Marblehead Net Zero Roadmap

May 2023

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Acknowledgements

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- John Albright, Marblehead Building Commissioner
- John Buckey, Superintendent, Marblehead Public Schools
- Becky Curran, Marblehead Town Planner
- Michael A. Hull, Chairman, Marblehead Light Commission
- Thatcher W. Kezer III, Marblehead Town Administrator
- Joe Kowalik, General Manager, Marblehead Municipal Light Department
- John Livermore, Co-Founder, Sustainable Marblehead
- Eileen Mathieu, Leader, Clean Energy Working Group, Sustainable Marblehead
- Andrew Petty, Marblehead Public Health Director
- Alexa Singer, Member, Marblehead Select Board
- Lisa Wolf, Vice Chair, Marblehead Light Commission

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Introduction

Letter from the Future:

July 4, 2040

Dear Marblehead Residents of 2023,

What an amazing opportunity to be able to speak with you from 17 years in the future to tell you how your bold actions made all the difference to ensure that Marblehead achieved net zero carbon emissions by 2040, and helped America lead the world to achieve a sustainable climate. We are writing to congratulate and thank you for your vision and courage, and we are thrilled to report that we successfully achieved our transformation to a Marblehead powered 100% by clean, affordable energy.

It is clear now that your decision was timely, given the state of the global climate in 2023. After the Net Zero Action Plan was adopted, implementation became an all-hands on deck effort that brought the Marblehead community together in a common purpose, reminiscent of our 'First in Freedom' support for the American Revolution in the 1770's, but this time to fight for a livable future for ourselves and our children.

Residents, businesses, and the Town led with the 3-prong strategy: 1) dramatically ramp up the energy-efficiency of our homes and buildings, 2) electrify our homes and buildings, and 3) electrify our transportation. Homeowners and businesses significantly reduced their energy usage through deeper energy efficiency and smart energy technologies and installed air-source heat pumps to provide for their heating, cooling, and hot water needs. Some residents installed solar to help the town generate more renewable electricity. Word spread quickly that electric vehicles were not only more economical and sustainable, but they were also much more fun to drive, with their superior acceleration and performance. Electric bikes also proliferated in town and helped to enhance Marbleheaders' feeling of camaraderie and community.

Our Marblehead Municipal Light Department set to work expanding its initial efforts to green our electricity grid. Their foresight and strategic planning to employ battery storage, solar, wind, nuclear, and hydro generation, and smart grid technologies made this possible. Their efforts, in cooperation with Marblehead Town Departments and all of the town residents, enabled the electrification of most buildings and transportation, with the remaining emissions offset with tree planting and carbon capture and storage technology.

Achieving this enormous success was at times difficult and was the result of the dedication and inspired work of numerous Marblehead leaders and all of the citizens of the town. It was gratifying to be able to track our success toward eliminating our carbon emissions with the Marblehead Community Carbon Dashboard that helped people to see how their efforts were contributing to achieving our goal.

As we stand here in 2040, we are inspired by your vision and decision to act decisively in 2023, and we thank you from the bottom of our hearts for making our tomorrow possible!

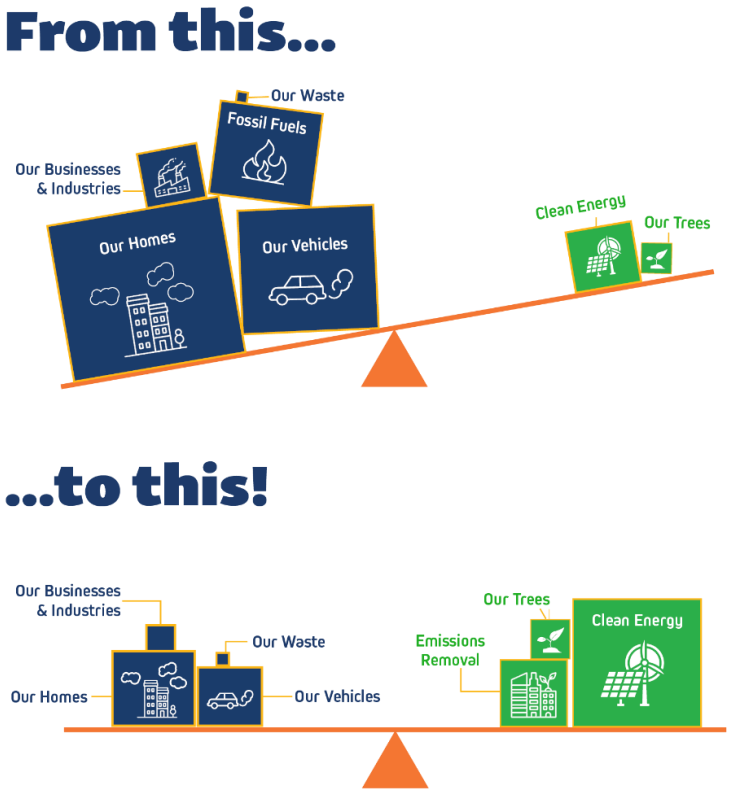
With deep gratitude,

The 2040 Green Marblehead Committee

Getting to Net Zero

Marblehead is committed to reaching net zero greenhouse gas (GHG) emissions by 2040. What exactly does this mean for our community and why does this matter? What do we need to do to reach this goal? The Marblehead Net Zero Roadmap answers these questions and charts our course to reach net zero by 2040.[1]

What does "net zero" mean?



Reaching "net zero" means that our community will reduce its GHG emissions as much as possible and remove or offset any remaining emissions by 2040 or ideally sooner. This will require a major shift in the way we heat and cool our homes, how we get around, and where our energy comes from. It also presents a huge opportunity to change our community for the better. By

[1] While the 2021 *Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy* requires all municipal light plants to achieve net-zero greenhouse gas emissions by 2050, Marblehead committed to reaching net zero emissions community-wide in its Marblehead Climate Vision, adopted by the Select Board in November 2020.

achieving net zero GHG emissions, we can also have cleaner air, healthier people, and a more equitable and prosperous community for everyone.

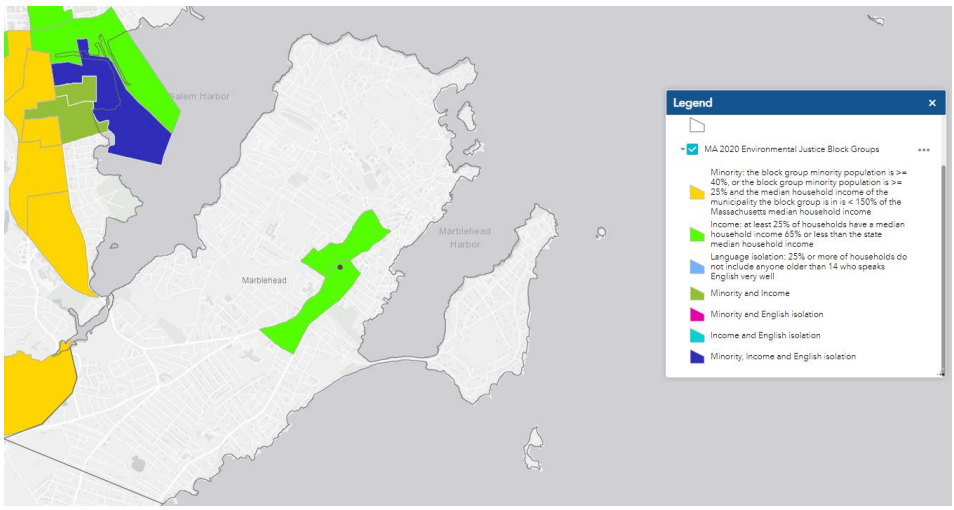
Why net zero?

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 on a large scale in the mid-1800s. We also know that if we can keep warming below 1.5° Celsius, we can avoid the worst impacts of climate change like more extreme floods, wildfires, and droughts. We have a limited "carbon budget," or amount of GHG pollution that we can afford to 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 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. During the spring of 2021, the Commonwealth enacted Senate Bill 9, An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy, which set the interim GHG reduction targets of no less than 50% by 2030 and 75% by 2040. Our net zero roadmap highlights the strategies that we can deploy locally to accelerate this transition over the next several years.

Getting there equitably

Climate change is an existential challenge, but it is also an opportunity to reimagine Marblehead's future and to make that future safe, affordable, and equitable for all who live and work in our community. As Massachusetts municipalities are increasingly undertaking climate mitigation and adaptation strategies, they are seeking ways to ensure that climate action benefits the entire community, especially those most vulnerable to the impacts of climate change and people who have so far been largely excluded from the benefits of climate solutions. By centering equity in this plan, we can build a future that not only is safer and more affordable for all, but that also allows each individual in Marblehead 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 different groups and neighborhoods are able to respond to a changing climate, and the needs of residents. We recognize that the effects of climate change systemically impact environmental justice communities and other vulnerable populations inequitably. The comparatively negative health outcomes that people of color experience are one example. The inequities we see today will persist in the future if we do not act.



Marblehead has two environmental justice block groups, shown in the map above generated using the Massachusetts 2020 Environmental Justice Populations mapping tool available here.

Many of the actions and strategies outlined in this roadmap include "equity considerations" – observations about the ways in which the action can be and should be implemented to advance equity in our community.

Where we're starting

To get a sense of Marblehead's emissions baseline, MAPC and the Green Marblehead Committee completed an inventory of community-wide greenhouse gas emissions using MAPC's Community Greenhouse Gas Inventory Tool.[2] The inventory calculated emissions from buildings, transportation, waste, and other sources in Marblehead for the calendar year 2017, the most recent year for which complete datasets are available. The inventory does not include emissions from boating or airplane travel. For a full description of the inventory methodology, see Appendix B.

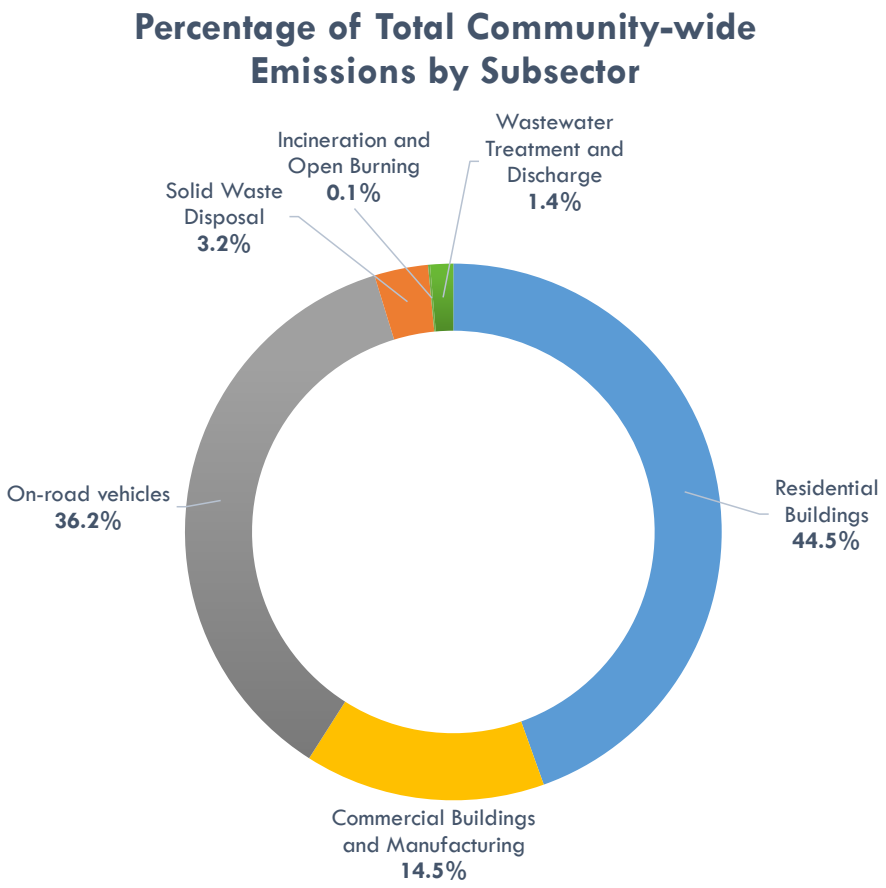
In 2017, Marblehead's total community-wide greenhouse gas emissions were 161,130 metric tons of carbon dioxide equivalent (MT CO2e).

Total emissions in Marblehead in 2017 = 161,130 MT CO2e

Marblehead's community-wide GHG emissions in 2017 by sector are as follows:

- 59.0% of emissions (or 95,119 MT CO2e) from the stationary energy sector (buildings and industry).
- 36.2% of emissions (or 58,353 MT CO2e) from the transportation sector.
- 4.8% of emissions (or 7,657 MT CO2e) from the waste sector.

[2] https://www.mapc.org/resource-library/community-ghg-inventory-resources/



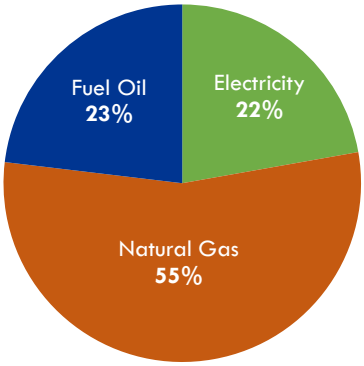
The largest source of GHG emissions in Marblehead is residential buildings, which are responsible for emitting approximately 45% of the total community-wide emissions. About 48% of residential building emissions come from natural gas.

Approximately 75% of the total stationary energy's emissions came from residential buildings.

On-road transportation emits about 36% of the community-wide emissions.

Residential buildings and passenger vehicles are responsible for 78.5% of the total community-wide emissions in Marblehead. This shows how critical it is for residents and businesses to work with the Town to reduce their emissions.

Percentage of Building Energy Emissions by Source Energy



Natural gas is the largest source of emissions from buildings in Marblehead, making up 55% of building emissions while fuel oil contributes another 23%. Together, the combustion of fossil fuels in buildings produces 78% of emissions from buildings and 38% of total community-wide emissions.

How do we get there?

A lot can change in 17 years and this plan is a starting point on our path to net zero that we will revisit and adjust as we continue to move forward in the coming years.

Currently, our GHG inventory summary shows that our community needs to focus on the sectors where the majority of our emissions are coming from: transportation and buildings, and residential buildings specifically. Along with these two sectors, we will also be focusing on other efforts. To reach our net zero goal, our community will need to work towards six core transitions.

1. **Make our homes and buildings super-efficient.**

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

2. **Electrify heating, cooking, and appliances.**

Switching to electric heating, cooking, and appliances like air-source heat pumps, induction stoves, and heat pump clothes dryers immediately reduces carbon emissions and improves indoor air quality, and these benefits only get better as our electric grid gets cleaner.

3. **Electrify cars, trucks, buses, trains, and other ways we get around.**

Electric vehicles (EVs) are cleaner, cheaper to run over time, and require less maintenance. Providing access to charging stations and creating electric transportation options for those who do not own vehicles are essential to this transition.

4. **Make walking, biking, and public transit the best way to get around.**

By designing people-centered streets and sidewalks, we can reduce emissions and air pollution while also providing opportunities for residents to be healthier and more connected to their community.

5. **Green the grid with renewable energy sources.**

Renewable energy comes from endlessly sustainable sources such as wind, the sun's heat or light, and the earth beneath our feet. Our electricity is getting greener all the time and the Marblehead Municipal Light Department (MMLD) is statutorily required to achieve net zero emissions in its portfolio by 2050 and is evaluating opportunities to achieve net zero as soon as possible.

6. **Produce and store more renewable energy locally.**

Generating renewable energy locally avoids the expense of long-distance transmission of power, and small-scale clean energy projects, such as rooftop solar, can provide new power sources more quickly than large developments. Local energy storage systems can help make our community more resilient to extreme weather and can help store excess clean energy generation for use when we need it most.

Commented [VT1]: Spell out

What have we already done?

Marblehead has already taken many important steps toward its net zero goal. For example, in 2018, Town Meeting voters approved Article 45 supporting the goal of Marblehead striving to reach 100% carbon-free energy. In 2018, Sustainable Marblehead released its first greenhouse inventory, and in 2020 it published its Climate Action Plan Framework, which proposed setting a community-wide target of net zero carbon emissions by 2040. Later in 2020, the Green Marblehead Committee published the Marblehead Climate Vision, outlining a vision and action plan to help guide Marblehead's efforts to reduce emissions and advance its intent to become a more sustainable community. The Climate Vision report plans and prioritizes sustainability initiatives based on public feedback and sets forth goals and a vision. The Climate Vision Document was presented to the Select Board in December 2020, and they voted to accept the document and its recommendations. This work was supported through a technical assistance grant received from MAPC. You can view the report **here.**[3] Also in 2020, the Town purchased the first electric vehicle charging stations for public use and leased its first electric vehicle for Town department use.

Marblehead Municipal Light Department (MMLD) has also taken multiple steps to increase the percent of carbon-free power in its portfolio, including the addition of hydropower from Quebec and solar photovoltaic (PV) electricity from Ludlow, Massachusetts. It has completed a townwide evaluation of potential municipal solar sites, with technical expertise provided by the National Renewable Energy Lab (NREL). It helps customers save energy and reduce carbon pollution locally by offering free home energy audits, and a suite of incentives to promote energy efficiency including cash rebates to customers who switch to clean energy technologies like heat pumps and high efficiency appliances. It has offered a free level two electric vehicle charger program to Marblehead residents who participate in a smart charging program designed to minimize level two charging during peak periods of the day.[4] MMLD offers customers the option to purchase 100% carbon-free energy through its "Go Green Now" program.[5] The department has also created a "Neighbors Helping Neighbors" program that assists Marblehead households in financial need, providing direct financial assistance on electric bills to qualified households in a program administered by the North Shore Community Action Program.

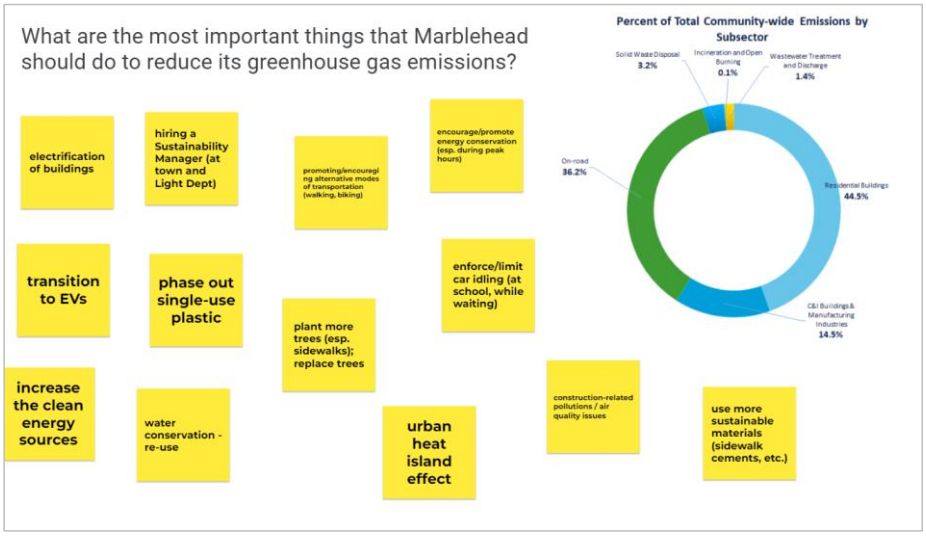
Commented [WB2]: Joe added some additional context on MMLD's activity to date here.

What have we heard from the community?

This roadmap was created with input from the Marblehead community. In October 2021, MAPC and the Green Marblehead Committee hosted a virtual public workshop to gather input from the community to inform the roadmap. Participants were asked to envision the future in 2040 once Marblehead has reached its net zero emissions goal and share their thoughts about the most important climate actions that Marblehead should take to reduce its emissions.

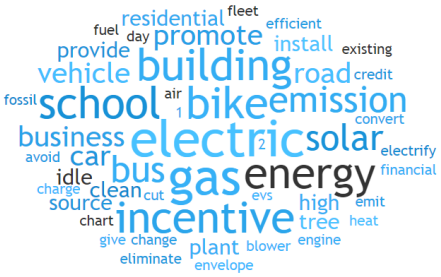
[3] https://www.marblehead.org/home/files/climate-vision
[4] https://marbleheadelectric.com/rebates-incentives.html
[5] https://marbleheadelectric.com/go-green-now.html

This word cloud displays the themes from workshop participants' visions of the future in 2040 once Marblehead has achieved its net zero emissions goal.



An example of one of the virtual whiteboards from the Marblehead Net Zero Workshop.

Following the workshop, the Green Marblehead Committee published an input survey that mirrored the questions posed at the workshop to allow other stakeholders to provide their input. That survey received 38 responses suggesting more than 100 potential actions for consideration for the roadmap.



This word cloud displays the themes from survey respondents' suggestions for which actions to include in the roadmap.

MAPC and the Green Marblehead Committee then used the suggestions from the public, actions submitted by Sustainable Marblehead, and MAPC's Municipal Net Zero Playbook to create a long list of actions that the committee then narrowed down to the ones outlined here in the roadmap.

In February 2023, a draft of the Marblehead Net Zero Roadmap was presented at a public meeting and posted on the Green Marblehead Committee's website. The committee collected feedback on the draft at the public meeting and through a survey and "virtual open house" posted on the town website and used the feedback it received to revise and strengthen the roadmap.

How can you be a net zero hero – ways to get involved

Reaching net zero by 2040 will be an all-hands-on deck effort! In addition to supporting the types of policy changes and collective actions outlined here in the roadmap, here is a list of ways that you can do your part in helping us get there:

Marblehead Resident

Share your voice, get involved, and act on choices in your control (e.g., complete an energy audit, insulate your home, go solar, switch to clean heating, make your next car electric) and participate in the local and state programs available to support you.

Marblehead Small Business

Share your commitments with customers and staff. For those in a climate-adjacent field – such as contractors, electricians, HVAC specialists, plumbers, bankers, real estate agents, and landscapers – participate in the green economy and support climate solutions locally.

Larger Employer or Local Institution

Provide programs that assist employees in decarbonizing their homes and commute, and work with other large businesses to share experiences and support community-wide GHG emissions reductions.

Elected and Appointed Officials

Consider how the decisions your board, committee, or legislative body will impact Marblehead's net zero goal. Advocate and vote to support policy or regulations that advance actions identified in the Net Zero Plan.

Municipal and School Staff

Lead by example with new public facility construction and renovation projects and when possible, purchase zero emission fleet vehicles. Continue to make municipal buildings and schools as energy efficient as possible and add solar to new roofs as they are replaced.

Implementing the Net Zero Roadmap

Marblehead is committed to implementing this roadmap in partnership with community members and stakeholders. The following actions will support the implementation of the plan.

Hire a sustainability coordinator

Many municipalities in the Greater Boston region have hired at least one full-time staff position to support local sustainability efforts and the implementation of their climate action plans. Such positions help coordinate work across municipal departments and throughout the community and can also raise money for projects through grants and other sources. MMLD is already committed to hiring a staff position to coordinate its sustainability efforts while the Town has discussed the possibility of hiring for such a position, but budget constraints have so far made it difficult. The Town will continue exploring ways to hire a sustainability coordinator or sustainability manager, including through a regional or multi-town collaboration.

Lead implementer: Select Board, Town Administrator, MMLD

Commented [WB3]: Add to summary table.

Partners: MAPC,[6] Northeast Energy Efficiency Partnerships (NEEP)[7]

Develop a community carbon dashboard

Sustainability staff will develop a community carbon dashboard published on the Town's website to track progress toward implementing the Marblehead Net Zero Roadmap and achieving net zero emissions.

Lead implementer: Sustainability staff

Provide annual progress updates to the Select Board

The Green Marblehead Committee and town staff (see above) will provide an annual update to the Select Board in January highlighting the progress made toward implementing the Marblehead Net Zero Roadmap.

Lead implementer: Green Marblehead Committee, Town staff

Periodically update Marblehead's greenhouse gas inventory

The Town will update the community-wide greenhouse gas inventory using MAPC's Greenhouse Gas Inventory Tool periodically to track its progress in reducing emissions compared to the 2017 baseline year. MAPC will be updating the tool as new data become available for the Massachusetts Vehicle Census and other sources that will enable inventories for more recent years.

Lead implementer: Town staff

[6] http://www.mapc.org/wp-content/uploads/2017/11/Shared-Energy-Manager.pdf

[7] NEEP's Achieving Community Efficiency (ACE) Project focused on supporting small, medium, and rural communities in to increase energy affordability, reliability, and resiliency and included the development of a model for shared energy manager positions. Learn more at https://neep.org/blog/top-seven-things-know-about-ace

Net Zero Roadmap

This roadmap was developed by the Green Marblehead Committee with support from MAPC and with input from community members. The actions outlined below are those identified with the highest potential to reduce greenhouse gas emissions in the near-to-medium term and will help set our community on the path to achieving net zero emissions. The actions are organized in the following categories:

- Our Homes & Businesses (buildings)
- Getting Around Marblehead (mobility & transportation)
- Where Our Energy Comes From (net zero energy sources)
- Our Natural Systems (nature-based solutions)
- Other Actions (outreach, education, etc.)

Each section also includes a list of "additional actions for consideration." These actions will also help Marblehead achieve net zero but were deemed by the Green Marblehead Committee to be less impactful in reducing emissions.

Our Homes & Businesses

Marblehead's buildings produce more than half of total emissions and are the largest single source of greenhouse gas pollution, so reducing emissions from our homes and buildings will be one of the most important steps to achieving net zero. Progress will depend on achieving carbon-free electricity, converting as many building components to electricity as possible, and increasing energy efficiency dramatically.

Create and preserve efficient affordable housing, implement strategies outlined in the Marblehead Housing Production Plan

The Marblehead Housing Production Plan, published in 2020, outlines a set of 26 recommended strategies to meet its housing goals. Implementing this plan will create new homes that are more energy efficient and affordable. Low- and moderate-income (LMI) residents, renters, and people of color, who have historically been excluded from homeownership, are most impacted by the current housing crisis.[8]

Equity considerations: LMI residents and renters also face greater barriers to accessing resources for energy efficiency and other clean energy solutions (e.g., solar PV), including high upfront costs and program design that favors higher-income households, such as high credit score requirements. As climate change accelerates and more areas become uninhabitable due to sea level rise, people from additional demographic groups will also feel the impacts of the lack of affordable, climate resilient, and energy efficient housing. Implementation of this action should prioritize the needs of communities of color and LMI residents to ensure that the benefits of energy and water efficiency are distributed equitably to those who have been historically excluded.

[8] Marblehead Reporter. *Making Marblehead more accessible: How to increase affordable housing.* March 7, 2022. https://www.wickedlocal.com/story/marblehead-reporter/2022/03/07/making-marblehead-more-accessible-how-increase-affordable-housing/9407092002/

Lead implementer: Housing Production Plan Implementation Committee

Partners: Green Marblehead Committee, Town staff, Marblehead Housing Authority, MAPC

Partner on clean energy outreach programs that facilitate building electrification and efficiency retrofits

Partnering with service providers (e.g., solar installers or home performance contractors) to develop outreach programs is a proven strategy to increase the adoption of clean energy products and services in homes and businesses. Outreach campaigns can simplify the process of selecting a vendor and often reduce costs through collective purchasing power and bulk discounts.

The Town will consider replicating successful models such as Solarize and HeatSmart, which have helped other communities increase adoption of clean energy in their homes and businesses. In partnership with Sustainable Marblehead and MMLD, the Town will consider launching a public awareness campaign like the "Electrify Arlington"[9] campaign to encourage residents and business owners to implement energy efficiency measures and install clean energy solutions.

Equity considerations: Renters, moderate-income residents (those between 60% and 80% of State Median Income), and residents with limited English proficiency have historically been underserved by clean energy programs in Massachusetts. These same groups will continue to be underserved if there is not a concerted effort by communities, service providers, and program administrators to form partnerships that address the barriers to undertaking clean energy upgrades. With such an effort to build partnerships that address access barriers, the benefits of this action can be distributed broadly and equitably across the community.

Lead implementer: Sustainability staff, Green Marblehead Committee

Partners: MMLD, Sustainable Marblehead, clean energy vendors

Incentivize energy efficiency and electrification

MMLD offers rebates and incentives for various clean energy solutions. Under the Inflation Reduction Act of 2022, the federal government is also offering tax credits and other incentives for solar, heat pumps, electric vehicles, and more. MMLD, the Town, and Sustainable Marblehead will work together to raise awareness and provide education to residents and business owners about existing statewide financing and other incentives.

Equity considerations: Incentivizing building owners to transition to efficient electric heating, cooling, and cooking can benefit everyone in a community by reducing energy costs, improving air quality (indoor and outdoor), and increasing occupant health and comfort in homes and businesses, but only if those incentives are structured to be inclusive of underserved populations. For example, tax credits only benefit those with significant taxable income and therefore may exclude LMI households. Marblehead will work to ensure that incentive programs are accessible to all residents and prioritize the needs of LMI residents and renters.

Lead implementer: MMLD

[9] https://www.arlingtonma.gov/i-want-to/go-green/electrify-arlington

Partners: Town staff, Green Marblehead Committee, Sustainable Marblehead, Massachusetts Municipal Wholesale Electric Company (MMWEC)

Advocate for and adopt the specialized stretch energy code

A net zero stretch code allows communities to ensure that new construction and major renovations will be built to net zero standards and helps ensure that buildings are not locked into high emissions for years into the future. In late 2022, the Massachusetts Department of Energy Resources (DOER) released an updated stretch energy code and a new specialized stretch energy code. These codes determine how much energy is consumed in buildings that are newly constructed or majorly renovated. Marblehead has already adopted the stretch code and will strongly consider adopting the specialized stretch code once it is finalized by DOER. The Town and its partners will also work to educate developers, builders, and residents about the new specialized code.

Equity considerations: The building code presents an opportunity to make buildings healthier and safer and to transition away from onsite combustion. Today, the upfront cost differentials of building to a net zero standard are minimal[10] and will continue to reduce over time.[11] Subsequently, the annual energy costs can be reduced when buildings are built to a highly efficient standard, especially when paired with renewable energy like solar PV.

Lead implementer: Select Board, Planning Board

Partners: Town staff (Planning, Building Inspection), Planning Board, Green Marblehead Committee, MAPC

Require energy efficiency licensing for rental units

One of the largest barriers to implementation of energy efficiency in rental units is that it requires those who own and manage the property, such as landlords and building managers, to invest in efficiency upgrades while those occupying the building units – assuming they are responsible for the utility payments – experience the benefits, including economic, quality of life, resilience, and health. This is known as a "split incentive." Rental licensing helps to address this challenge and promote energy efficiency in existing buildings by requiring that certain actions, such as energy audits and weatherization, be implemented in rental properties and that rental units pass a regular inspection during the point of leasing.

Marblehead will explore the creation of a rental licensing process that requires landlords to improve energy efficiency of their buildings over time. See MAPC's Net Zero Playbook Climate Smart Zoning and Permitting Chapter for more details.[12]

Equity considerations: One of the primary goals of this policy is to implement energy efficiency measures, such as clean heating and cooling technologies, and weatherization in units occupied by

[10] "Zero Energy Buildings in Massachusetts: Saving Money from the Start," Built Environment Plus, https://builtenvironmentplus.org/zero-energy-buildings/
[11] "Guidebook for Zero Emission Buildings (ZEBs)," City of Boston Department of Neighborhood Development" https://www.boston.gov/sites/default/files/file/2020/03/200306_DND%20book_FOR%20WEB.pdf
[12] "Climate-Smart Zoning and Permitting," Metropolitan Area Planning Council, https://www.mapc.org/wp-content/uploads/2021/11/FINAL-Playbook_Climate-Smart-Zoning-Permitting-Chapter.pdf

those often underserved by these benefits, including LMI residents and small businesses, environmental justice communities, and those with limited English proficiency.

Lead implementer: Select Board, Town staff (Building Inspection)

Update zoning laws to account for more housing types, retrofitting for multi-unit dwellings, in-law apartments

Allowing more housing types such as multi-unit dwellings and in-law apartments helps reduce emissions by reducing the amount of energy needed in housing, and it is also one of the priority strategies identified in the Marblehead Housing Production Plan.[13]

Lead implementer: Town planner

Partners: HPP Implementation Committee, Planning Board.

Allow changes to historic buildings that reduce GHG emissions

Marblehead is home to many historic buildings. The Town will explore ways to allow changes to these buildings that reduce GHG emissions while maintaining their historic character. Marblehead will consider collaborating with the City of Salem, which has been working on identifying adaptation strategies for historic buildings and has hosted a conference on Preservation in a Changing Climate in 2021 and 2022.[14]

Lead implementer: Town planner

Partners: Historical Commission, Green Marblehead Committee, Planning Board

Provide financing options for Marblehead residents to adopt electric and renewable technologies and invest in energy efficiency

The Town and MMLD will explore options for providing residents and businesses with financing options for clean energy solutions, including Commercial Property Assessed Clean Energy (C-PACE), and "tariffed on-bill financing." Towns can adopt C-PACE by passing a simple resolution through the Select Board with support from MassDevelopment. MMWEC and its members are exploring on-bill financing programs. MMLD could adopt such a program, enabling its customers to finance energy upgrades with loans that are paid back through the savings on their energy bills.

Lead implementer: MMLD, Town

Partners: MassDevelopment, MMWEC

Additional actions for consideration

- Lead by example on municipal building performance - e.g., retrofit existing municipal buildings and adopt a net zero standard for new municipally owned and funded buildings
- Create climate overlay zones to reduce GHG emissions from an array of building types

[13] Marblehead Housing Production Plan. https://www.marblehead.org/sites/g/files/vyhlif4661/f/uploads/final_marblehead_hpp_for_dhcd_review_06.18.2020_1_0.pdf

[14] https://www.salemma.gov/home/events/334466

- Require all new construction and roof replacements to implement an eco-roof (green roof, solar PV, white roof, etc.)
- Offer reduced permitting fees for net zero emissions buildings and net zero enabling technologies
- Train reviewers and staff on net zero building standards and design principles
    - Work with contractors on electrification. Plan reviews with Building Department - informational program to get the word out about electrification options. Add information to the Building Department website about building energy code.
- Use more sustainable, low-embodied-carbon materials for buildings and other projects (e.g., sidewalks, roads)
- Explore whether Affordable Housing Trust Money can be used to help LMI households retrofit their homes to be carbon free
- Require EV charger installation at all new and substantially renovated multi-unit residential buildings and office buildings with off-street parking spaces
- Zoning changes:
    - Allow by-right the installation and operation of net zero enabling technologies
    - Exempt net zero enabling technologies from height and setback requirements
    - Include net zero enabling technology and related terms in zoning definitions
    - Incentivize clean heating and cooling technology by including provisions for special permits

Getting Around Marblehead

Transportation accounts for more than one third of Marblehead's total greenhouse gas emissions. Electrifying our transportation system and giving people more and better choices about how they get around are key strategies to achieving net zero. The following actions will help us get there.

Continue implementation of the Marblehead Complete Streets Prioritization Plan

In 2019, Marblehead published its Complete Streets Prioritization Plan.[15] In 2021, the Town was awarded a grant from the Massachusetts Complete Streets Funding Program to make safety and pedestrian improvements along the rail trail. In 2022, the Town received additional funding from state and federal grants to continue implementing priorities identified in the plan including adding ADA-compliant curb ramps and new signage and marking at rail trail crossings. In 2023, the Town is working on upgrades to the Marblehead Rail Trail as part of the larger Border to Boston Community Project. This funding for design and survey work on the critical segments of the Marblehead Rail Trail will improve mobility, connectivity, accessibility, safety and create improved and safe connections within and between communities. The Border to Boston Trail is a 70-mile shared use trail that links Marblehead and the region to communities from the New Hampshire border to Boston.

Improvements like those outlined in the prioritization plan will make walking and bicycling safer and more convenient, helping Marbleheaders make more trips around town without cars and

[15] https://www.marblehead.org/sites/g/files/vyhlif4661/f/uploads/complete_st_prioritization_plan.pdf

thereby reducing transportation emissions. The Town will continue implementing the prioritization plan and will look for funding through the Complete Streets Funding Program and other funding sources.

Lead implementer: Town planner

Partners: Complete Streets Committee, Mass Department of Transportation, MAPC

Develop and implement a bike and pedestrian plan

Developing a bicycle and pedestrian plan can help identify gaps in the transportation network and inform how best to prioritize near- and longer-term projects. The Town will develop a plan that outlines priorities for expanding and improving bike and pedestrian infrastructure and promoting biking and walking as the best ways to get around town.

Lead implementer: Town planner

Partners: Complete Streets Committee, MAPC

Promote and incentivize electric vehicles for all Marblehead residents

As of August 2022, there are state and federal incentives for electric vehicles designed to lower the cost of purchasing. MMLD also currently offers incentives for EV chargers that are enrolled in its scheduled charging program designed to reduce energy demand at peak times. Marblehead will work to educate residents about these programs and explore other ways to encourage EV adoption among Marblehead residents.

Commented [BW4]: EM suggested addition: "Working with Condo Associations to make sure that Condo owners can charge EV's in the Condo parking lots, including passing a town wide Right to Charge bylaw, if necessary, that would override individual condo associations bylaws, which in many cases currently prevent EV chargers from being installed."

Equity considerations: The cost of owning a vehicle (electric or otherwise) and the lack of free, public charging stations or charging stations at multifamily housing are barriers for renters and lower income residents. Promotion and outreach should prioritize opportunities for these groups and should explore ways to remove these barriers.

Lead implementer: MMLD

Partners: Sustainability staff, Green Marblehead Committee, Sustainable Marblehead, MassCEC

Explore and implement an EV car sharing program

The implementation of an EV car sharing or shuttle service is one approach to providing mobility services that aligns with, and works toward, achieving net zero. Marblehead will explore private partnerships or a regional collaboration with neighboring communities. Local examples to look to include Boston's Good2Go[16] and the Salem Skipper shuttle (not electric but may be in the future).

Equity considerations: In advance of program implementation, Marblehead will carry out community engagement to identify residents' transportation needs to inform the program direction and design. This process may uncover mobility options that are better suited to meet resident needs within a particular neighborhood that take a different approach, while achieving the same goal of increasing access to zero emission mobility options. The program should be designed to be accessible to LMI residents through tiered pricing or other mechanisms.

Lead implementer: Sustainability staff

[16] https://evgood2go.org/

Partners: Mobility technology companies, MAPC

Adopt a zero-emission municipal fleet policy

Marblehead will develop a municipal fleet policy that sets zero emissions standards, or as low as possible if zero emissions is not currently feasible, for new acquisitions and leased vehicles. The MAPC Net Zero Playbook recommends that municipalities fully transition to electric vehicles by 2030 for all types of vehicles, as viable electric alternatives become available.

Lead implementer: Select Board

Partners: Town staff

Procure electric school and shuttle buses

Marblehead will explore making school busing universal and free and purchasing electric buses through the Environmental Protection Agency's Clean School Bus Program[17] or with support from other state and federal programs. Electric school and shuttle buses produce the co-benefits of reduced air pollutant exposure for students/passengers and increased resiliency of the electric grid. Electric buses run on large batteries capable of storing energy when not in operation, which can be a majority of the day and night for some school buses. These batteries have the potential to be charged by renewable energy sources during the day and discharged to address demand on the electric grid later in the day. Marblehead will consider working with neighboring municipalities to explore the potential for collective procurement of electric buses, which can provide additional cost and time saving benefits.

Lead implementer: Marblehead Public Schools, MMLD

Partners: MAPC, U.S. EPA

Commented [BW5]: EM suggestion: " and make school busing universal and free to reduce traffic congestion and emissions at drop off and pick up."

Commented [WB6R5]: District has pursued options to purchase electric buses. Looking at electric and diesel options.

Commented [WB7R5]: Approved - add this in.

An electric school bus in Beverly, MA. Photo credit: Brooks Winner, MAPC.

[17] https://www.epa.gov/cleanschoolbus

Enable and incentivize transit-oriented development (TOD)

As an MBTA Community, Marblehead is required to have at least one zoning district in which multifamily housing is permitted as of right. This presents an opportunity for Marblehead to help residents lower transportation emissions by making transit more accessible and appealing. Transit-oriented development encourages increased proximity and access to public transit and active modes of getting around. This can address the challenges for the first and last mile of a commute and provide a more connected and car-free commute through options such as walking and biking.

Lead implementer: Town planner

Partners: Planning Board, HPP Implementation Committee, Sustainable Marblehead

Advocate for community and regional transit needs

Marblehead will explore opportunities to connect town transportation networks to surrounding communities like Salem, Swampscott, and Lynn to address last-mile connection issues that make transit access challenging, including by exploring adding intermodal solutions such as shuttle buses to train stations. The Town will advocate for local bus and railway service priorities and fleet electrification during upcoming planning processes with the Boston Region Metropolitan Area Planning Organization (MPO) and the Massachusetts Department of Transportation (MassDOT). The Town will also coordinate with community partners to identify the priority list of service improvements that will increase frequency and reliability of service to underserved areas and provide access in transit service deserts (areas with no access to buses or trains).

Lead implementer: Town planner

Partners: MAPC, Boston Region MPO, MBTA, MassDOT

Expand public EV charging stations

As more people shift to driving EVs, this will reduce GHG emissions in the transportation sector. Currently, EVs are the most widely available zero emission vehicle option on the market. Currently MMLD has installed ten level two EV charging ports at three locations in town: the Mary Alley Municipal Building on Widger Rd. (four ports), the Roundhouse Road public parking lot (four ports) and the MMLD main office at 80 Commercial St. (two ports). Soon, the town will need to develop a town-wide EV parking plan that includes additional sites for level two public EV charging stations at high traffic areas that support longer parking durations (e.g., libraries, schools, yacht clubs, churches, and downtown parking lots), and level three fast charging stations so that residents, workers, and visitors have multiple convenient options to charge their vehicles away from home.

Commented [BW8]: Additions from JK.

The Town will also explore other charging options such as chargers attached to Light poles, which would allow on street charging and could be mobile so they could rest above street level when not in use. Finally, at locations such as the post office which will soon have electric vehicles and will need to be building charging infrastructure the Town will consider making these two-way chargers so they can be utilized during peak events.

Commented [BW9]: Addition from EM.

Equity considerations: Many of the early adopters of electric vehicles in Massachusetts have been predominantly male, affluent, and highly educated.[18] There are two primary considerations that should guide municipal investments in public charging stations: 1) strategic geographic placement of charging stations, specifically in areas of town with multifamily homes, or without driveways or off-street parking, and 2) programs to reduce economic barriers to EV adoption. The deployment of charging stations should be paired with promotion of available incentives, creation of additional funding support, and potentially car sharing models.

Lead implementer: Sustainability, planning staff

Partners: MMLD, MAPC

An MMLD-installed and maintained electric vehicle charging station at the Mary Alley Municipal Building in Marblehead. Photo credit: Louise Yarmoff.

Advocate for and implement utility rate design changes

MMLD will explore changes to its rates that encourage electric vehicle charging at times that don't contribute to peak demand on the grid and will conduct education and outreach to get customers signed up for its scheduled charging program designed to charge EVs during off-peak hours.

Equity considerations: Changes to utility rate structures have the potential to adversely impact LMI customers. In Massachusetts, LMI households (at or below 80% Area Median Income) experience an average energy cost burden nearly three times higher than the statewide average

[18] "MOR-EV Year Three Report (July 2016 – October 2017)," Center for Sustainable Energy, October 2018, https://mor-ev.org/sites/default/files/docs/MOR-EV_Year_Three_Report.pdf

energy cost burden.[19] MMLD will work to ensure that changes to utility rates do not negatively impact or exclude LMI customers. MMLD should design and expand incentives for LMI customers in its EV programs.

Commented [BW10]: Revision from JK.

Lead implementer: MMLD

Enforce existing idling law with particular focus on schools

Massachusetts state law limits idling to five minutes, but this law is rarely enforced. The Town will work with the Marblehead Police Department to enforce idling law, especially around schools and other areas where children and seniors are present.

Lead implementer: Marblehead Police Department

Partners: Sustainable Marblehead, Marblehead Public Schools

Additional actions for consideration

- Test feasibility of creating an e-bike share system
- Develop a bike and pedestrian plan
- Adopt climate-smart parking policies
- Create subsidy for town bus passes
- Conduct parking study and explore parking charge, other disincentives for parking to increase walking and biking
- Adopt EV charging site guidance
- Create a database and tracking mechanisms to understand the number of EVs in town
- Evaluate GHG emissions contribution of marine engines, diesel and gasoline, inboard and outboard, to emissions in Marblehead harbor and add to GHG inventory
- Actively promote the adoption of electric boats
- Electrify the waterfront and put charging stations on floats throughout the harbor, connected by underwater cable to electricity. Work with the Harbor and Waters Board and the Harbor Plan Group to implement this

Where Our Energy Comes From

There is no path to achieving net zero GHG emissions without dramatically changing where our energy comes from and how we use it. Switching to carbon-free energy sources such as renewable electricity and producing more energy locally will help reduce emissions in Marblehead. The following actions will help us get there.

Promote & incentivize solar electric systems for Marblehead residents

Marblehead and MMLD will consider outreach programs and incentives that promote the installation of solar photovoltaic systems on homes and businesses. Such programs may include a "Solarize" outreach program similar to those implemented in other Massachusetts towns and using publicly available tools like Project Sunroof to identify homes with roofs suitable for solar.

[19] Low-Income Energy Affordability Data (LEAD) Tool, U.S. Department of Energy, 2016, https://www.energy.gov/eere/slsc/maps/lead-tool

A screenshot from Project Sunroof.

Lead implementer: Sustainability staff, MMLD

Partners: Sustainable Marblehead

Establish a Community Solar program

For Marblehead residents who don't have a roof suitable for solar or those who can't afford to install their own solar system, community shared solar (CSS) allows multiple energy users in a community to benefit from the project. Based on NREL study results, the initial community solar PV sites would include the Brown Elementary school and the Marblehead High School after the planned new roof is installed. Other solar PV sites evaluated are the Village School, Veterans Middle School and DPW garage.

Equity considerations: Low- and moderate-income CSS builds access to solar for residents who may have been excluded from other solar models because participation does not depend on owning a home, having a roof in good condition, or a suitable location for installing solar. To ensure that LMI residents are able to participate, municipal staff will look to include residents in the development of the program.

Commented [WB11]: Change to LMI throughout the roadmap

Commented [BW12]: Revisions from JK.

Lead implementer: MMLD

Partners: Sustainability staff, Sustainable Marblehead, solar developers

Maximize the installation of utility-scale solar and battery storage

MMLD has been evaluating opportunities for developing municipal utility-scale solar PV systems and planning local distribution system upgrades that would enable solar PV and behind-the-meter battery storage systems. Investing in these systems at the local and regional scale can help reduce and stabilize electricity costs and provide an additional measure of system reliability and resilience. MMLD will continue to evaluate the opportunities for developing these systems locally and/or in partnership with MMWEC. Town staff and MMLD will also explore the feasibility of developing renewable energy-powered microgrids, systems that can operate independently during power outages at key facilities that could provide services (electricity, water, internet, heating/cooling, etc.) to community members during emergencies.

Lead implementer: MMLD

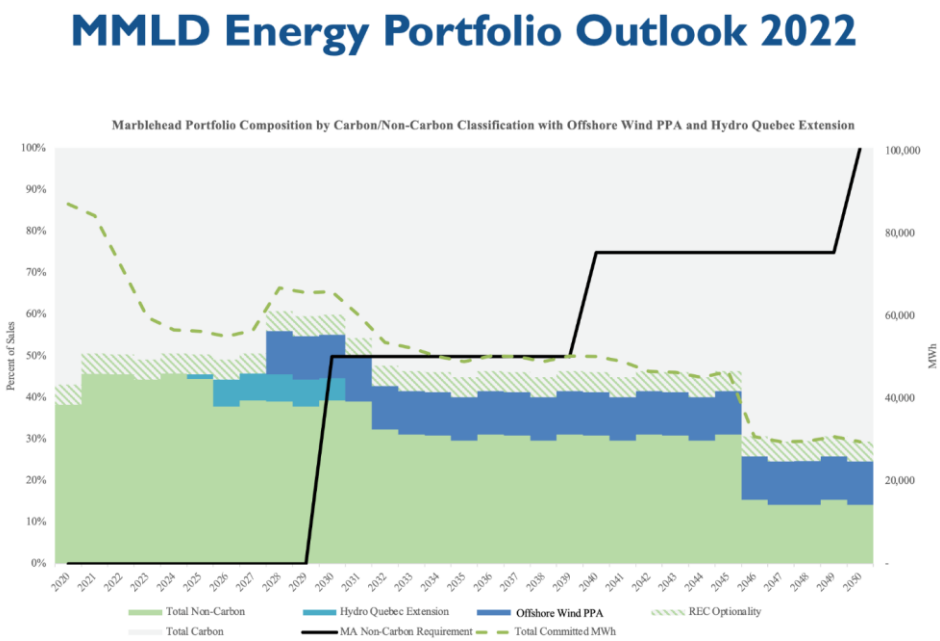
Partners: MMWEC, National Renewable Energy Laboratory (NREL)

Transition MMLD electricity supply to 100% clean energy

The Marblehead Municipal Light Department (MMLD) is statutorily required to achieve net zero emissions in its portfolio by 2050 and is evaluating opportunities to achieve net zero as soon as possible. MMLD is working with MMWEC to develop a plan for transitioning to 100% carbon-free electricity by 2050 in compliance with *An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy*, the climate law passed in March 2021. This plan will outline MMLD's plans for procuring power from renewable energy projects and other non-emitting sources. MMLD has also evaluated its current supply and ownership contracts to identify options to increase electricity from carbon-free power sources and reduce exposure to price volatility from natural gas and other sources.

Lead implementer: MMLD

Partners: MMWEC



Coordinate with utilities to address major gas leaks

As of 2021, there were 128 unrepaired gas leaks in National Grid's distribution pipe system in Marblehead. The methane released by gas leaks is a potent greenhouse gas contributing 54.5 metric tons of methane emissions, equivalent to 4,688 metric tons of carbon dioxide or approximately 3% of Marblehead's total emissions in 2017.[20] These leaks also pose a health and safety hazard to Marblehead residents and kill trees. The Town and Sustainable Marblehead will

Commented [BW13]: Comment from EM: MMLD should commit to obtaining and increasing percent of its electricity from non-emitting sources year on year, not just state that they are planning with MMWEC to meet the 2050 carbon free requirement.

Commented [WB14R13]: Copy text from intro section.

[20] HEET Annual Gas Leaks Map, https://heet.maps.arcgis.com/apps/webappviewer/index.html?id=73f7627766e64161a65c7518acb7eb9d

work with the Multi-Town Gas Leaks Initiative – a coalition of municipalities and local activists – to continue to encourage National Grid to accelerate the pace of leak repair work while the community transitions from natural gas to electrified heating and cooking.

Lead implementer: Sustainability staff, DPW

Partners: Sustainable Marblehead, National Grid

Implement public housing solar program

The Town and MMLD will work with the Marblehead Housing Authority to explore the potential for installing solar PV at its properties to benefit residents. Housing authority residents could also participate in the community solar program referenced above, especially if solar is not feasible at some properties.

Equity considerations: Housing authority residents should be engaged in decision making about siting and installation and to ensure that they benefit from solar systems installed through these efforts.

Lead implementer: Marblehead Housing Authority

Partners: Town staff, MMLD

Encourage battery storage

Battery storage for residential and commercial customers can help increase climate resiliency and reduce emissions by reducing the need for fossil fuel power generation during peak demand events. MMLD will work to enable customers to install battery storage systems by simplifying permitting and interconnection use agreements. MMLD will also encourage or may require customers with interconnected battery storage systems to participate in its Connected Homes program.

Commented [WB15]: Revisions modified from those suggested by JK.

Lead implementer: MMLD

Partners: Sustainable Marblehead

Implement new rate structures that help reduce emissions

MMLD is analyzing the implementation of Distribution Demand and Time of Use (TOU) rates, which can encourage residents distribute their use of electricity use over the course of the day and to shift the use of electricity from on-peak to off-peak times to relieve strain on the ISO-NE grid and MMLD distribution system, lessen wholesale power purchases when the market price for electricity is at its highest and reduce emissions from less efficient fossil fuel power plants by eliminating the need for them to run. Any changes to rates will be designed equitably to avoid increasing energy burdens, including for LMI residents.

Commented [WB16]: Changes suggested by JK. Left in the last sentence about energy burdens per our previous discussion.

Lead implementer: MMLD

Implement and advocate for demand management

Marblehead can participate in demand management programs to help reduce energy costs and emissions. During times of peak grid energy use, dirtier and more inefficient fossil fuel sources are often brought online to meet demand. Larger buildings like schools are generally best suited for demand management programs and participate by reducing their energy use during times of

peak strain on the electric grid. This reduces energy demand on the grid and lowers GHG emissions by avoiding the need for additional energy generation from fossil fuel generators which only turn on during peak events. In turn, participants that pay demand charges on their electric bills can save on their energy costs when reducing during peak times.

MMLD will also explore ways to expand and improve its Connected Homes program to encourage more residents to reduce energy use during peak events.

Lead implementers: Town staff (facilities), MMLD

Partners: MAPC, ISO-NE

Utilize power purchase agreements to lower or eliminate up-front capital costs in renewable energy agreements, including solar PV and battery electric storage projects

Municipalities can install solar systems at municipal facilities for low or no upfront cost through power purchase agreements or other financing models. The Town will explore opportunities to install solar under such models in ways that lower energy costs. The Town may also explore opportunities to partner with local financing institutions to provide financing for solar systems whereby a community financing entity, such as a local bank or credit union, provides funding and captures tax credits and depreciation to support solar installations at municipal buildings and town businesses.

Lead implementer: Town staff

Partners: Local financial institutions

Analyze and upgrade distribution system infrastructure

MMLD is proactively evaluating the condition and capacity of its distribution system, including power lines, substations distribution transformers and utility poles, in anticipation of significant load growth from transportation and building electrification. MMLD is simultaneously making improvements to the system to make it more resilient to climate disasters.

Lead implementer: MMLD

Additional actions for consideration

- Support pilots of centralized clean heating projects that transition neighborhoods or districts off fossil fuels
- Maximize renewable energy generation on municipal property
- Advocate for equitable clean energy access and policy within the community and statewide
- Align zoning and permitting to support public and private sector centralized clean energy systems
- Deploy energy storage at critical facilities

Commented [WB17]: JK suggested removing this context. Let's discuss.

Commented [WB18]: Look for double negative

Commented [WB19]: Revisions from JK.

Commented [WB20]: Comment from EM: "implement solar on existing school roofs rapidly, and make sure that every school and municipal building roof that is repaired is made solar ready as well. The Brown School was built with a solar ready roof, but has not had the solar installed. Both the High School and Veterans Middle School roofs were approved for repair and to be solar ready in an infrastructure override that was passed in 2022, but accomplishing solar on these roofs needs coordinated efforts by MMLD and the school department, and a Sustainability/Energy manager in Town Facilities department could help accomplish this."

- Develop income-based rates that reduce energy burden for LMI residents

Our Natural Systems

To help our community reach net zero and increase our climate resilience, among other co-benefits, we should work to implement strategies that highlight the usage of nature-based solutions.

Develop a tree planting and maintenance program

The Town will explore funding a tree canopy assessment, in addition to the street tree inventory currently underway by volunteers, and funding street tree replacement in an amount that allows the tree warden to replace every tree that comes down every year and also replace inventory from years of underfunding and lack of street tree replacement. The Town will also consider the creation of a Tree Committee by the Select Board that could create ordinances to be passed by the Select Board to protect mature trees of a certain age or Diameter at Breast Height (DBH) so that private landowners would need to consult the tree warden before taking down a tree on their property.

Commented [WB21]: Text provided by EM.

Lead implementer: Tree Warden

Partners: Select Board

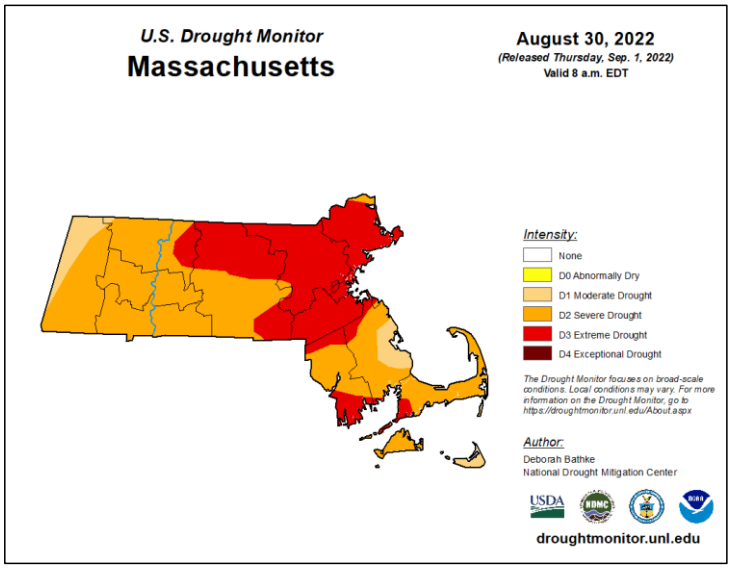
Marbleheaders planting a street tree.
Photo credit: Louise Yarmoff.

Reuse water and develop water conservation tactics

As the Marblehead Net Zero Roadmap was being drafted in 2022, most of Eastern Massachusetts was in an extreme drought (see map below). As climate change worsens, droughts will likely become much more common, making water conservation critical. Saving water also saves energy and reduces emissions. Marblehead will work with residents and businesses to adopt water conservation and reuse, including allowing rainwater collection (e.g., rain barrels, cisterns).

Lead implementer: Sustainability staff

Partner: Sustainable Marblehead



This map from August 30, 2022, shows that much of Eastern Massachusetts was in extreme drought at the time.

Significantly increase participation in composting programs

Waste accounts for about 5% of Marblehead's emissions and composting more organic waste can significantly reduce emissions of methane, a potent greenhouse gas. More than 700 of Marblehead's 8,126 households already compost, and with communities around the region starting municipal composting programs, the examples and resources available are increasing rapidly. The Massachusetts 2030 Solid Waste Master Plan set goals of reducing solid waste disposal 30% by 2030 and 90% by 2050.[21] Marblehead will explore strategies to significantly increase participation in composting programs and decrease solid waste in line with Commonwealth's goals.

Lead implementer: Health Department

Partners: Sustainable Marblehead, composting companies, other municipalities (regional collaboration), Mass. Department of Environmental Protection

Phase out single-use plastic

Most plastics are made from petrochemicals (fossil fuels). Eliminating single use plastic reduces emissions and helps reduce plastic pollution in oceans and elsewhere in the environment. Marblehead has already banned single-use plastic bags and polystyrene food containers and will continue to phase out other forms of single-use plastic.

Lead implementer: Select Board

[21] https://www.mass.gov/doc/2030-solid-waste-master-plan-working-together-toward-zero-waste/download

Partner: Sustainable Marblehead

Create community gardens

Reducing the distance that food travels to get to our plates is an effective strategy for reducing emissions created by food production. Community gardens give residents access to healthy, local food. Marblehead will explore potential sites on Town property to establish community gardens.

Lead implementer: Health Department

Partner: Sustainable Marblehead

Additional actions for consideration

- Promote aquaculture practices that help sequester carbon and/or provide resilience benefits
- Encourage personal farming

Other Actions

There are additional steps we can take to reach net zero broadly.

Advocate for funding options for incentive programs (federal and state grants)

State and federal funding for incentive programs will be crucial in facilitating and accelerating Marblehead's path to achieving net zero emissions. The Town and its partners will advocate for funding from state and federal sources that help residents and businesses switch to clean energy options, especially those which provide support for LMI households.

Lead implementer: Town staff

Partners: Select Board, MMLD, Sustainable Marblehead, MAPC

Pass town-wide ban on gas- and diesel-powered landscaping equipment

Landscaping equipment powered by gasoline and diesel produces greenhouse gas emissions as well as other forms of air pollution. Marblehead will explore a ban on such equipment to be phased in over a reasonable period of time to allow landscaping businesses and residents to switch to cleaner alternatives, such as electric equipment. As of September 2022, MMLD was offering rebates for electric yard equipment, including lawn mowers, trimmers, leaf blowers, and more.[22]

Lead implementer: Select Board, Town Meeting

Partners: Sustainable Marblehead, MMLD

Provide residents with straightforward carbon emission measuring tool and informational resources about how to reduce emissions

Some residents may want to set their own household net zero goals and track their progress. Tools like the U.S. Environmental Protection Agency's Carbon Footprint Calculator can help.[23]

[22] https://nextzero.org/marblehead/electric-yard-equipment/
[23] https://www3.epa.gov/carbon-footprint-calculator/

Marblehead will share such tools and resources with residents and businesses to inform them about the important role each of us plays in helping achieve net zero.

Lead implementer: Sustainability staff

Partner: Sustainable Marblehead

Educate contractors and residents about clean energy and electrification

Getting to net zero will require replacing a lot of appliances and other systems that use energy. Educating contractors and residents about these systems will help build awareness about the benefits of switching to clean energy and how to do so efficiently and cost-effectively.

Lead implementer: Sustainability staff

Partners: MMLD, Sustainable Marblehead, MassCEC, Mass Save

Additional actions for consideration

- Encourage green jobs training through local technical schools
- Consider becoming a Green Community
- Revisit the GHG inventory and roadmap every five years and track progress to accomplishing goals
- Evaluate the GHG emissions contribution of commercial gas-powered lawn mowers, leaf blowers, and trimmers by quantifying how many are in use
- Ask the Select Board to assign responsibility for overseeing roadmap implementation and tracking progress to the Green Marblehead Committee