direction that promotes general sustainability of resources and facilitates the healing of our environment.

The plan, to that end, can help raise the consciousness of individuals, families, and town officials to the consequences of their actions so all of us make the right decisions for the right reasons.

Further, I see the potential for the plan to help unite residents in a worthy cause that is larger than themselves, that informs them, that galvanizes them, and that multiplies the impact of their efforts to benefit generations to come.

Done right, the final climate action plan should one day be recognized as a historical moment of critical change, doing much for the long-term sustainability of our local environment but also for the short-term needs of our community.

I hope that all aspects of our town —citizens, elected officials, and town employees -- could one day soon rally around such a vision.

Seth Meehan, Chairman, Planning Board
April 28th, 2022

Introduction

Historical Experience of Energy Transition in Medfield

Fred Davis, Chair of Medfield Energy Committee (2019-2022)

As one of the original members of the Medfield Energy Committee (MEC), I have been asked to provide a historical perspective, for this, a historic document.

TOMCAP is being written by a dedicated team of civic-minded Medfielders, united in concern about the current climate emergency, and committed to community action. We are quite conscious of the transitions being delineated. Certainly, we hope that today's Medfielders will take heed, but we also would like our successors to know what we were thinking in 2022.

Looking backward provides some good news, Medfielders, because we see we have done this before! See below for a depiction of Medfield's predominant form of transportation[4]:

Below is a picture of Medfield's first horseless carriage (1903).

In the early 1900s, many would have considered the new technology to be an "infernal contraption" – it was uncouth, noisy, smelly, dangerous, inconvenient, expensive, certainly way too fast, etc.

That is, until it wasn't.

Few would have foreseen just how quickly this new 'automobility' would become widespread. In less than thirty years, 60% of American households would have a motor car. In other words, adoption accelerated dramatically.

Medfield can do this again!

[4] Photographs courtesy of the Medfield Historical Society

How Do People Adopt New Technologies?

Uptake of New Technology Always Follows a Distinct Pattern[5]

Indeed, all sorts of new technology have followed similar adoption trends over the last century (see chart).

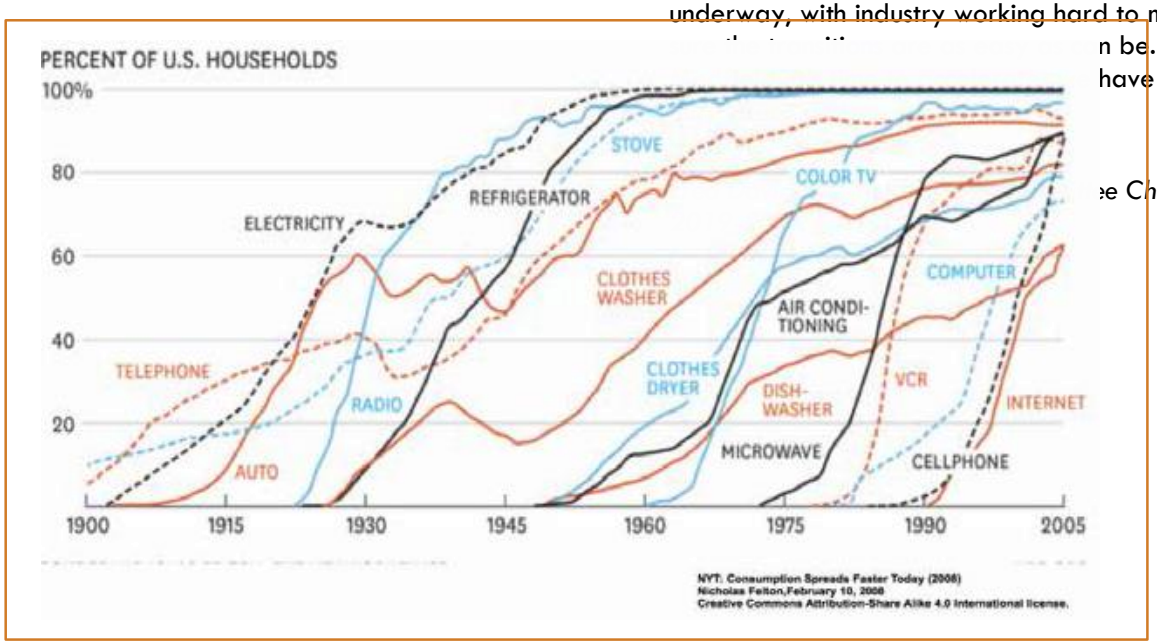
No matter how popular they eventually became, each new technology had to overcome initial hurdles. Early technology and early adopters first test things out, during which time, public attitudes are highlighted by fear, skepticism, high costs, all suppressing adoption. At some point, some combination of innovation, competition, mass production and marketing overcome the obstacles and consumers adopt the technology in large numbers.

That's what's needed now. The climate emergency demands that the adoption of new technology accelerates. Medfield households need to adopt electric vehicles (EVs) in place of the internal-combustion-engine passenger vehicles that are prevalent today. And existing gas- and oil-fired home heating systems need to be replaced with high-efficiency heat pump systems (HPs).

As the MEC has been working for the past few years to inform Medfielders, various obstacles and issues and differences emerge in discussion; and certainly, there are many valid elements.

But apprehension of the "new" can be expected. The historical perspective demonstrates that "the nature of the new" is not new; it is a constant at every moment of change.

The reality in 2022 is that hundreds of Medfield households already have transitioned to EVs and HPs. More and more Medfielders are doing so all the time, especially as they realize that the change is not strange or difficult for their friends and neighbors.



Transitions Medfielders made over a century ago certainly must have seemed strange: carriages needing gasoline, lights needing wires. Today, adoption of new technology is well underway, with industry working hard to make n be. have done

e Chair

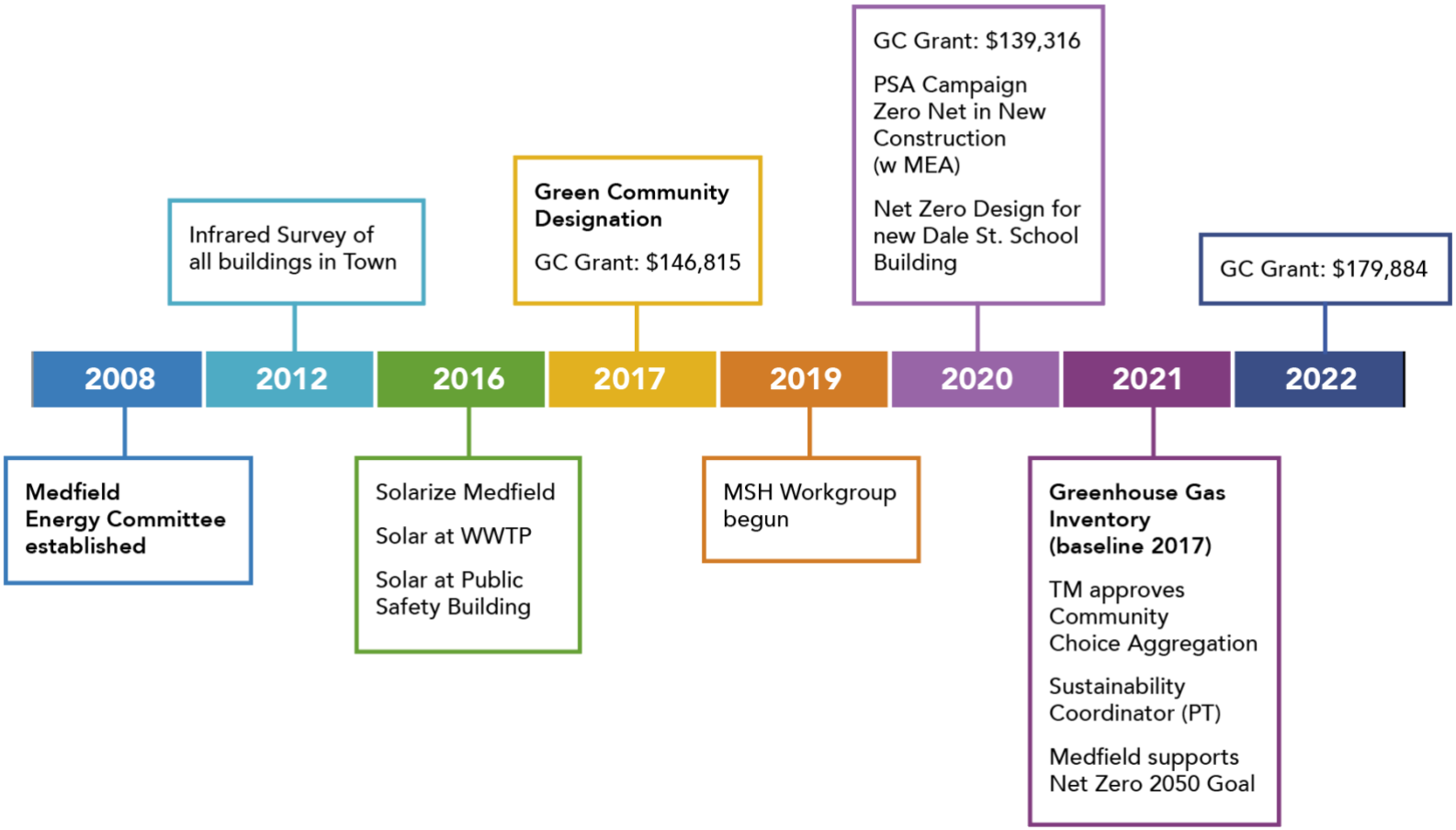
[5] https://www.mass.gov/doc/transportation-sector-technical-report/download, p.30

Energy Management in Medfield

Recent Energy Related Work in Medfield

Since its formation in 2008, the Medfield Energy Committee has advised the Town on a number of energy conservation and efficiency measures. Savings to the Town and grants realized during this time because of the MEC's work have so far exceeded $9.2 million. Highlights of the MEC's work are illustrated below.

Highlights of the Medfield Energy Committee Activities



Medfield Supports the Net Zero Goal and Needs a Climate Action Plan

Medfield voted to support the Net Zero 2050 Goal and to develop a climate action plan at Town Meeting in May 2021. The article approved is below.

To see if the town will adopt the following resolution:
Greenhouse gas content of our atmosphere has increased alarmingly as a result of human activities with negative impact on our climate as evidenced by rising temperatures, rising sea level and ocean acidity, increased flooding with more intense and frequent storms, droughts, forest fires, other unpredictable weather patterns and increased health risks.

Therefore, the Town of Medfield supports a goal of eliminating or offsetting all greenhouse gas emissions originating in the Town by the year 2050 or earlier (known hereafter as the Net Zero 2050 goal); and encourages the Board of Selectmen, all Town Boards and Committees, and residents and businesses to take action in the furtherance of Medfield's Climate Goal by developing a Net Zero Action Plan by March 2022 that outlines specific strategies and sets measurable, attainable and realistic interim targets aligned with State and Federal goals, roadmaps and incentives; or do or act anything in relation thereto.

Residents are sitting socially distanced on the Medfield high school turf during the May 2021 Town Meeting, due to Covid -19 restrictions.

Medfield's Energy Goals Align with State and Federal Commitments

The goals set in the Town of Medfield Climate Action Plan "align with commitments set at the state and federal levels. In 2021, the Biden administration pledged a national target of 50% GHG emissions reductions from 2005 levels by 2030. Here in Massachusetts, new climate policies put the state on a path to achieving net zero emissions by 2050. Specific relevant policies adopted at the state and federal levels include:

MA Decarbonization Roadmap (Issued December 2020)[6]
This Roadmap was developed by the MA Executive Office of Energy and Environmental Affairs and includes planning scenarios for Massachusetts to achieve net zero carbon emissions by 2050. These planning scenarios serve as a model for local governments and were used to identify emissions reduction pathways for [this] Climate Action Plan. They include building and vehicle electrification, efficiency, and clean energy pathways that prioritize equity and affordability.

Interim Clean Energy and Climate Plan (CECP) for 2030 (On-going)[7]
Building on the MA Decarbonization Roadmap, the CECP details sector-specific strategies the Commonwealth will pursue to achieve interim emissions reduction targets by 2030, making it a useful resource for local governments to align their initiatives with the Commonwealth's strategies.

An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy (Enacted March 2021)[8]
Signed into law in 2021, the Next-Generation Roadmap codifies the Commonwealth's goal of net zero emissions by 2050 and sets interim emissions limits of at least 50% below 1990 levels by 2030, and at least 75% below 1990 levels by 2040. The law also expands protections for environmental justice communities, requires the development of an opt-in net zero energy code within 18 months, and authorizes an increase in the Commonwealth's procurement of offshore wind energy.

Net Zero Stretch Energy Code (Under Development)[9]
The Next Generation Roadmap law requires the Department of Energy Resources to develop a new building code with stricter energy efficiency standards for new buildings, including net zero building performance standards and a definition of a net zero building. Draft Code language was released in June 2022. Municipalities will have the option of adopting this new stretch code in order to reduce GHG emissions from the building sector. Adoption of the code by municipalities throughout Massachusetts will play an important role in the Commonwealth's ability to meet its climate goals.

American Rescue Plan Act (Enacted March 2021)
President Biden signed the American Rescue Plan Act (ARPA) into law in March 2021. ARPA funds provide direct relief to state and local governments to assist with recovery from the COVID-19
pandemic. These funds can be used for important infrastructure improvements to help build resilience and mitigate the effects of climate change."[10]

[6] https://www.mass.gov/info-details/ma-decarbonization-roadmap#final-reports-
[7] https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download
[8] https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030, https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8
[9] https://www.mass.gov/info-details/stretch-energy-code-development-2022
[10] https://wellesleyma.gov/DocumentCenter/View/27281/Climate-Action-Plan

Infrastructure Investment and Jobs Act (IIJA) (November 2021)[11]

Signed into law in November 2021, the Infrastructure Investment and Jobs Act provides federal funds to modernize the organization and structure of our roads, bridges, transit, rail, ports, airports, broadband and drinking water and wastewater. It includes strategies to reduce the climate change impacts of surface transportation and promotes greater electrification. Investment will be made in power infrastructure and clean energy transmission, focusing on residential and commercial energy efficiency as well as improvements in public schools. The work needing to be done is expected to generate well-paying union jobs.

Inflation Reduction Act (IRA) (August 2022)[12]

Signed into law in August 2022, the Inflation Reduction Act covers a plethora of significant investments in conservation, climate resilience, energy security, clean energy, and energy efficiency. Funding to agencies and state and local governments will support local programs that encourage a wide range of investments in clean energy technology, energy efficiency, emissions reduction and avoidance, and environmental equity. In addition, taxpayers can claim investment tax credits of up to 30% for investing in clean energy generation and storage, a $7,500 tax credit for purchasing new electric vehicles, and a $4,500 tax credit for used ones. The IRA eliminates the previous "per-manufacturer" limits that applied to the new vehicle credit.[13]

An Act Driving Climate Policy Forward (MA Climate Bill, August 2022)[14]

The bill "involves clean energy workforce and economic development, offshore wind procurement, potential large scale procurement of energy storage, regional coordination of clean energy development, changes to the treatment of other clean energy resources, further adoption of electric vehicles, energy efficiency and building electrification, the transition away from the use of natural gas, and modernization of the electric distribution system to enable increased adoption of renewable energy, energy storage, and vehicle and building electrification."[15]

An Act Relative to Massachusetts's Transportation Resources and Climate (MA Transportation Bond Bill, August 2022)

The transportation bond bill provides "over $11 billion in funding for a wide range of clean transportation projects, including making streets safer for biking and walking, investing in fare-free bus pilot programs, electrifying buses and commuter rail, cleaning up pollution from heavy-duty vehicles, building out electric vehicle charging infrastructure, promoting e-bikes as a replacement for car trips through rebates, and repair our bridges and roads."[16]

Since 2008, Massachusetts has already enacted and implemented a series of tools and policies, such as Mass Save, that have earned the Commonwealth "first or second place every year" in the ACEEE State Energy Efficiency Scorecard rankings.[17]

[11] https://www.congress.gov/bill/117th-congress/house-bill/3684 , https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/02/updated-fact-sheet-bipartisan-infrastructure-investment-and-jobs-act/

[12] https://www.natlawreview.com/article/general-overview-inflation-reduction-act-2022, https://www.congress.gov/bill/117th-congress/house-bill/5376

[13] https://www.natlawreview.com/article/relief-arrives-renewable-energy-industry-inflation-reduction-act-2022

[14] https://malegislature.gov/Bills/192/S2819 , https://www.natlawreview.com/article/significant-new-clean-energy-and-climate-act-becomes-law-massachusetts

[15] https://www.natlawreview.com/article/significant-new-clean-energy-and-climate-act-becomes-law-massachusetts

[16] https://www.sierraclub.org/press-releases/2022/08/massachusetts-passes-113-billion-transportation-bond-bill , https://landline.media/massachusetts-governor-signs-11-3-billion-transportation-bond-bill/ , https://malegislature.gov/Laws/SessionLaws/Acts/2022/Chapter176

[17] https://database.aceee.org/state-scorecard-rank

Town of Medfield

Climate Action Plan (2022)

How Did We Go About It?

This document, the Town of Medfield Climate Action Plan (TOMCAP) was developed by the Town of Medfield in response to a climate goals resolution passed at Town Meeting in May 2021[18]. TOMCAP is designed to identify and prioritize practical, near-term actions the town can take, paired with the long-term, aspirational goals set by the climate resolution. The town, having created a common goal and a bold vision with the adoption of this resolution, is expected to use TOMCAP to inform and guide Town actions, stimulate discussion, and disseminate information to encourage appropriate actions for residents, businesses, and the Town.

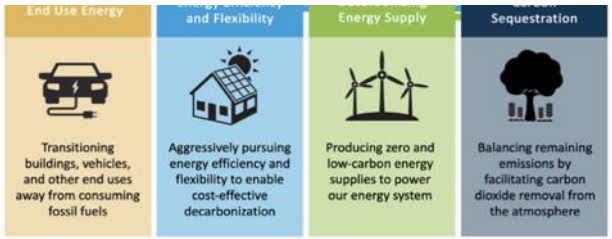
The development of the TOMCAP was a collaborative effort between municipal staff, the Medfield Energy Committee (MEC), residents and community groups, with support from the Metropolitan Area Planning Council (MAPC).

The TOMCAP workgroup, an eleven-member workgroup that included MEC members, resident volunteers and Osler Peterson, Selectman, served as the primary advisor in developing the plan. Additional volunteers participated in the three sections: renewable energy, buildings, transportation.

The strategies and actions identified in the TOMCAP were informed by existing Medfield plans: the Townwide Master Plan, the Municipal Vulnerability Plan and the Rapid Recovery Plan. TOMCAP aligns with research the MAPC completed on other communities' climate action plans and with the Municipal Net Zero Playbook, a regional guide for municipalities seeking to reduce emissions. The final priority strategies and actions included reflect Medfield's net zero journey, community feedback, the major sources of greenhouse gas emissions in Medfield, and the availability of relevant technologies, rebates, and incentives.

The MA 2050 Decarbonization Roadmap[19] identifies four pillars on which decarbonization in Massachusetts will rely:

Four key "pillars of decarbonization" for the Commonwealth



TOMCAP has adapted the first three of these pillars to best suit Medfield's current needs and opportunities: Renewable Energy pillar, Buildings pillar and Transportation pillar.

The authors of TOMCAP intentionally chose to not attempt determinations or financial analyses of the economics underlying these transitions, although we are fully aware and sympathetic to these considerations. In the future, as the Town and residents are implementing various measures, economic efficiency continue to be individually evaluated, considering conventional risk analysis. In developing recommendations for expenditures for the town, a cost benefit analysis will be conducted. Those projects with a cost/benefit analysis ratio (CBA) above 1.0, including externalities (also called total resource costs [TRC]) will be put forward first.

The TOMCAP will guide the Town's decarbonization efforts by determining and prioritizing specific actions that to be taken in the near term. As goals are achieved and new opportunities and challenges arise continually, TOMCAP is an ever-green plan that will be assessed and updated regularly and frequently.

[18] https://www.town.medfield.net/DocumentCenter/View/4968/Proposed-Climate-Goals-Warrant-Article-1

[19] https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download

Engaging the Community

The Town sought to engage the public in drafting and finalizing the TOMCAP. Medfielders was able to learn about and participate in the development of the plan in several ways.

A webinar held in June 2021 introduced Medfield to the TOMCAP. In September 2021, the Energy Committee engaged residents at the town's annual Medfield Day. During the event, Committee members offered residents to sign up to stay informed and shared information about the net zero planning process. Throughout the development of the plan, members of the work group seized opportunities to speak to community groups and representatives, such as MEMO, church leaders, seniors and to a variety of groups at Sustainable Medfield networking meetings. Partnering with Medfield Environment Action and SustainableMedfield.org allowed for increased distribution of news to the community. A questionnaire distributed in the fall of 2021 had over 100 responses and showed citizens' interest in access to more education and resources on how to make changes. A preview of the TOMCAP draft was presented to the public in a webinar in January 2022.

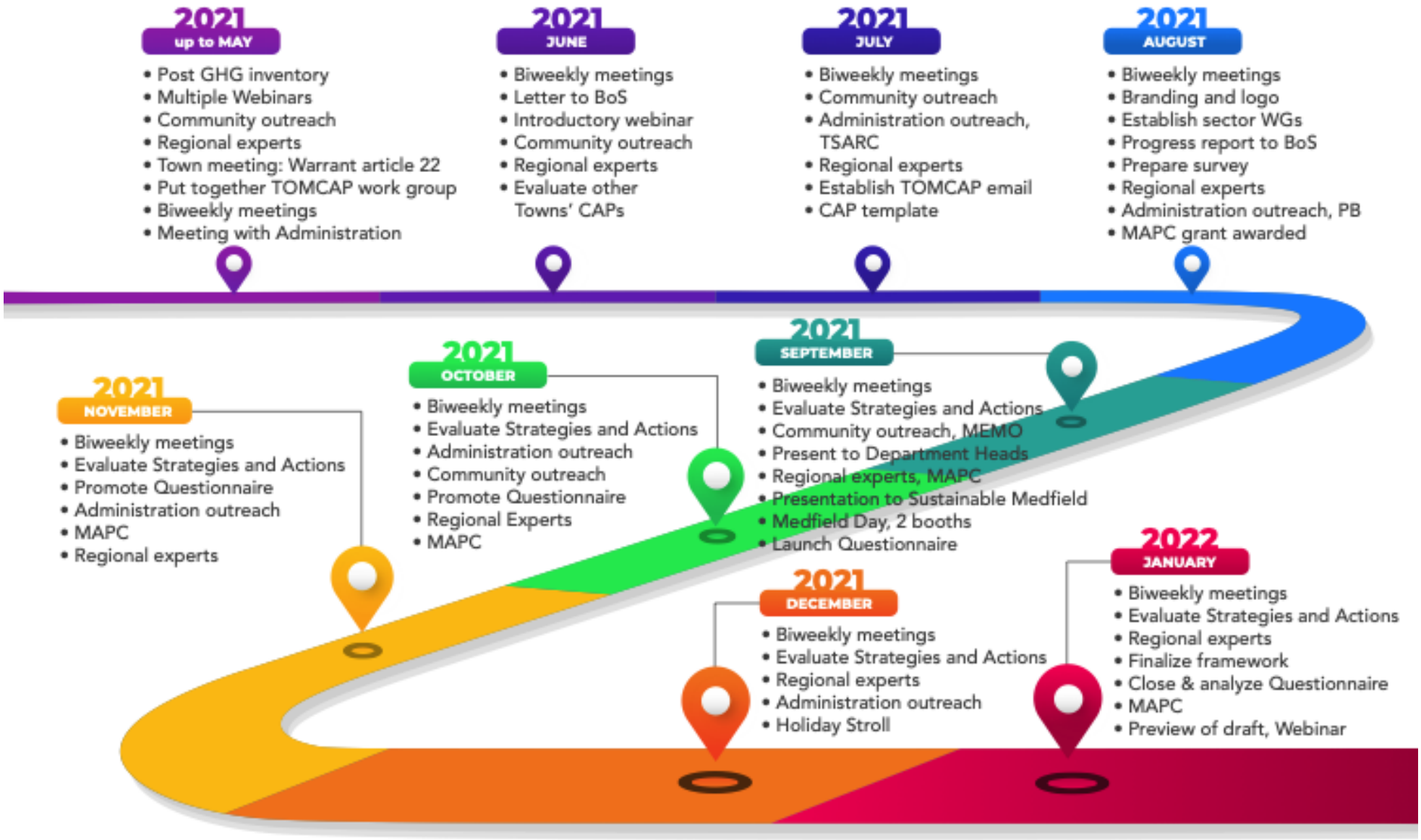
Departments, elected boards and committees, including the Board of Selectmen, Planning Board, and the School Committee were engaged throughout 2021 and 2022. These groups were provided with updates during public meetings, via email and in person regarding the plan's development. These groups also received draft documents in April 2022 and were invited to provide input in finalizing the plan.

The MEC and TOMCAP work group are actively engaged in regional networks and collaborations which have helped to inspire and inform the development of TOMCAP.

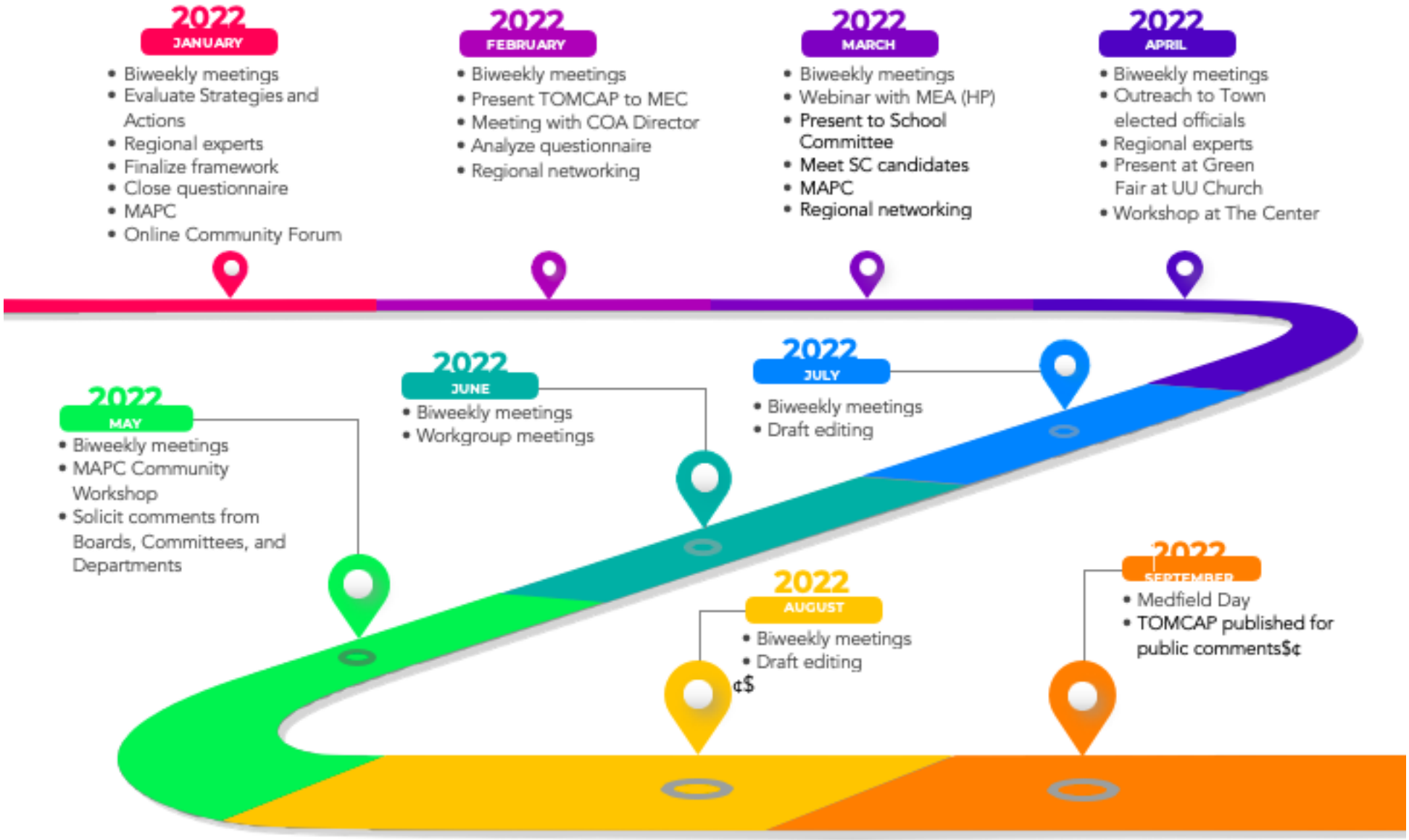
The Town of Medfield was awarded a grant securing the support of the Metropolitan Area Planning Council (MAPC) for the development of TOMCAP. In May 2022, MAPC in partnership with the Town and TOMCAP group, held a public workshop that focused on educating on TOMCAP and gathering input from the public (see Appendix A).

TOMCAP is designed to be an ever-green plan, meaning it will be updated regularly as goals are achieved and new priorities and opportunities arise. As a result, TOMCAP will continually welcome input from the public, and, in consultation with boards and committees, will seek broadening and widening of its scope. Medfield residents are invited to submit comments and suggestions at any time to TOMCAP@medfield.net.

TOMCAP Activities and Outreach 2021



TOMCAP Activities and Outreach 2022



Where Do Our Carbon Emissions Come From?

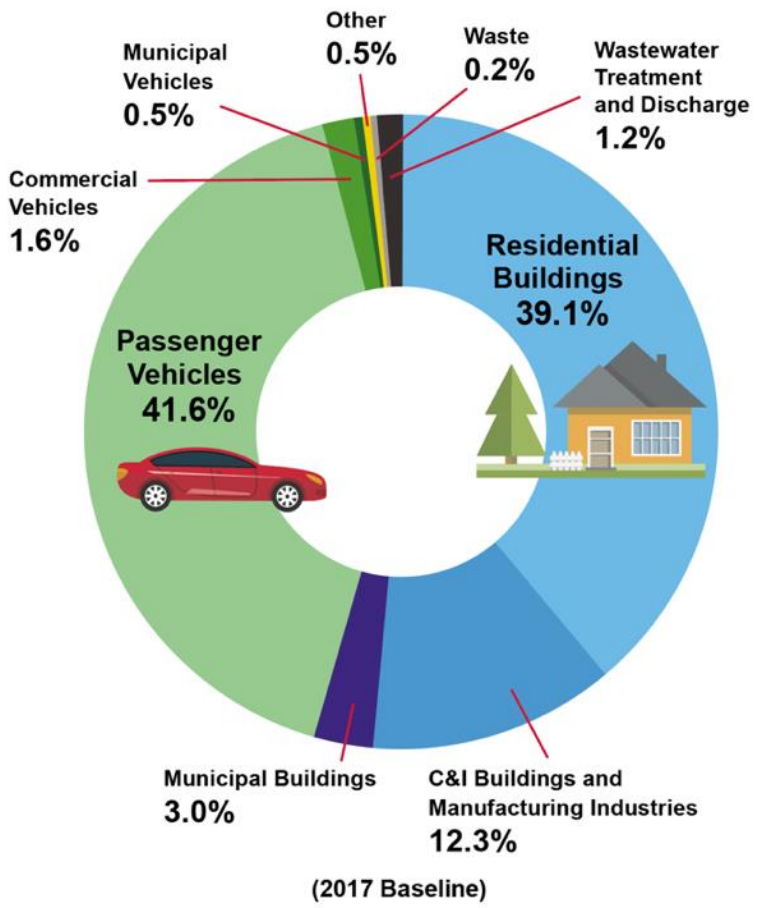
In 2020, Medfield Energy Committee volunteers, using the MAPC Community Greenhouse Gas Inventory tool, worked to identify the primary sources of emissions across our community in 2017, the most recent year for which complete data were available, and to calculate a baseline for future emission reductions. The team followed the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), an internationally recognized greenhouse gas accounting and reporting standard.[20] Neighboring communities including Ashland, Framingham, Sherborn, Natick and Wellesley have completed GHG inventories using the same tool and methodology. The goal is for the same methodology to be used to determine future GHG emissions to chart progress toward and achievement of the 2030 and 2050 goals.

The total carbon footprint of Medfield in 2017 was calculated to be 112,301 MT CO2e (metric tons carbon dioxide equivalent).

What are the sources of emissions in Medfield?

- In Medfield, buildings are the largest source of emissions (55.2%).
- On-road transportation is another major source of emissions (43.7%).
- Private homes and passenger cars make up the biggest share, together accounting for 87.7% of Medfield's GHG emissions.

Note that this is a community inventory of the GHG emissions originating in Medfield, not to be confused with a personal carbon footprint. Calculators vary greatly, and may additionally count emissions resulting from: travel not originating in Medfield (air, rail, cruise), and products created outside of Medfield (food, durables, consumer goods).



Source: MEC, MAPC https://www.mapc.org/planning101/community-ghg-assessment/

[20] https://www.mapc.org/resource-library/community-ghg-inventory-resources/ , https://drive.google.com/drive/u/1/folders/1nmu1VKgenKu10_ZKix3DGEi7-u33AtvU

Determination of Medfield's GHG Emission Levels

Every day, Medfield residents and businesses rely on fossil fuels to heat and cool our homes, keep the lights on, power our electronics and drive our cars. In doing so, we release greenhouse gas emissions. We must steadily and rapidly reduce these emissions to meet our state and federal goals and to limit global warming.

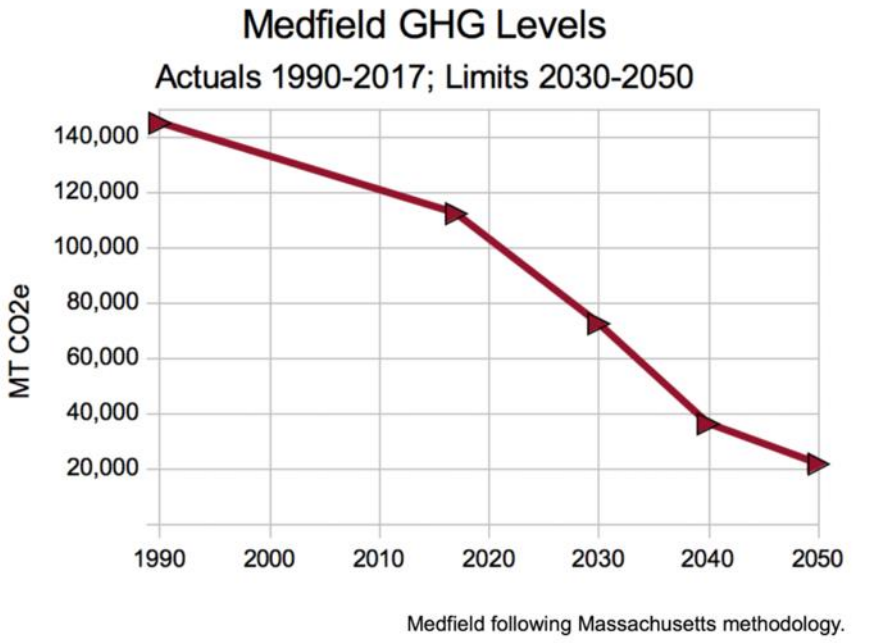
Using the municipal GHG inventory as a baseline, this model highlights how Medfield will have to reduce GHG emissions to comply with the State mandated levels of emissions limits.

The first calculation of greenhouse gases for Medfield determined the town's carbon footprint as 112,301 MT CO2e as of 2017.

Massachusetts' methodology relies on a 1990 baseline year for emissions. Since statewide carbon emissions are known to have declined 23% between 1990 and 2017, the simplifying assumption is made that Medfield's level decreased by the same percentage over the same period. With this reasoning, Medfield's 1990 level is pegged as 145,000 MT CO2e.

Medfield's upcoming limits are shown in the graph and are determined using the statewide percentage decreases that were recently set by legislation:

- by 2030: 50% below 1990
- by 2040: 75% below 1990
- by 2050: 85% below 1990



Percentage reductions were as set by state for 2030, 2040, 2050..

Note that these numbers do not include air, rail or cruise travel, or embodied carbon in food, consumer goods or building material, which are part of each resident's personal carbon footprint.

What Does Net Zero Mean?

Reaching "net zero" GHG emissions means that most GHG emissions are eliminated and any GHG emissions are balanced with removal of greenhouse gases from the atmosphere, so that the "net" is zero GHG emissions.

To become net zero, our community will reduce GHG pollution as much as possible and remove or offset any remaining emissions by 2050, and ideally sooner. Limiting emissions is cumulative: any emissions eliminated today will not be emitted tomorrow or thereafter. This aspirational, necessary goal will require that we all work towards reaching net zero and shows the need and impact of starting now.

Initially, the biggest reductions in GHG emissions can be achieved with a shift in the way we run our homes, how we get around, and where our energy comes from. Thus the priority areas that TOMCAP focuses on:

- Decrease energy use:
  - Increase energy efficiency in buildings
  - Maximize low-energy-intensity travel
- Locally produce and store renewable energy
- Electrify everything

Many of the solutions offered in the priority areas are also often relatively straight forward to put in place: next time one needs to buy a new car, replace a heating system, or upgrade an appliance, one can choose a climate friendly solution and still be able drive a car and be comfortable at home. While removing the largest sources of emissions in the priority areas first, Medfield will also continue to identify ways to limit GHG emissions from smaller sources of emission.

Reaching net zero GHG emissions also presents a huge opportunity to change our community. Massachusetts is committed to climate equity and to making sure everyone can afford to choose climate-friendly actions, such as insulating one's home to reduce energy costs. Many new jobs are being created along the way. Less pollution means better health. Alongside reducing GHG emissions, we can achieve cleaner air, healthier people, and a more equitable and prosperous community for everyone.

In 2020, Massachusetts has achieved a 25% reduction in the state-wide GHG emissions from 1990 levels by reducing GHG pollution in the electricity supply. Remarkably, this was achieved while the state's population increased and the Commonwealth's economy grew.[21]

In the future, it may be possible to reduce atmospheric GHG levels through carbon capture and sequestration by technological means. For now, Medfield's best strategy is to effectively steward its abundant natural resources, to preserve biodiversity and to support the biosphere to remove more carbon from the atmosphere: Maintaining trees, open spaces, soils and healthy wetlands, and engaging in sustainable gardening are oft-cited approaches. Achieving net zero emissions in Medfield will require sustained efforts and continued commitment of residents. With the support of the Commonwealth, the Federal government, public utilities, the Town and the business community, and aided by technological progress, Medfielders will make "Net Zero 2050" a reality.

"Net-zero emissions: the balancing of gross emissions with removals of greenhouse gases from the atmosphere[22]".

[21] https://www.mass.gov/service-details/gwsa-implementation-progress, https://www.usgs.gov/media/images/massachusetts-population-trends-1990-2015 , https://www.census.gov/library/stories/state-by-state/massachusetts-population-change--between-census-decade.html

[22] https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download)

Why Net Zero?[23]

"Climate scientists have made it clear that we need to reduce global GHG emissions to net zero by 2050, or sooner, to avoid catastrophic climate change. We know that the planet has already warmed by about 1° Celsius since we started burning fossil fuels like coal, oil, and gas in the mid-1800s.[24] We also know that if we can keep warming below 1.5° Celsius, we can avoid the worst impacts of climate change like extreme floods, wildfires, and droughts."[25]

We have a limited "carbon budget," the amount we can put into the air without passing 1.5° Celsius of warming. The longer we wait to start reducing our GHG pollution, the faster we use up our carbon budget and the less time we give ourselves to meet our goal. We recognize that climate change is a global problem and that many of the solutions are beyond our control. To reach our net zero goal, we will need help from global, federal, state, and regional policies that support our transition to clean energy, but we can lead at the local level. TOMCAP, Medfield's net zero roadmap, highlights the strategies that we can deploy locally to accelerate this transition over the next few years.

GETTING THERE EQUITABLY

Climate change is an existential challenge, but it is also an opportunity to reimagine Medfield's future, and to make that future both safe and equitable for all who live and work in our community. Massachusetts municipalities are increasingly undertaking climate mitigation and adaptation strategies and are starting to seek out ways in which to advance equity within those measures. By centering equity in this Plan, we can build a future that is not only safer for all, but also allows each individual in Medfield to thrive. An equitable net zero carbon future must be our goal.

In equitable planning, we must be conscious of the history of our region, the differences in how populations are able to respond to a changing climate, and the needs of residents and businesses. We recognize that the effects of climate change disproportionately impact communities suffering from environmental and social injustice. Socially or economically disadvantaged people are likely to experience greater harm from climate change.

Action to mitigate climate change by reducing GHG pollution will benefit socially or economically disadvantaged people. But we must also ensure that those strategies do not hurt the most vulnerable among us, for example by increasing the cost of housing or utilities to unacceptable levels. In addition, the action items in this Plan should be structured and marketed so that all Medfield residents and businesses can take advantage of them. There are challenges to including the broadest possible range of people as Medfield implements the measures in this Plan, including reaching those with a primary language other than English, homes without high speed (or any) Internet access, and the huge challenge of marketing energy efficiency and renewable energy programs to renters and landlords, who have a split incentive (tenants typically pay for utilities, but landlords typically pay for building upgrades). For our Plan to be actionable and for our vision of the future to be equitable, we must center equity throughout the planning and implementation of our net zero strategies. This plan attempts to do this, including equity considerations throughout the document.

[23] This page was adapted from https://www.natickma.gov/DocumentCenter/View/10920/2017-Community-wide-Greenhouse-Gas-Inventory-and-Draft-Net-Zero-Action-Plan
[24] Visualization of global temperature change at https://apod.nasa.gov/apod/ap220822.html

Town of Medfield

Climate Action Plan (2022)

How to Read the Town of Medfield Climate Action Plan?

The Town of Medfield developed this Climate Action Plan to inform and guide Medfield's next few years of action to reduce green-house gas emissions across all sectors of Medfield.

The journey on the road to Net Zero in Medfield will be a long one, but we know where we need to be by 2050 to achieve this goal and where we are today.

TOMCAP outlines the six priority objectives, organized on three major sections: Renewable Energy, Buildings and Transportation.

Informed by engagement with Medfield's Energy Committee members, municipal staff, and the public, these objectives in TOMCAP have been prioritized to identify immediate next steps for the Town to implement based on potential for impact.

The priority objectives are those that target the biggest pollution sources, where action can be taken most easily because cleaner technology solutions exist. These are often more economical and/or supported by State or federal rebates, incentives, or tax credits.

For each objective, the plan outlines several strategies leading to the 2030 and 2050 goals. Actions describe activities the Town can carry out in the near future as it works towards advancing each strategy. Future iterations of the plan will update near-term actions and incorporate appropriate modifications.

All the actions contribute to the core objectives and goals of the TOMCAP. Future updates of TOMCAP will include sections on Natural Resources and Waste as these areas play roles in achieving the Net Zero goal.

NAVIGATING THE ROADMAP

For each strategy in the TOMCAP, there are a few important indicators identified to support the Town's implementation of the plan over the next several years:

Potential Co-Benefits

This section identifies the high-level potential for the types of benefits, *in addition to green-house gas emissions reductions*, that our community may experience through effective implementation of the action.

- PUBLIC HEALTH BENEFITS
- ECONOMIC BENEFITS
- ENERGY SYSTEM BENEFITS
- ENVIRONMENTAL BENEFITS

Equity Considerations

This section describes issues the Town will consider to ensure that implementation of the action does not cause undue burden on historically disadvantaged populations in Medfield and that this implementation creates direct benefits and co-benefits for these populations. Additional consultations with relevant groups and representatives will result in refined recommendations in future TOMCAP updates.

Partners for Implementation

This section calls out those members within municipal operations and the broader community-at-large that will be critical to successful implementation of the action.

Measures of Success

This section identifies the key performance indicators the Town intends to track through-out implementation of the roadmap and the particular action. Some measures may be data-driven, while others may indicate key achievements to work toward (interim goals).

The Six Priority Objectives and Milestones of the TOMCAP

ROADMAP MILESTONES	TODAY	2030	2050
Green the grid with renewable energy sources	Our electricity supply comes from 51% carbon-free sources.*	Our electricity supply comes from 100% carbon-free sources.	Our electricity supply comes from 100% carbon-free sources and is more affordable.
Produce more renewable energy locally.	2.5MW of solar production from 165 facilities**	Half of all viable roofs in Medfield have solar.	Solar capacity is maximized in Medfield.
Make our homes and buildings super efficient.	All new buildings are built to the state stretch energy code.	All new buildings are built to net zero standards and all high priority homes have at least one improvement.	Nearly all existing homes and businesses in Medfield have been retrofitted.
Electrify heating, hot water and cooking equipment.	73% of Medfield's building emissions come from oil and natural gas fuels.	Every new heating, hot water and cooking system installed is electric.	Nearly all municipal buildings, homes and businesses are 100% electric.
Electrify cars, trucks, buses, trains, and other ways we get around.	Less than 1% of vehicles registered in Medfield are zero emissions.There are 4 public charging stations.***	Nearly all new vehicle purchases are zero emissions. More accessibility to charging.	Nearly all vehicles registered in Medfield, including public transportation, are zero emissions.
Make walking, biking, and local public transit the best way to get around.	Medfield has school buses and one late school bus, but many parents and students drive to school. Medfield uses The Ride. The Medfield Rail Trail has opened.	The Town has plans in place to make biking and walking in Medfield safe and accessible. Public transportation has expanded.	All Medfield residents have access to a diverse set of mobility options that are zero-emission, safe, convenient, and accessible.

* https://www3.epa.gov/region1/npdes/merrimackstation/pdfs/ar/AR-1744

** Source: Renewable Energy Pillar MEC.

*** Currently at Bank of America. Three more public charging locations, at Wheelock school, Blake middle school and Town House, are planned to be installed in 2022.

Renewable Energy

Town of Medfield
CLIMATE ACTION PLAN
TOMCAP@medfield.net

Decarbonizing Our Electricity

Medfield will plan for and support the adoption of renewable sourced electricity and installation of clean energy technology throughout town.

Currently there are 205 solar installations in Medfield with another 29 pending inspection[26].

There are two municipally owned solar arrays. Significant future municipal opportunities include the reuse of the former town landfill site, as well as additional rooftop and parking lot applications involving town and school department buildings.

The successful Solarize Medfield campaign (2016) is a blueprint for similar future programs.

The plan envisions affordable, renewably sourced electricity available to all residents and businesses with the objectives of:

OBJECTIVE 1

Achieve 100% renewably sourced electricity supply by 2030

OBJECTIVE 2

Encourage renewable energy solutions throughout Medfield

The largest solar array in Medfield, located at the commercial facility at 7th Wave Brewing, 120 North Meadows Road, Medfield, MA 02052.

Photo by Silas Trotter

[26] Medfield Town Assessor, 9/2022 data

1.1 Transition Medfield municipal electricity supply to 100% renewable by 2030

The Town of Medfield will implement Medfield Community Electricity and adopt supply options with increasing amounts of renewable energy with the goal of achieving 100% of Medfield electricity supply being renewable by 2030.

Foundational to achieving the Town of Medfield's goal of carbon neutrality by 2050 is ensuring that the Town's electricity supply is entirely renewable. The great news is that this can be an early action and achieved through municipal aggregation with leadership by the Town.

Municipal aggregation involves the Town of Medfield contracting with a fully vetted energy supplier for electricity. The Medfield Community Electricity program will allow the Town to select from electricity supply options with increasing amounts of renewable energy content for the Town's properties.

1.1.1 The Town of Medfield will adopt a goal of sourcing electric supply for all municipal properties with increasing percentages of renewables over the next 8 years, with the goal of sourcing ALL electric supply from 100% renewable energy by 2030.

While the future of energy supply is difficult to predict, it is possible that by the town adopting this goal, a cost premium may be incurred associated with the selection of 100% renewable energy. Any possible additional cost can be reduced through increases in efficiency, which reduce the Town's energy need, and revenue from solar installations. Any potential increase in cost would be reflected in the Town budgets[27].

Recognizing that it is vital that citizens of the town are aware and have the opportunity for input on the Town's adoption of this leadership goal of sourcing all electricity from 100% renewable energy by 2030, there will be a series of open houses, webinars, surveys, and other town listening posts to gather citizen input and support on adopting this goal.

Potential Co-Benefits

- Stability of electricity prices by the Town contracting for a long-term contract with an electric supplier.
- Higher percentage of renewables than required by Commonwealth.

Equity Considerations

- Explore municipal aggregation electricity suppliers that are minority owned.

Partners for Implementation

- Board of Selectmen
- Energy Broker
- Electricity supply vendor
- Sustainability Consultant
- Energy Committee
- Department of Public Utilities
- Department of Energy Resources

Measures of Success

- Percentage of electricity sourced from renewable energy by the Town

[27] In developing recommendations for expenditures for the town, a cost benefit analysis will be conducted. Those projects with a cost/benefit analysis ratio (CBA) above 1.0, including externalities (also called total resource costs [TRC]) will be put forward.

1.2 Transition Medfield residential electricity supply to 100% renewable by 2030

With the implementation of Medfield Community Electricity, citizens will have the opportunity to select electricity supply options with increasing amounts of renewable energy. The goal is that 100% of Medfield electricity supply is renewable by 2030 with the adoption by citizens in Medfield Community Electricity of 100% renewable.

With the introduction of Medfield Community Electricity, all citizens of the town can engage in achieving the Town of Medfield's goal of carbon neutrality by 2050 by selecting 100% renewable electricity supply.

1.2.1 Citizens will be able to choose their energy supply. There will be extensive community outreach and education provided to all Town citizens on Medfield Community Electricity so informed personal choices can be selected on energy supply.

There will be tools to help citizens understand the impact of respective supply elections on reducing carbon footprint. Medfield Community Electricity will offer several options to citizens for energy supply, which will include one that is competitive with current default electric supply provided by the utility, and other options with increased percentages of renewables.

Potential Co-Benefits

- Stability of electricity prices by the Town contracting for a long-term contract with an electric supplier.
- Higher percentage of renewables than required by Commonwealth.

Equity Considerations

- As the Town of Medfield offers Medfield Community Electricity, there will be an option available that is competitive to the utility electric price.
- Additionally, outreach and communication to citizens to maximize awareness of options such as the utility low-income discount rate and fuel assistance so these programs can be fully leveraged (i.e., LIHEAP).
- Mitigate language and other barriers in educational material and programs.

Partners for Implementation

- Board of Selectmen
- Energy Broker
- Electricity Supply Vendor
- Sustainability Consultant
- Community Action Agencies
- Energy Committee
- Department of Public Utilities
- Department of Energy Resources

Measures of Success

- Percentage of renewably sourced electricity purchased by town residents
- Percentage of renewable electricity offered in the default product
- Percentage of customers choosing 100% renewable when provided options
- Percentage of customers who remain in the program

2.1 Address regulations to make it easier to install clean energy technology.

The Town of Medfield will reduce barriers to installing clean energy technology such as renewables, EVs, batteries, energy efficiency and others by identifying any current regulatory barriers and developing recommendations to address and remove these barriers.

More and more, Medfield homeowners and businesses are interested in clean energy solutions. In addition to the measures covered in other sections of the Plan, this includes partnering solar photovoltaic installation with battery storage. In order to fully leverage the opportunity of these clean energy solutions, it is important to explore if there are hurdles to installing clean energy technology, to surface and mitigate any regulatory constraints.

2.1.1 The Renewable workgroup will conduct an overview of current Town regulations to screen for potential regulatory concerns and bring them to the Town's attention. (Completed August 2022)

2.1.2. In an effort to understand potential barriers, community focus groups with builders, inspectors, developers, and advocates will be undertaken. These sessions will both explore the potential of clean energy technology and identify barriers associated with this potential. Based on what is learned, focus groups will tackle developing recommendations to address barriers. Action plans to implement the recommendations will be developed and vetted with the Medfield Community and as appropriate, submitted to the town and/or state for recommended consideration, approval, and adoption.

2.1.3 The plan proposes the Town to explore the Massachusetts PACE program, which can make additional funding available for clean energy technology on commercial properties, non-profits and multi-unit dwellings.

Potential Co-Benefits

- Clean energy solutions improve air quality both indoors and outdoors.
- Building resiliency is enhanced with the implementation of storage solutions.
- Homeowners and businesses investing in clean energy solutions will see reduced total energy costs.

Equity Considerations

- Advocate and seek community based clean energy solutions that can benefit Medfield's most vulnerable citizens.
- Provide the opportunity for broad community input and feedback on proposed regulatory changes to fully vet for any unintended consequences.
- Ensure multilingual outreach.

Partners for Implementation

- Planning Department
- Zoning Board
- Planning Board
- Building Department
- Sustainability Consultant
- Board of Selectmen
- State regulatory agencies
- State representatives
- Developers
- Building professionals
- Energy Committee

Measure of Success:

- Number of permits issued for clean energy technology
- Number of net new clean energy technology installations
- Number of regulatory barriers identified/mitigated

2.2 Maximize clean energy technology on municipal and school properties.

The Town of Medfield will assess clean energy technology (i.e., solar arrays, EV, batteries) potential for publicly owned facilities, and work to build municipal renewable energy projects at 100% of all viable facilities by 2030.

The Town has a strong start in clean energy technologies with the installation of two photovoltaic arrays. The Wastewater Treatment Plant has a 237kW ground mount system, and the Public Safety Building has a 70kW roof mount system. Both of these installations were developed by the town, using specifications provided by Solar Design Associates and are owned by the town. Another method of implementing clean energy solutions is to secure a purchase power agreement (PPA) with a clean energy developer. In the case of the Department of Public Works, the Town is pursuing the PPA approach. This will provide the Town with experience in both ownership and PPA business models.

The Town has many additional properties that may be candidates for clean energy technologies. A recent, high-level analysis of the town's properties has identified a maximum potential, assuming no barriers to implementation, to be well over 2,844MW on 10 properties. This would be sufficient to cover 83% of the electricity used in these buildings.

2.2.1 The town will strengthen efforts to remove regulatory hurdles to build a large solar installation at the old landfill. Such a large array could produce more electricity than the Town currently uses and would make the transition towards all 100% renewably electricity, and all-electric heating, cooling and transportation more cost-effective.

2.2.2 The opportunities identified in the assessment will be reviewed and prioritized for clean energy investment. Business cases will be developed for each clean energy investment and vetted with the community and town leaders for review and approval.[28]

Potential Co-Benefits

- Clean energy solutions improve air quality both indoors and outdoors.
- Building resiliency is enhanced with the implementation of storage solutions.

[28] All recommendations for expenditures by the Town will have a cost/benefit analysis (CBA) above 1.0; including externalities (TRC, total resource costs).

- The Town, by investing in clean energy solutions, will see reduced total energy costs.
- Investment by the Town in clean energy solutions, particularly on school properties, provides an educational opportunity for students, and town businesses and residents.

Equity Considerations

- Leadership by the Town in the investment in clean energy solutions provides the opportunity for citizens to see and learn more completely about the benefits of these investments.
- This will also afford time to discuss how the Town taps into these investments to benefit all citizens including the Town's most vulnerable citizens.
- Clean energy solutions improve air quality both indoors and outdoors.

Partners for Implementation

- Eversource
- MassCEC
- Board of Selectmen
- School Committee
- Facilities Manager
- Sustainability Consultant
- Public School Department
- Public Works Department
- Town Administrator and staff
- Town Departments
- Energy Committee

Measures of Success

- Reduction of CO2 emissions as municipal buildings' PV arrays contribute to renewably sourced electricity
- Percentage of viable facilities with solar installations
- Percentage of municipal operations supplied by onsite carbon free electricity
- Number of additional clean energy technology projects identified [29]

[29] All recommendations for expenditures by the Town will have a cost/benefit analysis (CBA) above 1.0; including externalities (TRC, all resource costs)

The DPW garage will be the next Town building to receive a rooftop solar array (foreground). The Town continues to work towards building a solar field on the old landfill. (Background) (Photo credit: Solect Energy)

2.3 Create programs to help home and small business owners adopt renewable energy solutions

The Town will support and encourage homeowners and businesses to invest in clean energy solutions. Implementation and adoption of clean energy solutions such as renewable energy photovoltaic systems, energy storage, and energy efficiency will substantially advance Medfield towards the Massachusetts
2050 Net Zero goal.

Medfield successfully implemented the Solarize Medfield campaign a few years ago with great success. Several business leaders have placed solar installations on their facilities providing them with both a profitable investment as well as a demonstration to their customers of their commitment to the environment.

2.3.1 Going forward, the Town will offer programs similar to the Solarize Medfield-type campaign, which provide citizens and business owners with information and the business case for investing in renewable energy solutions. Additionally, this approach often pre-vets and selects a solar provider, simplifying the selection process for the homeowner or business owner.

In this initiative, new Solarize Medfield campaigns would be developed. These campaigns would include community engagement through community meetings and webinars. Additionally, events to promote the campaign would be offered, allowing citizens to learn more about the benefits of investing in clean energy solutions. Tools that will help residents and business owners assess their solar potential are being considered as well as information on the Sustainable Medfield website.

2.3.2 The plan proposes for the Town to explore the Massachusetts PACE (Property Assessed Clean Energy) program, which can make additional funding available for clean energy technology on commercial properties, non-profits and multi-unit dwellings.

2.3.3. Explore the possibility of offering Community Solar programs to residents[30].

Potential Co-Benefits

- Clean energy solutions improve air quality both indoors and outdoors.
- Building resiliency is enhanced with the implementation of storage solutions.
- Homes and businesses will see reduced total energy costs.
- Businesses can achieve a competitive advantage both from reduced energy costs, and from promotion of their leadership on being an environmentally responsible enterprise.

Equity Considerations

- The Town to explore community based solar and renewable solutions that can benefit all citizens, particularly our most vulnerable.
- State-vetted PACE program allows more businesses, non-profits and multi-family homeowners to secure funding.
- Renters and small businesses benefit from reduced electricity cost.
- Mitigate language and other barriers in educational material and programs.

Partners for Implementation

- HeatSmart Alliance
- Energy Committee
- Sustainability Consultant
- MEMO
- Sustainable Medfield
- Medfield Environment Action
- Assessor
- Tax Collector
- Building Inspector
- Board of Selectmen
- Town Administrator and staff

Measures of Success:

- Number of homes and businesses installing photovoltaic arrays, or PV/storage combinations
- Number of kW from solar arrays installed
- Number of homes and businesses engaged and participating in program

[30] https://communitysolar.energysage.com/?utm_campaign=CDG%201%3A%20Transactional&utm_medium=email&_hsmi=217776527&_hsenc=p2ANqtz--0oVk-neA6RD99080ZXnlxXbAwcBY-H6iN_2ckHXbHhn-P9z-ouXr_G-DQDByppeQj38_JYcUjJQvb7zZaz9-DO02AGA&utm_content=217776527&utm_source=hs_automation

Buildings

Town of Medfield
CLIMATE ACTION PLAN
TOMCAP@medfield.net

Decarbonizing Our Homes and Businesses

Strategies to reduce emissions from our homes, schools, town buildings, and commercial buildings can be summarized in two words: reduce, electrify.

OBJECTIVE 3
Increase Building Efficiency

OBJECTIVE 4
Electrify Heating

In Medfield, buildings - including schools, town buildings, homes, and commercial buildings - emit over one-half of our GHG emissions. Homes alone account for almost 40% of our GHG emissions. So, all building owners in Medfield play a part in achieving the carbon emissions reductions the Commonwealth is pursuing.

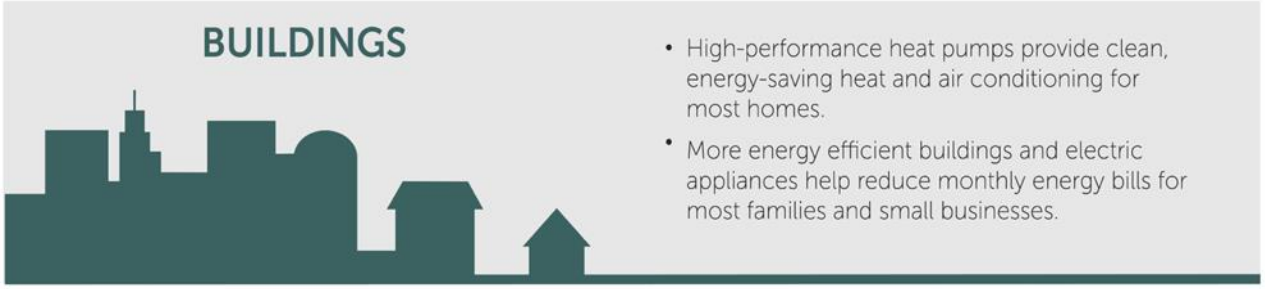
Most Buildings Waste Energy Needlessly.

On average, 30% of the energy used in commercial buildings and 45% of the energy used in residential homes is wasted.[31]

Increasing energy efficiency is the single largest way to eliminate this waste, reduce emissions, and save money. Depending on the building, efficiency improvements can include upgrades such as LED lighting, induction cooktops, and efficient appliances.

The largest efficiency gains often come from improvements to the "building envelope": insulation in walls and roof, windows, and "air sealing" to reduce the amount of heated or cooled air that escapes the building. Medfield will support residents in dramatically improving their buildings, including deep energy retrofits in municipal buildings, commercial buildings, and residential homes. **However, efficiency improvements alone will not result in net zero. Electrification of heating is critical.**

Heating typically accounts for over half of all the energy used in buildings and net zero is not possible with fossil fuel combustion.



Heat pump technology which uses electricity replaces gas and oil burning heating equipment. Paired with the renewable electricity discussed in the first section, heating and cooling will have zero carbon emissions.

The plan envisions to educate and familiarize residents with this technology so that as their current equipment is replaced, they upgrade to a cleaner heat pump. Homeowners and facility owners should develop a comprehensive plan to decarbonize at natural transition points: efficiency improvements in combination with high efficiency heat pumps over time will optimize the costs and benefits.

All **new buildings** must be designed to minimize carbon emissions. The Commonwealth is expected to upgrade building codes in 2023 as well as offer an optional net zero building standard.

[31] https://www.energy.gov/eere/buildings/about-commercial-buildings-integration-program

3.1 Accelerate energy efficiency improvements in existing residential buildings

The Town will educate, encourage, and guide Medfield residents to improve insulation and air sealing, and to pursue other carbon emission reduction opportunities in their homes. The goal is that by 2030, all high-priority homes will have had a MassSave audit and have implemented at least one energy efficiency improvement, and all homeowners and landlords will report energy usage when advertising for sale or lease.

Medfield has 4,490 residential housing units, 81% of which are single family homes or duplexes[32]. Residential buildings account for 39.2% of Medfield's carbon emissions, making them the top priority for the Climate Action Plan.

The Plan strongly encourages all eligible Medfield residents to have a MassSave assessment; this program recently announced a new set of incentives so even residents who have had a prior assessment may qualify for new benefits.

The Pan includes education of residents to incorporate energy efficiency and low carbon emissions anytime they replace a heating or cooling system, hot water heater, appliances, or undertake a significant home improvement project. The Town will track progress by the number of residents reached and the actions they take to increase energy efficiency.

All facilities with fossil-fuel heating (with gas, oil, propane) are excellent candidates for rapidly upgrading to heat pump heating. But not all buildings have the same energy and carbon emissions reduction potential, so the plan specifically targets these high-priority homes:

Homes built before 1983 (when energy efficiency was not a major factor in building codes). Unless they have undergone major renovations, these homes would likely benefit the most from these measures.

Homes using oil or propane heat. About 30% of Medfield homes use oil which is both less efficient and has a higher carbon footprint than methane gas.

Rentals. Rental units are known to be the most challenging type of building to improve but renters may have lower income and so will benefit from energy savings. The plan will engage both landlords and tenants in implementing energy efficiency.

Energy expenses are a significant part of a homeowner's budget so they should be a consideration whenever first purchasing or renting a home. The plan will include outreach to real estate agents in town to educate them on the interest among homeowners in energy efficiency. Realtors and homeowner will be encouraged to build greater transparency in the disclosure of energy use in homes through voluntary disclosure of data, benchmarking, or a formal assessment such as a HERS rating.

Potential Co-Benefits

- Residents save money.
- Homes are more comfortable: warmer and less drafty in the winter, cooler in the summer.
- Residents get a return on the money they have paid into the MassSave program through their monthly energy bills.
- New homeowners and tenants are aware of the anticipated energy use they will experience so household budgets are more informed.

[32] Town of Medfield Assessor's data, 2022

Equity considerations

- Create programs targeting landlords and renters to ensure they realize the savings benefits.
- Mitigate language and other barriers in educational material and programs.
- Identify low- and moderate-income residents to educate them about additional incentives available to them.
- Identify and address hurdles for hard-to--reach populations such as language, time constraints and technological and cultural barriers.

Partners for implementation

- MassSave
- Medfield Environment Action
- Sustainable Medfield
- Affordable Housing Trust
- Medfield Housing Authority
- Council on Aging
- Veterans
- CAP agencies
- Building Department
- Assessor
- Energy Committee,
- Sustainability Consultant,
- HeatSmart Alliance
- Real estate agencies

Measures of success

- Number of outreach events, number of attendees at each event, total number of people reached
- Number of MassSave audits and improvements
- Number of permits issued for heat pumps, energy efficiency renovations, etc
- Percentage of high-priority homes that have had a MassSave audit
- Percentage of homes listed for sale that include energy efficiency information
- Reduction of fossil fuel/energy used in Medfield homes as reported periodically in public databases

This infrared photograph shows that a well-insulated building, such as the one in the center, is highly energy efficient and loses much less heat.

3.2. Accelerate energy efficiency improvements in municipal buildings

The Town will evaluate all town buildings and create a prioritized list of projects, beginning with the biggest opportunities for cost and carbon emissions reductions. The town will achieve 50% emission reductions from buildings by 2030 and eliminate fossil fuel use in all town buildings by 2050.

Medfield owns 11 buildings totaling 596,000 gross square feet (GSF). Energy consumption from the operation of municipally owned buildings is estimated to be 3% of the town's total carbon emissions. Given that the School Department owns 5 of these buildings and accounts for 456,000 GSF, schools will be the primary focus of this strategy. Medfield High School, Blake Middle School, and Memorial Elementary account for nearly two thirds of the energy consumption of all town buildings and will be a first focus.

As of FY21, 35% of the Town's carbon foot-print comes from consumption of electricity and 50% from methane ('natural') gas; the remaining 15% is from transportation fuels[33]. As grid electricity will continue to be decarbonized, the proportion of GHG emissions from fossil fuel heating will only increase over future years.

Since its inception in 2008, the Medfield Energy Committee has worked with the town to identify and implement energy efficiency projects in a number of town buildings including LED lighting upgrades in the schools and for street lighting as well as heat system upgrades in the schools. But there is much more work to be done.

The Plan seeks to further reduce operational energy consumption within existing municipally owned buildings by encouraging simple shifts in occupant use, implementation of enhanced monitoring devices, optimization of HVAC controls, targeting the least-efficient buildings for deep envelope retrofits and upgrades to heating and cooling systems. Robust measuring, verification, and benchmarking of energy data will quantify and validate the impact of these measures.

A subset of buildings will also undergo a significant renovation or be replaced with a new building in the next 30 years, most immediately the Dale Street School and the Pfaff Center. Any such new construction must achieve the lowest possible energy use and highest emissions reductions because those buildings may not undergo significant rebuilding for another 50 to 100 years. Commissioning services that analyze and measure thermal performance of existing architectural assemblies and HVAC commissioning that measures energy efficiency under a variety of conditions can inform the town on what measures will have the most energy impact and cost benefit. This process can include the installation of energy management systems to provide consistent ongoing reporting and more sophisticated control of HVAC equipment.

3.2.1 Increase efficiency by improving occupant behavior. The largest and least expensive way to reduce emissions is by promoting sustainably minded occupant use. Creating building operation manuals for facility staff to troubleshoot problems, including staff training, or adding signage with suggested steps for efficient building operation are examples of how an increased awareness can reduce energy use by improving occupant behavior.

3.2.2 Create a schedule of anticipated replacement of existing HVAC equipment and anticipated renovations of all municipal buildings. Once the schedule is established, look for ways to accelerate implementation such as when other significant building maintenance projects occur.

3.2.3 Conduct energy assessments of the first priority schools (High School, Blake Middle School, and Memorial School), and document age, condition, type, and models of existing HVAC equipment.

Create customized energy conservation measures that include and target energy use intensity and recommended actions to achieve it.

3.2.4 Engage with the town Capital Planning process to schedule and budget for equipment replacement and electrification of all municipal buildings (see Strategy 4.2).

3.2.5 Establish a regular, monthly, town-led process using MEI Insight data (a report available to the town of consumption by building). This process would actively monitor energy consumption in each building, identify unusual increases, diagnose the reason for the increase and act to reduce it.

[33] MassEnergyInsight, "Overall Use, Emissions and Cost Dashboard" report

Equity considerations

- Procurement practices encouraging diversity in suppliers

Partners for implementation

- MassSave
- Board of Selectmen
- Permanent Planning and Building Committee
- Town Administrator
- Facilities Director
- Sustainability Consultant
- School Committee
- School Superintendent
- School Building Staff
- Other relevant Department Heads
- Capital Budget Committee
- School Building Committees
- Energy Committee

Potential Co-Benefits

- Lower energy costs to the town.
- Minimize taxes to residents and/or spend tax receipts in ways that provide additional benefits to residents.
- Improved comfort for Town employees, students and residents.

Measures of success/Interim goals

By 2025:

- Perform energy assessments on three (3) municipal buildings and take at least two actions that result in at least a 20% reduction in energy use in those buildings.

By 2030:

As of August 2022, the Thomas Blake middle school now boasts four heat pump hot water heaters.

(Photo credit: Amy Colleran, Director of Facilities)

3.3 Propose regulations that promote sustainable building practices

Educate on and support town actions that lead to lower carbon emissions., such as advocating for the adoption of the Specialized Opt-in Stretch Code and PACE financing by 2023.

3.3.1 Medfield will consider the adoption of the new Specialized Opt-In Stretch code[34].

The Department of Energy Resources (DOER) released a "Straw Proposal" of new energy efficiency codes on February 8, 2022, with the goal of implementing them in 2023. In addition to a Stretch Code with higher energy performance, they have created what they call a "Specialized Opt-in Stretch Code" which will result in buildings that are Net Zero or Net Zero ready the moment they are built.

As a Stretch Code community Medfield will automatically implement the new Stretch Code, but must vote to adopt the Specialized Opt-In Stretch Code. The DOER's analysis shows that buildings built to these higher efficiency standards are less expensive to construct than homes built to the base code due to generous incentives.

The Medfield Energy Committee will lead a dialogue in town to explain the new requirements to the public, hear concerns, and assess whether these requirements are feasible and affordable.

3.3.2 The Plan proposes that the Town explore the Massachusetts PACE program, which can make additional funding available for clean energy technology on commercial properties, non-profit and multi-unit dwellings.

Potential Co-Benefits

- Builders and new homeowners save money on construction with MassSave incentives for Net Zero homes.
- Homeowners save money every year due to the lower energy use.
- Homeowners enjoy better indoor air quality and live in a healthier home.
- Homes using the techniques required to meet these energy requirements typically need less maintenance.
- Learn from other towns and groups what climate actions are most effective.

Equity considerations

- Ensure that upgraded housing remains affordable.

Partners for implementation

- Planning Board
- Town Planner
- Building Department
- Board of Selectmen
- Tax Collector
- Assessor
- Sustainability Consultant
- Energy Committee
- Town Meeting
- Warrant Committee

Measures of success/Interim goals

- Adoption of the Specialized Opt-in Stretch Code at Town Meeting, 2023
- Explore PACE in 2022 and begin conversation with key stakeholders in Town departments and committees

[34] https://www.mass.gov/info-details/stretch-energy-code-development-2022

3.4. Accelerate energy efficiency improvements in commercial buildings

Educate and encourage commercial building owners to pursue the benefits of energy efficiency with the goal of having 20% of commercial buildings improve energy efficiency by 2030.

Commercial and institutional properties within Medfield account for approximately 13% of GHG emissions.

Increasing energy efficiency in commercially owned properties has immediate bottom-line benefits to landlords and business owners. The Plan will educate facility and business owners on the positive financial benefits of energy efficiency, the incentives available to businesses through the MassSave program, and the appeal of being seen as an environmentally responsible company by customers and prospective customers.

The primary areas of focus of this strategy are similar to the types of actions seen for existing buildings in Strategy 3.1. Efficiency in residences such as weatherization, transition to efficient equipment and taking advantage of programs and incentives offered by the utilities will be the areas of focus. An added priority when dealing with energy efficiency in commercial buildings is the issue of peak demand, i.e., when demand for electricity spikes due to weather conditions such as a hot summer day. The grid typically must activate "peaker" power plants which are typically dirtier sources of electricity. "Shaving", i.e., lowering, peak demand thus lowers pollution and overall electricity production costs.

3.4.1 Create a database of commercial buildings, their owners, and tenants. Document use types (office, retail, manufacturing, etc.), building age, type of fuels used. Such a database can be modeled on existing programs such as BERDO, simplified and scaled appropriately. This would become the core asset to enable the following actions.

3.4.2 Create an education campaign targeting commercial building owners about the paths and benefits of energy efficiency and decarbonization. Encourage and educate owners on a range of small yet practicable building practices that can achieve an overall reduction in electric use during times when electricity use is at its highest.

Research and compile a list of energy measures that will have the most impact on reducing energy use within the most common use types with specific focus on peak electric demand reduction.

3.4.3 Encourage property owners to perform deep energy retrofits beyond MassSave - incentivized measures. They should begin with a more comprehensive energy assessment (e.g., ASHRAE Level 2) and create customized energy conservation measures. Curate a set of resources to support the selection and implementation of conservation measures.

3.4.4 Encourage owners to participate in the Energy Star Portfolio Manager program to track energy use. Further, encourage disclosure of energy use to the town to aid in MEC's ongoing effort towards refining the town wide GHG inventory.

Potential Co-Benefits

- Lower costs and decarbonization improve Medfield businesses' ability to thrive and potentially expand.
- Health benefits for tenant companies, their employees and customers.

Equity considerations

- Create programs targeting landlords and tenants to ensure they realize the savings benefits to building owners, tenants, and employees of all ages, income levels and backgrounds.
- Mitigate language and other barriers in educational material and programs.

Partners for implementation

- MassSave
- MEMO
- Commercial building landlords
- Medfield Environment Action
- Sustainable Medfield
- Building Department
- Sustainability Consultant
- Energy Committee
- Assessor

Measures of success/Interim goals

- Create a database of commercial properties in Medfield with building owners and tenants.
- Create a schedule of annual outreach communications and events.
- Create (voluntary) energy use disclosure program, seeking ongoing participation.

By **2030**:

- 30% of commercial buildings have had an assessment and 20% have implemented least one envelope or HVAC efficiency measure.
- 50% have converted to heat pump for heating and cooling.
- Commercial building energy use disclosure has become adopted into standard building practices and includes large participation.

- Expanded benchmarking of energy use to track GHG emissions from embodied carbon.

By **2050**:

- 100% overall reduction in GHG emissions
- 100% of commercial properties have had an energy assessment performed and 70% have implemented (3) energy conservation measures
- 80% of existing properties have transitioned to heat pump technology

4.1 Electrify residential HVAC, hot water, and cooking equipment

Educate, encourage, and guide residents to replace heating, hot water and cooking equipment with electric equipment.

The combustion of fossil fuels like oil, propane and natural gas in homes is a substantial source of greenhouse gas emissions, responsible for an estimated 40% of carbon emissions in the town of Medfield.

The Town of Medfield's Climate Action Plan reflects the high-priority on electrification of residential heating systems that the Commonwealth's 2050 Decarbonization Roadmap envisions which states "Electrification of space and water heating is a low-risk, cost-effective strategy for decarbonizing the majority of the Commonwealth's building stock".

The Decarbonization Roadmap also states, "Implementing electrification in this context implies the widespread deployment of ... heat pump-based electrified heating systems in place of gas and oil furnaces and boilers."

While the electricity used for heat pumps is generated partially by fossil fuel combustion in 2022, the Commonwealth's Renewable Portfolio Standard mandates a steadily increasing percentage of renewably sourced electricity. Over time, electrified heating using grid electricity will become zero carbon. Further, we anticipate that the Medfield Community Energy program currently in development will offer an affordable 100% renewable electricity option. This would enable Medfield residents to dramatically reduce their emissions by 2025.

"Electrification" of homes primarily focuses on heating and hot water generation, but it also includes changes to electricity for other common household uses of fossil-fuel gas such as propane or methane ("natural gas") for cooking and clothes drying.

The Plan envisions to educate and encourage residents to replace gas cooktops with induction units, gas ovens with electric units, and gas clothes dryers with heat pump models. Not only does burning gas for these uses emit carbon dioxide into the atmosphere, it also emits methane and carbon monoxide into homes. Eliminating the use of gas will eliminate these emissions and improve indoor air quality.

4.1.1 Create an outreach plan to target homes most likely to benefit the most from electrification. The Plan envisions:

Educational and informational events, many to repeat year after year, as the town makes progress to achieve its decarbonization goals. Local events will include webinars, presentations at the library, senior center and high school, and Medfield Day.

Articles in our local newspapers, and programming on Medfield TV, and social media will also be made.

Targeted and general mailings, brochures, oral presentations, and social media. Promotion of resources such as the induction cooktop available for lending at the Medfield Public Library, which allows residents to try out the technology.

4.1.2 Create a resource with information and links to credible, reliable information about heat pumps, high quality HVAC companies, and financial considerations.

4.1.3 Showcase the stories of local residents who already own heat pumps: "Medfield Decarbonizers".

Objectives

Encourage homeowners to become educated about new technologies and plan ahead for natural transition points. Preemptively installing a heat pump when nearing natural transition points will avoid the necessity of an emergency replacement of a boiler, furnace, air conditioner, or water heater.

Potential Co-Benefits

- Increased comfort due to the performance characteristics of heat pumps.
- Improved indoor air quality as a result of not burning fossil fuels in a home.
- Residents will likely save money, especially those heating with oil or propane.

Equity considerations

- Create programs targeting landlords and renters to ensure they realize the savings benefits.
- Mitigate language and other barriers in educational material and programs.

Partners for implementation

- MassSave
- Medfield Environment Action
- Sustainable Medfield
- Building Department
- Assessor
- Sustainability Consultant
- Energy Committee
- Medfield Public Library
- HeatSmart Alliance

Measures of success/Interim goals

By 2027:

- 20% of housing units in Medfield have converted to heat pumps. 80% of housing units that replace a piece of heating/cooling equipment opt for heat pumps.

By 2030:

- 50% of housing units in Medfield have installed a heat pump for at least part of their heating/cooling.
- 100% of housing units that replace a heating/cooling system opt for heat pumps
- 100% of housing units that replace a hot water heater replace it with a heat pump model.

By 2050:

- 100% of housing units in Medfield have converted to heat pumps and induction cooking.

Mini splits and heat pump condenser

4.2 Electrify heating and cooling systems in municipal buildings

Create a long-term, strategic plan to convert all town buildings to electrified heating and cooling upon replacement of existing HVAC equipment.

This strategy dovetails with Strategy 3.2: Increase efficiency of municipal buildings. Planning for building envelope improvements and HVAC upgrades go hand-in-hand. As discussed, the data gathered about the buildings will include detailed information about the current HVAC equipment and its condition.

It is expected that the majority of HP conversions will happen as existing components age and need replacing at the end of their expected useful service life. Likely there will be only one opportunity to replace and upgrade equipment before 2050, so making the lowest carbon choice at the next natural transition point is crucial.

4.2.1 Document the age, condition, and develop an anticipated end-of-life schedule for existing HVAC equipment in all municipal and school buildings.

4.2.2 Identify and mitigate obstacles to transitioning to electrification and ensure all replacement of HVAC equipment within municipal and school buildings are all-electric.

4.2.3 Develop a process to ensure proper selections for all HVAC equipment.

Objectives

Plan ahead to install heat pumps. (Avoid any emergency replacement.)

Potential Co-Benefits

- Minimize energy costs to the town and minimize taxes to residents while decarbonizing.
- A disciplined capital planning process enables efficient procurement, enables prudent financial management, and avoids expensive system failures and emergency replacement situations.
- Improved comfort for town employees.

Equity considerations

- Procurement practices encouraging diversity in suppliers.

Partners for implementation

- Medfield Energy Committee
- MassSave
- Board of Selectmen
- Planning Board
- Permanent Building Committee
- Town Administrator
- Facilities Director
- Sustainability Consultant
- School Committee
- Public School Department
- School building staff
- Town Planner
- Capital Budget Committee
- School Building Committee

Measures of success/Interim goals

By **2023**:

- Have a capital plan that includes HVAC replacement schedules and estimated costs for all town buildings that is integrated into the overall town Capital Budget Plan.

By 2030:

- 20% average reduction in municipal building energy use and 50% GHG emission reduction.

By 2050:

- 50% average reduction in municipal building energy use and 100% GHG emission reduction.
- All municipal buildings have had optimal energy efficiency improvements and have been electrified to the maximum extent feasible.

ADDITIONAL STRATEGY:

Adopt climate-conscious decision-making in Town administration and operations

Ensure consideration of environmental impacts becomes embedded in all Town decision-making and evolves as understanding of the issues evolves and new technologies become available.

In order to fully leverage the opportunity of these clean energy solutions, it is important to surface and mitigate any barriers or constraints to incorporate sustainability as a key evaluation factor in town decisions.

This strategy will also explore and develop action plans to embed sustainability criteria in town processes, vetted with key stakeholders, and presented to the appropriate town governance for review and approval.

AS 1.1 Prioritize sustainable building construction and operation practices within town's administrative priorities. Interviews and discussions with key town department heads and staff members will explore the role of sustainability in decision processes and define barriers to incorporating it more substantively. Ensure there is a clear, transparent, objective process for incorporating sustainability concerns.

AS 1.2 Investigate whether town bylaws or regulations are barriers to optimal implementation of energy efficient and clean technology. Interviews and discussions with key town department heads and staff members may identify examples or cases where existing requirements might discourage or disallow desirable carbon reduction measures. If such barriers are found, begin the process of modifying them to enable clean technology implementation.

AS 1.3 Incorporate checklist of sustainability concerns. Collaborate with Town, residents and regional partners to develop a sustainability checklist for all Town operations, planning and procurement. Formulate and adopt a pertaining policy.

AS 1.4 Incorporate evaluation of embodied carbon into town decision-making. Not only does the ongoing operation of buildings and systems emit carbon, but the manufacture, transportation and installation of products and materials has significant carbon emissions in the immediate term. This is embodied carbon. The goal is that Town decisions take into account the totality of embodied and operational carbon to optimize the lifetime carbon emissions of actions taken.

Potential Co-Benefits

- Improved coordination and decision making; fewer conflicting goals across departments.
- Continued qualification for further grant and funding opportunities.
- Having all departments consider the impacts of their decisions /spending plans as they relate to the town-wide effort to reach net-zero will make the best use of the town's financial resources, avoiding having to re-do something down the road.

Getting Around Medfield

Town of Medfield
CLIMATE ACTION PLAN
TOMCAP@medfield.net

Decarbonizing Transportation

Electrification of transportation and a reduction in the passenger miles traveled with subsequent reduction of direct emission are at the core of the transportation plan and involve two objectives:

OBJECTIVE 5

Reduce emissions from motorized vehicles

OBJECTIVE 6

Encourage a variety of low/no carbon mobility options

In Medfield, cars and trucks represent the second largest source of GHG emissions, with private vehicles producing nearly 42% of the total town GHG emissions. All Medfield drivers have a role in achieving the Town's GHG emissions reductions.

Internal Combustion Engine vehicles (ICE) produce a variety of pollutants, including the GHGs carbon dioxide and nitrogen oxides, as well as ozone, sulfur dioxide, unburned hydrocarbons and volatile organic compounds. All of these are of concern to the environment and human health.

Electric vehicles (EVs) offer the best choice to quickly and significantly reduce GHG emissions. The adoption of electric vehicles must accelerate for Massachusetts to reach its climate goals and the specific goal of 300,000 ZEVs registered in Massachusetts by 2025[35]. Massachusetts, public utilities, and the federal government are supporting EVs with regulations and incentives. Similarly, these same entities are committing major resources towards building grid resilience and charging infrastructure. Beginning in 2035, Massachusetts will allow only the sale of ZEVs.[36]

Auto manufacturers around the world are investing in the development of new electric models, battery improvements and dedicated factories. Currently, electric passenger vehicles and buses are cleaner, less costly to operate, and require little maintenance as compared to gasoline and diesel vehicles. The cost to purchase an EV depends on the type and size and spans from economical to luxury, just like ICEs. Massachusetts rebates and federal tax incentives up to a combined $10,000 in many cases, will help encourage EV adoption among consumers.

In addition, EVs ready for bidirectional charging, when combined with a modernized electrical grid, can contribute to grid resilience, reduce the cost of electricity by reducing peak demand, and create income to the EV owner.[37]

Medfield will plan for and work to encourage other modes of low carbon mobility, such as walking, biking, ride shares and public transportation. Continued and broader implementation of Massachusetts "Complete Streets" funding program[38], which promotes safety in mobility for pedestrians and bicycles, will help achieve our low carbon mobility goals. In addition, it will provide access to federal infrastructure funds administered by DOT, which require a Complete Streets plan and policy adoption.

[35] https://www.mass.gov/files/documents/2016/08/nk/massachusetts-zero-emission-vehicle-action-plan2015.pdf

[36] https://www.nbcboston.com/news/local/sales-of-new-gas-powered-cars-wont-be-allowed-in-massachusetts-in-2035/2818583/

[37] https://www.connectedsolutionsev.com/faqs/eversourceev-faq/

[38] https://www.mass.gov/complete-streets-funding-program

5.1 Accelerate adoption of EVs by Medfield residents

The Plan accelerates the adoption of private and commercial electric vehicles through comprehensive and sustained outreach efforts to educate and influence residents on the benefits, options, and incentives for electric vehicles. Medfield's goal matches the State goal of 15% of passenger vehicles registered in Medfield are electric by 2025[39]. By 2030, all new, purchased passenger vehicles and light duty trucks are electric, and by 2050 all private and commercial vehicles registered in Medfield are electric.[40]

Massachusetts law mandates that, beginning in 2035, all new, purchased vehicles must be ZEV. The Plan sets an accelerated goal for Medfield of all new, purchased vehicles being electric by 2030.

As of 2022, there are approximately 11,600 passenger cars registered in Medfield. About 4,200 vehicles are from model years 2000-2013 and are most likely to be replaced soon. Since 2013, approximately 800-900 vehicles have been registered for each model year. With hundreds of cars replaced every year, there is ample opportunity for residents to choose an EV when they purchase a new car or light truck. The 15% goal would require 1740 PAN (the MassDMV code for passenger vehicles) registered EVs in Medfield by 2025.[41]

Residents will continue to be encouraged to drive electric through ongoing education and outreach:

5.1.1 Education and outreach

- Support EV information on Sustainable Medfield website
- Webinars, newspaper articles and informational fliers
- Showcase Medfielders who already own EVs:"Decarbonizers"

5.1.2. Promote EVs at community events, such as:

- Medfield Day
- "Medfield on the Charles Antique, Classic and Custom Auto Show"
- New 'n Towne "Touch a Truck"

Potential Co-Benefits

- Cleaner air and improved public health
- Price advantage of operating costs
- Support grid resiliency by integrating bi-directional vehicle charging and mitigate expensive peak demand

Equity Considerations

- Promote rebates and incentives to increase accessibility
- Mitigate language and other barriers in educational material and programs
- Charging infrastructure at multi-unit dwellings and rental properties

Partners for Implementation

- Landlords
- Planning Board
- Sustainable Medfield
- Medfield Environment Action
- Assessor
- Energy Committee
- Green Energy Consumers Alliance
- EV car dealerships
- Town departments

Local Service groups: Veteran's groups, Medfield Food Cupboard, Churches, Medfield Home Committee, Medfield Together, Medfield Outreach, Service organizations (e.g., Lion's Club)

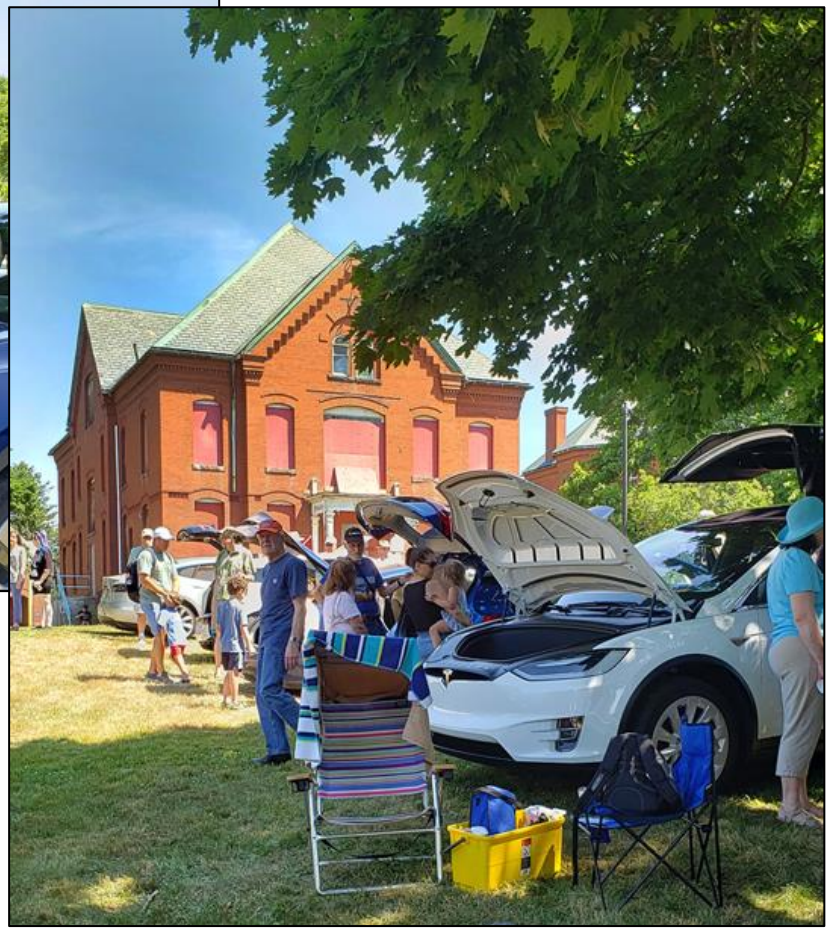
Measure of Success:

- Number of electric vehicles purchased
- Number of electric vehicles registered in Medfield
- Development of supporting infrastructure.

[39] https://www.mass.gov/service-details/zero-emission-vehicle-zev-commission https://www.mass.gov/files/documents/2016/08/nk/massachusetts-zero-emission-vehicle-action-plan2015.pdf

[39] PAN: "Passenger, Normal" registration

[40] Excepting Historic Vehicles https://www.dmv.org/ma-massachusetts/special-license-plates.php#Historic-Vehicle-License-Plates



Electric vehicles on display by their owners at the 2022 Medfield on the Charles Antique, Classic & Custom Auto Show. (Photos by C.F. White)

5.2 Develop electric charging infrastructure

The Plan supports charging station infrastructure that may include Town vehicle stations, public access stations, commercial stations, and residential stations. The goals are to make charging stations available town-wide, to cover at least 80% of need by 2030, and to provide full access by 2050.

Most EV owners will likely continue to charge at home. Eversource offers rebates and incentives for home charging stations through the EV Infrastructure Phase II and Connected Solutions programs.

Investments going into EV charging systems nationwide are making EV's easier to use, versatile, and practical. Medfield must accelerate planning and development for Town vehicle charging, and other opportunities to apply for upcoming incentives and grants.

The Town has begun this journey by installing charging stations near Town House, Blake Middle School and Wheelock Elementary. Town departments, such as the DPW, Fire, Police and others have identified potential public and Town vehicle charging locations for their vehicles.

Some other potential locations include the library, Medfield State Hospital, and commercial parking lots. Some local commercial businesses[42] have already installed charging stations and more are likely to do so. The Plan proposes that the Town encourage landlords, commercial property owners and developers of MUDs to install chargers for their residents, employees, and customers. The Plan encourages the Town to consider requiring a minimum number of EV charging stations at multi-unit dwelling lots, similar to the requirements at the Medfield State Hospital development.

While there are grant opportunities through Make Ready and MassEVIP programs for the installation of public charging stations, details of the metering and price of the electricity will be part of the considerations of each project. Some charger owners may see a benefit in subsidizing the cost of electricity.

Public chargers will include a combination of Level 2 and Level 3 chargers. The Level 3 chargers are faster and are also known as Direct Current Fast Charge (DCFC).

Some upcoming actions will include:

5.2.1. Participation in Eversource Make Ready Program and MassEVIP[43].

5.2.2. Encourage developers and landlords to install charging stations at MUDs and commercial properties.

5.2.3. Town to consider regulations requiring minimum EV charging in MUD lots.

5.2.4. Educate residents about home charging equipment and rebates.

Potential Co-Benefits

- Electric grid stability.
- Support economic development by supporting local businesses to be attractive to customers and employees.

Equity Considerations

- Access to capital; Short term affordability vs long-term savings
- Mitigate language and other barriers in educational material and programs
- Access to charging infrastructure at multi-unit dwellings and rentals

Install charging at affordable housing to enable EV ownership, while directing landlords to incentive programs and otherwise encouraging rent stability.

Partners for Implementation

- Board of Selectmen
- Town Administrator
- Town Planner
- Department Heads (e.g., COA)
- Energy Efficiency Consultant
- Eversource Make Ready
- MassEVIP
- MEMO and commercial landlords
- MUD landlords and developers
- Sustainable Medfield
- Medfield Environment Action
- Local Service groups: COA, Veteran's groups (e.g., American Legion), Medfield Food Cupboard, Churches, Medfield Home Committee, Medfield Together, Medfield Outreach, local service organizations (e.g., Lion's Club)

Measure of Success:

- Number of publicly available charging stations installed
- Number of residential chargers in Medfield

[42] Bank of America, Montrose School

[43] https://www.mass.gov/how-to/apply-for-massevip-public-access-charging-incentives

5.3 Efficient electrification of Town and school vehicles

The Plan calls for the electrification of the municipal fleet through the budgeting process, as appropriate department by department[44]. The goal is for all new vehicles purchased or leased to be electric by 2030, wherever financially and ***operationally feasible. (The Committee recognizes that some specialized vehicles may not be feasible to be electric but is optimistic that this will change over time.). The goal for 2050 is for all vehicles to be electric.***

Medfield can lead by example through its emphasis on making disciplined decisions in its proactive efforts to address critical issues affecting the town and community. As a Green Community, municipal vehicle purchasing and selection follow GC Criterion 4, a process that considers fuel efficiency, operating cost and acquisition costs.

EV manufacturers have focused on certain types of municipal vehicles. For example, one manufacturer of police vehicles has a hybrid SUV and an acclaimed EV line of pursuit vehicles. Additionally, many departments are looking at new EV pick-up trucks and how they may be integrated into their fleet.

The transition to electric school buses is a national priority and resources are becoming available for electrification. The Plan encourages the School Department to monitor and pursue options, to engage with regional partners, bussing contractors and EV Fleet specialists, and integrate e-busses into their future plans.

The following are components of the Plan to electrify Town vehicles:

5.3.1 Plan efficient electrification of eligible municipal vehicles for each department.

5.3.2 Integrate purchases with capital planning.

5.3.3 Allocate space and plan for municipal electric charging stations 2-3 years prior to acquiring EVs.

5.3.4 Pursue grants for electric school buses and other special electric vehicles, as well as charging stations.

5.3.5 Explore partnerships with programs that facilitate fleet electrification, such as fleet assessment services for commercial, municipal or non-profit fleets.

Potential Co-Benefits

- Cleaner air, improved public health.
- Less noise.
- Additional revenue from Eversource for using vehicle batteries for peak use and night use in the summer.
- Greater price stability of electricity due to long-term utility contracts in comparison to imported gasoline/diesel.
- No idling needed for police vehicles when parked at Public Safety Building.

Partners for Implementation

- Board of Selectmen
- School Committee
- School Department
- Town Administrator
- Facilities Director
- DPW Director (DPW has responsibility for the maintenance of town vehicles)
- Departments that own fleet vehicles: Police, COA, P&R, Building Inspector
- Sustainability Consultant
- Bussing contractor
- EV fleet specialist
- Eversource Make Ready
- MassEVIP
- Energy Committee

Measure of Success:

- Number of electric vehicles purchased by the town
- Number of electric school buses
- Number of light-duty, medium-duty, and heavy-duty trucks
- Number of electric police cruisers

[44] The Committee recognizes that some specialized vehicles may not be feasible to be electric.

5.4 Support regulations that encourage the transition to low carbon mobility

The Plan encourages continued improvements of the regulatory landscape to facilitate the adoption of electric vehicle and charging infrastructure. The plan also encourages the exploration of solutions through work with relevant stakeholders and agencies to adopt regulations.

Widespread adoption of EVs and electric charging infrastructure is made safer and easier with the adoption of rules that account for the new technology. Current initiatives in the Massachusetts legislature include that the RMV specifically tag EVs, which will enable towns and policy makers to accurately measure the number of EVs, and regulations relating to the safe use of e-bikes.

The equitable implementation of new charging infrastructure may require regulations stipulating a minimum density on lots or specific locations, and the Plan encourages the Town to explore equitable and potentially progressively stringent solutions, as needs are likely to change over the next decades.

The following action items will contribute to the process.

5.4.1 Support legislation for the State/RMV to code for EVs (metrics).

5.4.2 Advocate for sufficient charging station requirements for multi-unit dwellings.

5.4.3 Support effective and safe regulation of e-bikes, e-scooters and similar devices.

5.4.4 Support regulations that phase out gas-powered lawn care and landscaping equipment in Medfield.

Potential Co-Benefits

- Support of e-vehicles that will provide improved customer experiences for local businesses.
- Public health benefits.

Equity Considerations

- Mitigate language and other barriers in educational material and programs.
- Equitable access to charging infrastructure at multi-unit dwellings and rentals.

Partners for Implementation

- Board of Selectmen
- Town Administrator
- Town Planner
- Energy Committee
- Sustainability Consultant
- State legislators
- Regional partnerships
- Medfield Environment Action
- Planning Board

Measure of Success:

- Absence of identifiable barriers discouraging the expanded use of e-vehicles

6.1 Make Biking and Walking Safer and More Common in Medfield

The Plan envisions biking and walking become more common in Medfield not only through inclusive Town planning policies, but also by educating children and parents on safe bike use through training and workshops. A goal is to extend the Complete Streets program to all major roads, and to achieve Complete Street Certification by 2025. The 2030 goal is 50 % more bike usage, and safe bike access for all by 2050[45].

Medfield has been leading by example, making bike access a high-priority in street planning. The town has produced a sidewalk and bike lane inventory, has created marked bike lanes, provided bike parking at schools and other improvements. Friends of Medfield Rail Trail have successfully developed a 1.3-mile trail as part of the Bay Colony Railroad trail. Continued improvements will encourage riders and pedestrians of all ages and abilities.

Obtaining federal and state grant support is crucial for climate conscious infrastructure improvements, and the Plan encourages the Town to accelerate and broaden its plan and policy for Complete Street certification and the planning of projects ready for grant funding[46]. Medfield's Rapid Recovery Plan 2021 envisions Complete Streets in the center of town. While acknowledging the financial and practical hurdles, the plan strongly encourages the Town to extend bike-friendly and pedestrian-friendly Complete Streets plans and policies to all streets leading from outlying neighborhoods to downtown, the schools and business centers.

The town has been exploring mixed use zoning and higher density zoning/cottage housing. Such regulations can reduce the distances traveled by residents within town and facilitate low carbon mobility modes, which are needed to reach the 2030 50%GHG limit.

Training older children on traffic rules and bike handling will serve to make them and their parents more comfortable to ride bikes in town and will increase traffic safety. The Plan envisions systematic education on bike and traffic safety for 4/5th graders as part of the school education.

6.1.1 Work with DPW, Town Planner, Masterplan, Rapid Recovery Plan to accelerate Complete Street certification, which will give access to funds disbursed by MassDOT. Shared Streets and Spaces Program, Local Bottleneck Reduction Program and the recently filed $9.78 bond bill offer additional sources of funding.

6.1.2 Support the ongoing implementation of Complete Streets plan and policy that encourage low carbon mobility on all streets.

6.1.3 Plan and build a network of bike lanes, walking paths and access lanes that connect neighborhoods to the center of town, business centers and schools.

6.1.4 Work with local businesses to install or provide bike sheds and racks in strategic locations to encourage economic development.

6.1.5 Support and plan for e-bikes, e-scooters, Segway and other alternative transportation. Monitor and publicize new federal e-bike tax credits, when enacted.

6.1.6 Work with School Department, Blake and Dale Street school staff, police, parents, and advocacy groups to develop and run bike safety courses for 4-8^{thth} graders.[47]

6.1.7 Explore a crossing flag program.[48]

Potential Co-Benefits

- Public health: reduced pollution and more exercise/recreational opportunities.
- Economic development supporting local businesses.
- Mental health and social benefits.

Equity Considerations

- Greater opportunities for more varied forms of transportation expands opportunities for residents who may not have cars.
- Alternative transportation in case school bus fees are implemented.
- Bike and walking lanes provide safer travel for wheelchairs users, independence for disabled citizens and youth.

Partners for Implementation

- Town Planner
- DPW
- School Department
- School Committee
- Friends of the Medfield Rail Trail

[45] "**Complete Streets Funding Program**
A Complete Street is one that provides safe and accessible options for all travel modes - walking, biking, transit and vehicles – for people of all ages and abilities" https://www.mass.gov/complete-streets-funding-program.

[46] Complete Streets makes Medfield eligible for MassDOT funding, including Infrastructure Investment and Jobs Act

[47] Similar to https://www.sustainablewellesley.com/news/welleslseys-rules-of-the-ride-bike-event-grade-5

[48] https://www.motherearthnews.com/sustainable-living/green-transportation/crossing-flags-zb0z1304zpit/

- Board of Selectmen
- Town Administrator
- Energy Committee
- Sustainability Consultant
- Warrant committee
- MEMO
- Sustainable Medfield
- Medfield Environment Action
- Local Service groups: Veteran's groups (e.g., American Legion), Medfield
- Food Cupboard, Churches, Medfield Home Committee, Medfield Together, Medfield Outreach, local service organizations (e.g., Lion's Club)
- Bike safety and advocacy groups[49]

Measure of Success:

- Complete Streets certification
- Number and length of bike and walking paths that connect neighborhoods to town destinations
- Adequacy of bike racks/sheds installed in public locations and by businesses
- Number of students passing bike safety course
- Number of students biking to school, events, and locations around town.

Kids' sidewalk art showing how Medfield children envision bike lanes as part of a complete and safe street, safe for all ages.

[49] https://www.massbike.org/education, https://www.sustainablewellesley.com/news/wellesleys-rules-of-the-ride-bike-event-grade-5

6.2 Support and Expand Public Transportation and Shared Rides

The Plan calls for Medfield to explore options and expand programs and infrastructure that reduce the miles driven in single-occupancy vehicles.

Medfield's transit and shared ride options are mainly limited to bus and van services. The Council on Aging operates three vans. The Plan calls for a periodic review of available options and support for those that make shared rides more accessible to Medfield residents.

Ride sharing is an expanding opportunity that Medfield will explore. Some surrounding towns have good models that Medfield will evaluate.

6.2.1 Support and expand on demand ridesharing while electrifying the vehicles.

6.2.2 Explore transit or shuttle services to MBTA regional rail stations.

6.2.3 Explore options that other towns have found useful, such as Ride with Via.

6.2.4 Explore apps that facilitate carpooling for commutes and other regular trips.

6.2.5 Explore ways to reduce parents' trips to and from school and to make school bus travel more agreeable to students and parents, including shorter routes and extended service.

Potential Co-Benefits

- Support local businesses
- Reduce congestion
- Improve air quality
- Increase youth and elderly mobility and independence

Equity Considerations

- Mitigate language and other barriers in educational material and programs.
- Develop fee structure and routing to meet the needs of those most vulnerable.

Council on Aging provides local transportation for Medfield seniors.

Partners for Implementation

- Board of Selectmen
- Town Administrator
- Town Planner
- Medfield Energy Committee
- Department Heads and Boards
- Sustainability Consultant
- Energy Committee
- MEMO
- Sustainable Medfield
- ridewithVia.com or similar
- Medfield Environment Action
- Local Service groups: Veteran's groups (e.g., American Legion), Medfield
- Food Cupboard, Churches, Medfield Home Committee, Medfield Together, Medfield Outreach, local service organizations (e.g., Lion's Club)

Measure of Success:

- Number of rides shared.
- Number of ride share programs
- Number of routes that perform within budget
- Number of parents' school drop offs and pickups

ADDITIONAL STRATEGIES:

Enforce the No-Idling Law

The Commonwealth of Massachusetts seeks to improve air quality and public health by reducing unnecessary idling.

"Idling can produce more pollution per minute than driving. Studies have linked various types of vehicle emissions to asthma symptoms, cardiopulmonary disease, lung cancer and other serious health problems. Children are even more vulnerable to air pollution than adults because they breathe much more air per pound of body weight and their respiratory defenses are not fully developed."[50]

Massachusetts law prohibits idling with any vehicle for longer than 5 minutes unless the vehicle is being serviced, engaged in a delivery or similar, or the engine power is needed for another use[51]. The law specifies fines of up to $100 for a first offense and $500 for repeat violations. Offenses found to violate clean air provisions could see fines up to $25,000 per violation. Drivers and/or companies can be held responsible for paying the fine.

The Massachusetts Department of Environmental Protection has developed a toolkit for Towns and other organizations to publicize and enforce this law[52].

The Plan encourages the Town to adopt a no-idling policy, and to publicize and enforce such policy. Local enforcement can be handled by appropriate Town officials such as health officials or the police.

Support Mixed Use Zoning and Higher Density Use Zoning, Cottage Housing

Recognizing space limitations in town development, the Plan encourages the Town to continue exploring higher density housing, cottage housing, accessory dwellings, and mixed-use zoning in appropriate locations to help increase walking and biking.

[50] https://airqkc.org/pdf/Idling-myths-and-facts.pdf

[51] https://www.hampshire.edu/sites/default/files/envhealthsafety/files/massidlinglaw.pdf

https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXIV/Chapter90/Section16A

https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXVI/Chapter111/Section142A

[52] https://www.mass.gov › doc › massdep-idling-reduction-kit › download