ROAD TO 100% RENEWABLES

MASS POWER FORWARD CAMPAIGN HANDBOOK

MASS POWER FORWARD

For a clean energy future

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WHY IS LOCAL ACTION IMPORTANT?

Our dependence on dirty energy like oil and gas pollutes our air and water and harms the health of Massachusetts' communities. Pipelines threaten our safety and our green spaces. Pollution from fossil fuels are changing our climate, contributing to sea level rise and increasing the frequency of droughts, severe storms, and other damaging weather events.

This unprecedented threat is also an unprecedented opportunity to create clean energy jobs, develop sustainable neighborhoods, and clean up our air and water. With our state and federal governments considering multi-billion dollar investments in fossil fuels, now more than ever we need to lead a clean energy revolution from the ground up and show that we can get 100% of our energy from clean sources. We can live better lives while creating good jobs, making great neighborhoods, and saving our green space.

How does switching to clean energy help everyone?

A switch from dirty to clean energy helps communities in several ways:

- ✓ It puts the power and the solutions in the hands of our communities
- ✓ It creates sustainable jobs - clean energy solutions generate good safe jobs
- ✓ It protects green spaces - investing in clean energy and energy efficiency will help prevent the expansion of fossil fuel infrastructure that threatens our natural landscapes
- ✓ It protects coastlines – immediate major reduction of greenhouse emissions is necessary to stabilize sea levels
- ✓ it cleans up our air and water - the more clean energy we put into place, the more dirty energy we can take offline

Is it possible?

Though a 100% clean energy future may sound daunting, it is possible! Studies from major universities and institutions — including Stanford University, the University of Delaware, the National Renewable Energy Laboratory, the U.S. Earth System Research Laboratory, and others — have shown that a 100% clean electric grid is within reach. Communities like San Diego CA, Burlington VT, Boulder CO, and Rochester MN have all committed to 100% renewable energy, along with major corporations such as Amazon, Google, and Johnson & Johnson.

As we transition to 100% clean energy, as much of that energy as possible should come from local sources, like wind and solar installations in New England. That way, we can maximize the economic and environmental benefits for our communities, while ensuring that the dollars we spend are resulting in more clean energy on the grid.

Why local action and local projects?

Local action and local projects are good for two reasons: they let your community make choices based on your values and priorities, and they prove that climate change solutions work. Your town gets to decide what our energy future looks like, and prove to state policy makers that communities can . We can set the example at the local level and show that it is possible to clean up our state and transition to a clean energy future!

Across Massachusetts, cities and towns are already leading the way towards 100 percent renewable energy. For example:

- ✓ New Bedford has installed 16 megawatts of solar to power its municipal facilities, and more than a third of the vehicles in its municipal fleet are electric vehicles.
- ✓ Cambridge has adopted a Net Zero Action Plan, laying out steps for the city to reduce carbon emissions from its buildings by 70 percent by 2040.
- ✓ Sutton has received $440,000 in funding for energy efficiency upgrades for municipal buildings through the Green Communities program.

ABOUT THE CAMPAIGN

The 100% Renewables Town and Cities Campaign looks to empower and give resources to community members working to make their city less dependent on fossil fuels. Over 25 cities towns and cities in the United States and Canada have passed 100% Renewable Energy resolutions, and have been successful in decreasing their town's dependency on fossil fuel.

Here in Massachusetts, 100% renewable towns and cities campaign has two goals:

1. **GOAL ONE:** Persuade municipalities across Massachusetts to pass a non-binding town or city resolution setting a goal of 100% renewable energy for all
2. **GOAL TWO**: Persuade each of these municipalities to undertake 1-2 concrete projects to promote clean energy, energy efficiency, etc.

Note that these goals can be pursued in either order. Some towns and cities will work first on passing a nonbinding resolutions, and from there, figure out how to bring specific clean energy projects to their town. In other towns and cities, there are already active efforts underway to reach Green Communities status, build a municipal solar project, pass a Net Zero resolution, etc, and so it makes more sense to support these concrete efforts first, using the language of 100% renewable energy, and pass a non-binding 100% renewable energy resolution later.

Mass Power Forward, which is a statewide coalition of more than 200 environmental, community and social justice groups, is the primary organization pushing this campaign forward. The primary groups working on this within Mass Power Forward are Massachusetts Climate Action Network (MCAN), Environment Massachusetts, Clean Water Action, 350 Mass, and Boston Climate Action Network. We encourage partnering with local organizations wherever possible!

This document includes

- A timeline for passing a resolution
- A sample of a municipal resolution
- Materials for implementing concrete projects, including the Mass Power Forward Checklist, suggested policies and projects, and a link to further information on each

GOAL ONE: HOW TO PASS A 100% RENEWABLE ENERGY RESOLUTION IN YOUR TOWN OR CITY

1) Read this handbook and educate yourself about the campaign!
2) Learn about how decisions are made in your town or city:
    a) Do you have a town meeting style of government? If so, when does town meeting happen? Is it a representative town meeting, or an open town meeting? Learn more about town meeting here.
    b) Do you have a city council? How many city councillors are there? Who are they? Are they generally supportive of clean energy? Where does your mayor stand?
3) Research your town's progress on clean energy to date
    a) What has the city well? What can still be done?
    b) The checklist at the end of this handbook may be helpful for assessing your town's progress
4) Have some kind of informational meeting for community members, and form a team
5) Educate active people in town government (e.g. Board of Selectmen, city councillor, people on key committees) on the need to set a goal of reaching 100% renewable energy
6) Spread the word! Go on public access TV, put articles in the local paper, bring speaker to town, hold public events (e.g. at the elementary school)
7) *For town meeting style of government:*
    a) Draft a town meeting warrant article using sample below
    b) Get enough signatures to submit the warrant article to the town (you may need 10 or 20 - depends on the town)
    c) Submit the warrant article to the town government
    d) Meet with selectmen and encourage them to offer their support
    e) Get the word out and encourage fellow citizens and/or town meeting members to vote yes!
8) *For City Council style of government:*
    a) Meet with City Councillors to gauge submit
    b) Work with a City Councillor to draft a resolution
    c) Get the City Councillor to submit the resolution to the City Council
    d) Participate in city council committee hearings as needed! Turn out supporters to give testimony in support of the resolution
    e) Turn out big for the City Council vote!
    f) If the City Council passes the resolution, push the mayor to vote yes!
9) Help follow through and implement next steps -- use momentum provided by the warrant article to push for clean energy projects in your town or city

SAMPLE RESOLUTION

Resolution of the City Council of the City of CITY NAME in support of 100 percent renewable energy

WHEREAS, too much of Massachusetts' energy comes from fossil fuels that pollute our air and water and alter our climate; and,

WHEREAS, Massachusetts communities are already feeling the impacts of climate change; and,

WHEREAS, the City of CITY NAME is already taking action to reduce its carbon emissions and promote clean energy, including LOCAL EXAMPLES (e.g., energy efficiency retrofits of all municipal buildings and the installation of solar panels on the city landfill); and

WHEREAS, clean energy has brought many benefits to Massachusetts, including reduced pollution, tens of thousands of clean energy jobs, and more of our energy dollars retained in the local economy; and

WHEREAS, Massachusetts has historically been a leader in the fight against global warming, and has a responsibility to continue to set a positive example for other states and countries to follow; and

WHEREAS, Massachusetts can get 100 percent of its energy from clean, renewable sources by harnessing its abundant solar and wind resources, and taking advantage of innovations in energy efficiency, green transportation, energy storage, and other technologies; and

WHEREAS, the transition to 100 percent renewable energy should promote employment opportunities and economic growth in our communities, facilitate local control and ownership over energy options, and bring tangible benefits to low-income residents and others who have historically been disadvantaged by our energy system;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of CITY NAME, in the County of COUNTY NAME, Commonwealth of Massachusetts, that Massachusetts should commit to a goal of 100 percent clean, renewable energy, and move as quickly as possible to achieve that goal;

AND BE IT FURTHER RESOLVED that leaders in the Legislature and statewide elected and appointed officials are urged to do everything in their power to bring Massachusetts closer to 100 percent renewable energy, and ensure that the benefits of renewable energy are realized by Massachusetts residents from all walks of life;

AND BE IT FURTHER RESOLVED that the City of CITY NAME will commit to a goal of 100 percent renewable energy, and its officials and staff will consider all municipal decisions in light of whether they will bring the City and its residents, businesses, and institutions closer to 100 percent renewable energy;

AND BE IT FURTHER RESOLVED that the City of CITY NAME will avoid taking actions that could increase the use of fossil fuels or delay the transition to 100 percent renewable energy;

AND BE IT FURTHER RESOLVED that the City of CITY NAME will take actions to promote clean energy and reduce fossil fuel use, including:

- EXAMPLE
- EXAMPLE

GOAL TWO: HOW TO IMPLEMENT CONCRETE CLEAN ENERGY PROJECTS IN YOUR TOWN OR CITY

1) Educate yourself using materials provided – check out policy tiers below and policy fact sheets.
2) Assess your town's progress to date. Use the Mass Power Forward checklist below to assess your town's tier (link for identical printable checklist)
3) Have some kind of informational meeting
4) Form a team, and decide what concrete measures are appropriate for your municipality, based on the suggestions below
5) Educate active people in town government (e.g. Board of Selectmen, city councillor, people on key committees) and work with them to figure out next steps for moving the project forward
6) Spread the word! Go on public access TV, put articles in the local paper, bring speaker to town, hold public events (e.g. at the elementary school)
7) Help follow through and implement next steps

MASS POWER FORWARD CLEAN ENERGY CHECKLIST

This checklist is intended to help you understand how much your town has already done on clean energy and climate change, so you can target your next steps. Check a box if your town has done an action, or is well on its way to completing it.

You should be able to sit down with someone from your town/city government and fill this out.

Energy efficiency

- ❑ Completed energy audits in municipal buildings to identify energy-saving opportunities
- ❑ Implemented energy efficiency upgrades in municipal buildings:
  - ❑ Installing LED or high-efficiency fluorescent interior lights
  - ❑ Installing occupancy sensors to automatically turn lights on and off as needed
  - ❑ Installing new, high-efficiency heating and cooling equipment
  - ❑ Installing an energy management system
  - ❑ Weatherizing the building (for example, by installing additional insulation or high-performance windows)
  - ❑ Instituting a program to encourage building occupants to reduce energy use by modifying their behavior, such as turning off equipment when not in use
- ❑ Converted streetlights to LED fixtures
- ❑ Created a local outreach program to help connect residents and businesses with energy efficiency audits and upgrades
  - ❑ Mass Save program outreach for homes
  - ❑ Mass Save for businesses and institutions

Town Workings

- ❑ Established a committee to focus on energy, climate, and/or environmental issues
  - ❑ Local, volunteer-led
  - ❑ Municipal government-level committee
- ❑ Applied for Green Communities status under the Mass. Dept. of Energy Resources
- ❑ Received Green Communities status
- ❑ Applied for grants for energy upgrades from the Green Communities program
- ❑ Received Green Communities grants
- ❑ Completed a greenhouse gas inventory
- ❑ Created a climate action plan
  - ❑ If so, has it been updated in the last 5 years?
- ❑ Hired an energy manager or sustainability manager
  - ❑ If not, is there another staff person who is responsible for implementing clean energy and energy efficiency improvements?

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Clean energy

- ❑ Community choice aggregation passed (also known as "municipal aggregation")
  - ❑ With at least 5 percent additional Class I renewable energy?
- ❑ Community choice aggregation implemented
- ❑ Municipal operations' electricity from clean source
- ❑ Participated in MassCEC's Solarize Mass program
  - ❑ If not: have you created a similar program to connect residents and businesses with solar installations?
- ❑ New buildings required to be "solar-ready"
- ❑ Solar installed on school buildings
- ❑ Solar installed on capped landfill
- ❑ Solar installed on town buildings
- ❑ Solar installed on town parking lots (e.g., solar canopies)
- ❑ Wind turbines installed or wind energy purchased

Transportation

- ❑ Adopted a Complete Streets policy, requiring streets to be designed with the needs of all users in mind (including cyclists and pedestrians)
- ❑ Installed bike lanes
  - ❑ Are they being updated?
- ❑ No idling by-law in place
- ❑ Street planning like traffic calming patterns and roundabouts being implemented
- ❑ Permeable paving for parking lots, etc
- ❑ Installed electric vehicle charging stations that are open for the public to use
- ❑ Purchased electric vehicles for town fleet
- ❑ Purchased electric transit buses or schoolbuses

Other Sustainable Actions

- ❑ Created a bulk purchasing and outreach program for renewable heating technologies (e.g., solar hot water, air source heat pumps)
- ❑ Composting programs
- ❑ Recycling for hard to recycle items such as styrofoam, lids, etc
- ❑ Tree plantings

Adaptation

- ❑ Adaptation plan for increased heat waves, stronger storms
- ❑ If coastal, sea level rise adaptation plan

Next, count up the number of checkmarks on your sheet.

1-7) If you have checked 7 items or less, your town is just starting down the path to sustainability. We would put you in the category of a "beginner" town. This is exciting, because it means you have LOTS of things you can do to make things

better! However, it also means you will probably need to do some education of people in your town, including town staff. But don't worry, we have materials to help you do this.

8-15) If you checked 8-15 items, your town is on it's way to becoming a clean energy powerhouse. We would put you in the category of an "intermediate" town. The great news is that means you can still pick some low hanging fruit and do some fairly simple things that make a big difference. It also means there is a general level of knowledge about climate and clean energy issues, and it is probably a priority for people in town.

16-33) If you checked more than 10 items, you are a very active and sustainable community. We would put you in the category of an "advanced" town. This means you have done a lot, which is wonderful, but it also means the stuff that is left is harder to do. The great news is that being advanced means your town is pretty knowledgeable about climate change and committed to making the changes to become a truly sustainable town, and you get to be on the cutting edge of towns in MA making strong commitments to solutions.

So now what?
Now you are ready to get started! See our list of policy and project recommendations for each tier (beginner, intermediate, advanced). We have narrowed this down to the top things that you can do as a town to cut pollution and make your town into a clean energy powerhouse. Then, check out the fact sheets, which include information on each policy recommendation!

SPECIFIC POLICY RECOMMENDATIONS:

Beginner towns

1. Do a **greenhouse gas inventory** to identify the largest sources of global warming pollution in the community. Create a basic climate action plan for the town. (short-term)
2. Conduct an **energy efficiency audit** of all municipal buildings, including schools, and complete all energy efficiency upgrades with a payback period of 10 years or less. Additionally, convert streetlights to LED fixtures. (medium-term)
3. Join the Commonwealth's **Green Communities** Program, which provides funding for local clean energy and energy efficiency projects. (long-term)
4. Adopt a **Complete Streets policy**, requiring roads to be designed in a way that is safe and accessible for all users, including cyclists and pedestrians.

Intermediate towns

1. Pass **community choice aggregation** (which allows the municipality to choose a default source of electricity for residents and businesses), with at least 5 percent additional Class 1 Renewable Energy Credits beyond what the state requires.
2. Advance municipal policies that **promote solar power** in public and private development through "solar-ready" requirements on new construction, renewable energy development on public buildings and community-wide solar challenges such as the Solarize Massachusetts program.
3. Increase access for all to **electric vehicles** through town purchases of electric buses, increasing the percentage of electric vehicles in town fleets, and installing electric vehicle charging stations that are open for the public to use.

Advanced towns

1. Create an **energy efficiency program** with a strong emphasis on serving renters and low-income families.
2. Create a **net zero plan**, setting out a roadmap to achieve zero emissions for buildings and transportation.
3. For communities with existing climate action plans, update the local climate action plan to incorporate **environmental justice and equity principles**.
4. Create a community outreach and bulk purchasing program to increase the adoption of **renewable heating technologies**, such as solar thermal, geothermal, and air source heat pumps.

A reminder: it might be tempting to go for the big guns, even if you are in a beginner town. We don't recommend that - we want you to WIN in your first campaign (and second, and third).

OTHER RESOURCES:

- Now that you've picked the policy to focus on, the next step is to advocate for your city or town officials to adopt that policy. We have prepared fact sheets about each of the above policy recommendations, with basic information about how to get started, stories of towns that have already taken action, and links to other online resources. You should share these fact sheets with your local officials, bring them to events, etc. You can access the fact sheets at http://mapowerforward.com/100re.
- Want to host a 100% Renewable Towns and Cities campaign kick-off event to raise community awareness and garner interest? Email Emily Kirkland, Emily@betterfutureproject.org, for our event planning guide!
- Questions? Concerns? Ideas? We'd love to hear from you and put you in touch with other local activists in your area!
  Contact info:

  Ben Hellerstein, Environment Massachusetts, ben@environmentmassachusetts.org

  Carol Oldham, MA Climate Action Network, carololdham@massclimateaction.net

  Joel Wool, Clean Water Action, jwool@cleanwater.org

  Emily Kirkland, 350 Mass, emily@betterfutureproject.org.

Greenhouse Gas Inventory

Air pollution from fossil fuels, like carbon dioxide and methane, causes climate change. A first step to figuring out where to focus your town's clean energy efforts is to do an inventory of where your pollution is coming from, or a Greenhouse Gas Inventory.

What is a Greenhouse Gas Inventory?

A Greenhouse Gas (GHG) Inventory estimates the amount of greenhouse gas emissions from a town or city, as well as by power plants that supply electricity to the town's customers. An inventory usually lists the energy use and resulting emissions of municipal buildings, residences, and businesses. Emissions come from categories like:

- Electricity
- Building heat (oil and natural gas) in commercial, residential and municipal buildings
- Transportation (gasoline and diesel)
- Waste, or garbage

Why is it important to know where our greenhouse gas pollution is coming from?

It is important to do an inventory in order to get a baseline estimate of the energy use and GHG emissions within your community, so that GHG emission reduction targets can then be set. This will help your town figure out where you can have the most impact.

This is just one tool in a toolkit for involving town officials and residents in making your town more sustainable.

What are the steps for doing a GHG Inventory?

1. Pull together a team and divide up the work.
2. Figure out the scope of your inventory. (Are you looking only at municipal operations or at the community as a whole?)
3. Identify the base year. (You can use Mass Save's data from 2013.)
4. Identify sources of data for inventory (see below).
5. Collect and categorize data.
6. Calculate base year emissions.
7. Think about how to use this data. How can you involve your community in next steps?
8. Once you have a clear idea of where your climate change causing pollution is coming from now, you need to make a plan! Check out our fact sheet on how to make a climate action plan.

Data Sources

- **Electricity**
    - Utility Companies (National Grid, Eversource) are the main places to get data on electricity usage for towns. This can be broken down by residential and commercial use.
    - Mass Save has a data tool. Click on your town on the map, and you will get data (only for 2013) on residential and commercial electricity and natural gas usage.
    - If your town or city has a Community Choice Aggregation program, the utilities are required to give your community data on electricity use.
    - In order to get data on municipal buildings, look at the town's utility bills. It is helpful to separate out the municipal energy use, in order to compare emissions from municipal, commercial, and residential buildings.
- **Building heat (oil and/or natural gas)**
    - Utilities can provide data on natural gas usage (see Mass Save link above). The number of homes or businesses using natural gas can be subtracted out from the total number of homes or businesses to get an estimate of heating oil use.
    - There is U.S. Census data on type of home heating fuel. Click on the link below, put in the town or city, and then click on "Physical Housing Characteristics" under "2014 American Community Survey."
- **Transportation**
    - For car emissions data, you can contact the Metropolitan Area Planning Council. They have compiled data from the Registry of Motor Vehicles, and can give you the number of cars owned, the years of the cars, and the miles driven.
- **Waste**
    - Data on the amount of waste being landfilled or incinerated, and the associated emissions, can be obtained from the waste diversion facility itself. You can use this EPA calculator to calculate emissions from waste.
- **Calculating emissions**
    - The EPA has an online tool to calculate carbon dioxide emission equivalents for burning gasoline and using electricity, heating oil and natural gas:
    - Local Governments for Sustainability (ICLEI) also has an online tool for calculating GHG emissions called ClearPath, and it is free for all local governments to use.

Success Stories

Lexington

Sustainable Lexington had a team of five people and two volunteer interns conducting their inventory. They used 2012 as a base year, and got emissions data for electricity, heat, transportation, waste disposal, and food production/consumption. All of the data was local except for food. They also later added data from natural gas leaks, which added 10% to the town's total emissions.

The inventory revealed that 66% of the town's emissions were coming from buildings, and that almost a third of total emissions were from industry. The inventory also showed that only 2% of emissions were from municipal buildings. Mark Sandeen (from Sustainable Lexington and MCAN) presented this information to the town so that they could move forward on setting reduction targets and taking action. Actions that Lexington is taking include setting up Community Choice Aggregation and writing a plan for the town to go Net Zero.

Brookline

The inventory in Brookline was completed primarily by Alan Leviton, a retired engineer active in MCAN and in Climate Change Action Brookline. He used 2009 as the base year, and calculated emissions for electricity, heat, and transportation.

To help get data from the utilities, he contacted Representative Frank Smizik, who sits on the House Committee on Global Warming and Climate Change. Representative Smizik put him in touch with sources at Eversource and National Grid who helped provide Alan with the data on electricity and natural gas usage that he needed.

Alan used U.S. Census data to get the percentages of homes in Brookline that use oil and natural gas, as well as DOE data on BTUs per square foot for oil and natural gas, to calculate emissions for oil and natural gas heat. The inventory showed that, similar to Lexington, municipal buildings produced only 2% of emissions, while commercial buildings produced 25-30%, and residential buildings produced 60-70%. The inventory also showed that electricity use generated about one third of all emissions.

Based on these findings, the town focused on reducing emissions from residential buildings, including a big push for Mass Save audits and weatherization, increasing the number of homes with solar panels with Solarize Mass, and setting up a Community Choice Aggregation program that provides 25% of energy from renewables.

Writing A Climate Action Plan

Climate Change is impacting our towns and cities, our families and neighborhoods. Your town can be a part of the solution, and becoming sustainable and climate friendly as a community starts with making a plan. Working with your neighbors and your elected officials, you can get from where you are today to a better world.

What is a Climate Action Plan?

A Climate Action Plan (CAP) is a document that outlines a strategy to reduce Greenhouse Gas emissions. By setting goals and priorities for reducing emissions, a climate action plan provides a framework for achieving those goals.

How is It different from a Sustainability Plan or a Climate Resilience Plan?

A CAP is a framework of strategies for reducing GHG emissions and mitigating climate change. A Sustainability Plan is generally broader in scope, and addresses many more environmental issues, such as those related to solid waste, water use, and land conservation. A CAP may touch on these areas as they pertain to climate change, and it often makes sense for a CAP to be part of a larger Sustainability Plan.

A climate resilience or adaptation plan differs from a CAP in that it addresses the expected impacts of climate change, such as sea level rise and extreme weather event, rather than the mitigation of climate change. Communities should ideally develop both of these types of plans, and focus on initiatives that will help to both reduce GHG emissions and also reduce the effects of climate change. An example of this is green roofs, which both reduce energy consumption and lower emissions from heat use, and also reduce stormwater runoff resulting from increased precipitation.

Why Is a Climate Action Plan important?

A Climate Action Plan is important because it helps your town prioritize the actions you need to take to reduce your climate impact, and it provides a framework and a roadmap for implementing actions and policies. Writing a plan allows everyone to be involved in prioritizing actions, and facilitates coordination among town officials and departments.

What are the steps to writing your plan?

1. Determine your leadership team, advisory council, and responsibilities.
2. Determine the scope of the plan - what areas of energy use will it address?
3. Come up with a strategy for communicating with and engaging all stakeholders and community members. (see our fact sheet on integrating equity into climate planning, here: http://bit.ly/2h3ssRh)
4. Complete and analyze GHG inventory (baseline emissions) if this hasn't been done.
5. Set goals and GHG emissions reductions targets.

6. Identify initiatives and implementation measures to reach emissions reduction goals. Consider using SMART (Specific, Measurable, Attainable, Relevant, and Timely) criteria for developing initiatives.
7. Quantify the potential impact of the initiatives, and prioritize initiatives.
8. Develop a plan for implementation.
9. Establish metrics for tracking and reporting progress toward goals.
10. Draft the plan, get feedback, and edit your plan.
11. Implement the plan - and don't forget to track and report your progress!

A Success Story from Brookline:

Brookline was one of the first communities in Massachusetts to address climate change. The town did an inventory of greenhouse gas emissions in 2000, and wrote the first Climate Action Plan in 2002. While the town took a number of steps to reduce emissions based on that plan, they wanted to do more.

In 2008, Climate Action Brookline presented a warrant article to town meeting, which passed overwhelmingly, to create a 15 member Climate Action Committee. The committee then did another baseline emissions inventory, and rewrote the Climate Action Plan in 2012. The goal, consistent with the MA Global Warming Solutions Act, is to reduce greenhouse gas emissions 25% from 1990 levels by 2020, and 80% by 2050. To write the plan, a subcommittee reviewed plans from around the US and the world, and then solicited public input online and in meetings for actions to take to reduce emissions. The subcommittee then ranked over 150 possible actions, and established rating criteria such as carbon savings, cost, and feasibility.

They narrowed the list of actions to 37, and grouped them into 6 categories such as energy efficiency, renewable energy, and food and agriculture. As a result of Brookline's Climate Action Plan, the town has implemented measures such as "Green Homes Brookline," to increase the number of home energy audits and weatherizations, Solarize Mass, which increased the number of homes with solar panels, and Community Choice Aggregation, which will increase the amount of energy from renewables that the town uses for electricity.

*The steps for writing a Climate Action Plan are based on the recommendations in the "Climate Action Planning Guide," developed by the Climate Smart Communities Program of the New York Energy Research and Development Authority. (http://www.midhudsoncsc.org/documents/CAP%20Guide_MAR%202014_FINAL.pdf)

Energy efficiency for municipal buildings and facilities

Investing in energy efficiency is one of the most important steps we can take to reduce our fossil fuel use and achieve 100 percent renewable energy.

City and town governments can take several steps to make schools, municipal offices, police and fire departments, and other public buildings more efficient. By maximizing the energy efficiency of municipal buildings, local governments can reduce their energy use, cut down on pollution, save taxpayer money, and set a positive example for residents and businesses in the community to follow.

The American Council for an Energy-Efficient Economy estimates that we can reduce our use of energy by 40-60% by 2050 through energy efficiency measures. Cities and towns can achieve major gains in energy efficiency today, and realize the benefits for years to come.

First step: Complete an energy audit.

Typically, the first step towards improving the energy efficiency of municipal buildings is to complete an energy audit. Trained professionals will evaluate various aspects of the building — including lighting, heating and cooling systems, appliances, and insulation — to identify opportunities for energy savings. Often, an energy audit will include an estimate of how long it will take for each efficiency measure to pay for itself through reduced energy costs — known as the “payback period.”

These audits are available to most municipalities through the Mass Save program (except for cities and towns that are served by a municipal utility).

Some communities choose to enter into an energy performance contract, where local officials hire a contractor to identify and carry out energy efficiency upgrades, with the costs of the contract typically covered by the energy savings.

How can we make municipal buildings more efficient?

According to a recent survey of 191 cities and towns conducted by the Environment Massachusetts Research & Policy Center, these are the most common energy efficiency measures implemented by municipalities in Massachusetts:

- Installing LED or high-efficiency fluorescent interior lights. (82.2%)
- Installing new, high-efficiency heating and cooling equipment. (71.2%)
- Installing occupancy sensors to automatically turn lights on and off as needed. (70.2%)
- Weatherizing the building (for example, by installing additional insulation or high-performance windows). (66.0%)

Other common energy efficiency practices include:

- Installing an energy management system. These systems help to optimize a building's energy performance by enabling the control and monitoring of building facilities, such as heating and cooling equipment, by computer.
- Installing variable frequency drives (VFDs) to decrease motor speed in heating and cooling systems when possible.
- Instituting a program to encourage municipal employees to reduce energy usage through their behavior.

What funding and support is available for municipal energy efficiency efforts?

- The Massachusetts Department of Energy Resources has assembled a list of recommendations and resources for communities interested in energy efficiency upgrades.
- The Mass Save program provides energy audits for municipalities that are served by investor-owned utilities (rather than municipal utilities). Mass Save also helps to identify incentives and financing opportunities for energy efficiency upgrades.
- Cities and towns that have joined the Green Communities program can qualify for grants to offset the cost of energy audits and energy efficiency upgrades. The Green Communities program also provides technical assistance and advice for municipal clean energy and energy efficiency efforts.
- Some regional planning agencies, such as the Metropolitan Area Planning Council, provide technical assistance for communities within their coverage area that are considering energy efficiency upgrades. These agencies sometimes help to connect city and town governments with qualified contractors through a joint procurement process.
- Through the Industrial Assessment Center program, the Center for Energy Efficiency and Renewable Energy at UMass Amherst offers free energy audits for water or wastewater treatment facilities with annual energy bills of at least $100,000.
- The UMass Clean Energy Extension offers free assistance for clean energy projects on a case-by-case basis. Usually it is a good idea to contact the utility company first to see what support they can provide, and then contact UMass Clean Energy Extension if additional assistance is needed.

LED Streetlights

Upgrading streetlights to LED fixtures can result in significant energy savings. In 2015, the Town of Swampscott received funding through the Green Communities program to change its

streetlights to LEDs. As a result, Swampscott reduced municipal electricity usage by more than 477,000 kilowatt-hours per year, saving $80,000 on its lighting bills.

Although there is a significant cost associated with LED fixtures, the payback period is typically around 7 years. In addition to using less energy, LED fixtures also last longer than other types of outdoor lighting, cutting down on maintenance costs.

LEED Certification

Some communities require all new or renovated municipal buildings to meet higher standards for energy efficiency — for example, by qualifying for LEED certification. LEED is an international certification system for green buildings, taking into account energy efficiency, sustainable construction materials, water conservation, and other factors. Different levels of LEED certification are available, including Silver, Gold, and Platinum.

The Collaborative for High-Performance Schools (CHPS) is a similar certification system, specifically for school buildings.

In a recent survey conducted by the Environment Massachusetts Research & Policy Center, 19.4 percent of communities that responded said that they require new or renovated municipal buildings to meet LEED or other energy efficiency standards.

Becoming a Green Community

Does your community want to make a commitment to being better on energy efficiency and clean energy? Do you want state support to figure out how to be a cleaner, greener town, and state grants for projects to become more sustainable?

What is the Green Communities Program?

The Green Communities Program strives to help all Massachusetts cities/towns find clean energy solutions, reduce energy costs, and strengthen local economies. The program provides technical assistance and financial support for municipal initiatives aimed to improve energy efficiency and increase the use of renewable energy in public buildings, facilities, and schools. Overall, the Green Communities Program helps clean up your community's environment and encourages cutting-edge green development.

What is the Green Communities Designation?

The Green Communities Designation demonstrates a municipality's commitment to "green" efforts at the local level and lets the city or town get help for energy efficiency and renewable energy initiatives from the state. Green Communities aim to decrease their energy use by 20% over the course of 5 years and receive assistance in improving the energy efficiency of their public buildings, facilities, and schools.

What are the steps for becoming a Green Community?

Step 1: Review the Criteria to be Designated a Green Community:

- *Provide as-of-right siting in designated locations for renewable energy*
- *Simplify and expedite permitting for new clean energy facilities*
- *Develop a plan to reduce energy use by 20% within 5 years*
- *Purchase fuel-efficient vehicles for municipality departments*
- *Minimize life-cycle energy costs for new construction (e.g. "Stretch Code")*

Step 2: Submit application to DOER's Green Communities Division

Step 3: Green Communities Division review

Step 4: If accepted, submit proposal for energy reduction plans

Overall, becoming a green community can take more than a year, but it is a great way to learn where your community currently stands, bring your neighbors up to speed on the issues, and then get expert help on taking your next steps.

What are resources to help with the process of becoming a Green Community?

Green Communities Program Guidance is available through the MA DOER, and Regional Coordinators serve as go-to contacts to answer questions, give advice, and

assist with energy initiatives. Read more:
http://www.mass.gov/eea/docs/doer/green-communities/grant-program/gc-program-guidance-fall-2016.pdf
http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/green-communities-coordinators/

Technical Assistance: Communities can often find technical assistance through their local planning agencies. For eample, the Metropolitan Area Planning Council provides help to 101 communities in Greater Boston (http://www.mapc.org/green-communities-ta).

Central Region: Kelly Brown (Kelly.brown@state.ma.us)
Northeast Region: Joanne Bissetta (Joanne.bissetta@state.ma.us)
Southeast Region: Seth Pickering (Seth.pickering@state.ma.us)
Western Region: Jim Barry (Jim.barry@state.ma.us)

Success Stories:

Arlington, MA was one of the first municipalities to be designated as a Green Community in the spring of 2010. Since then, they have successfully reduced their energy consumption by 21% and have saved approximately $354,000 in annual energy costs. Arlington was also the winner of the DOER's Leading by Example Award in 2013. The Highland Fire Station in Arlington was recently renovated and designated a LEED Silver Building. Just one example of many sustainable projects going on in town!

Dedham, MA became a designated Green Community in 2011 and has enjoyed both the economic and the environmental benefits associated with this designation. Dedham successfully launched its Sustainable Dedham Initiative to educate its residents about energy conservation and sustainability. Additionally, the town has installed solar arrays on the high school and Town Hall, partnered with Next Step Living and Sustainable Business Network of Massachusetts, and has had countless other successful initiatives!

Complete Streets

Transportation is the largest source of global warming pollution in Massachusetts, responsible for 39 percent of statewide emissions. Pollution from cars and trucks is harmful to our health, contributing to diseases like asthma, bronchitis, and cancer.

Today, most of our transportation system is powered by oil. By promoting non-motorized forms of transportation like walking and biking, we can cut down on fossil fuel use and bring Massachusetts closer to 100 percent renewable energy economy-wide.

But often, our streets are designed for cars rather than people, with few sidewalks or bike lanes. As a result, walking and biking can seem unsafe, and a car can seem like the only way to get where you need to go.

Complete Streets is an approach to road design that requires planners to take into account the needs of all users, including pedestrians and cyclists, when building new streets or redesigning existing streets. By adopting a Complete Streets policy, communities can increase opportunities for walking and biking, and reduce the need for residents to travel by car.

What is a Complete Street?

According to the Massachusetts Department of Transportation, 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.”

Often, Complete Streets include the following elements:

- Sidewalks and crosswalks to encourage walking
- Bike lanes, protected bike lanes (lanes that are separated from traffic by parked cars, plantings, or other barriers), and sharrows (pavement markings) to encourage biking
- Transit stops and designated bus lanes, where appropriate, to encourage the use of mass transit
- Traffic calming measures to reduce the speed of cars in residential and commercial areas, including speed humps, curb extensions, and speed limit reductions
- Curb cuts and other features to ensure that everyone can get around, particularly people with disabilities and older adults

Complete Streets doesn’t mean that every road needs to have all of the features above. Rather, local officials and planners should consider the needs of all users when they design streets, and make decisions that will promote the use of zero-carbon alternatives like biking and walking.

Developing a Complete Streets policy

Typically, the first step is for communities to adopt a Complete Streets policy. This policy provides guidance to local officials and planners to ensure that streets are designed to be safe and accessible for all users. Depending on the community, this policy may be adopted by the city council, the board of selectmen, or the mayor.

Smart Growth America and the National Complete Streets Coalition have developed guidelines for communities looking to adopt Complete Streets policies, as well as sample policies adopted by cities and towns across the country.

What funding and support are available?

- The Massachusetts Department of Transportation (MassDOT) has created a Complete Streets Funding Program to provide support for municipalities at various stages of implementation. Funding can be used to support developing a Complete Streets policy, creating a plan to prioritize Complete Streets implementation, and building roadways that meet Complete Streets goals. The funding program is set to expire at the end of the current fiscal year, but may be extended depending on the program's success.
- *What Works*, a report from Transportation for Massachusetts, Livable Streets, Metropolitan Area Planning Council, and WalkBoston, profiles communities in Massachusetts and across the country that have adopted successful, low-cost measures to promote walking, biking, and transit.
- Regional planning agencies such as the Metropolitan Area Planning Council (MAPC) may provide support for communities looking to adopt Complete Streets policies and develop bicycle and pedestrian network plans. MAPC has created a fact sheet outlining the benefits of Complete Streets and the steps for communities to qualify for funding from MassDOT.
- The Massachusetts Public Health Association has assembled a list of Complete Streets resources.

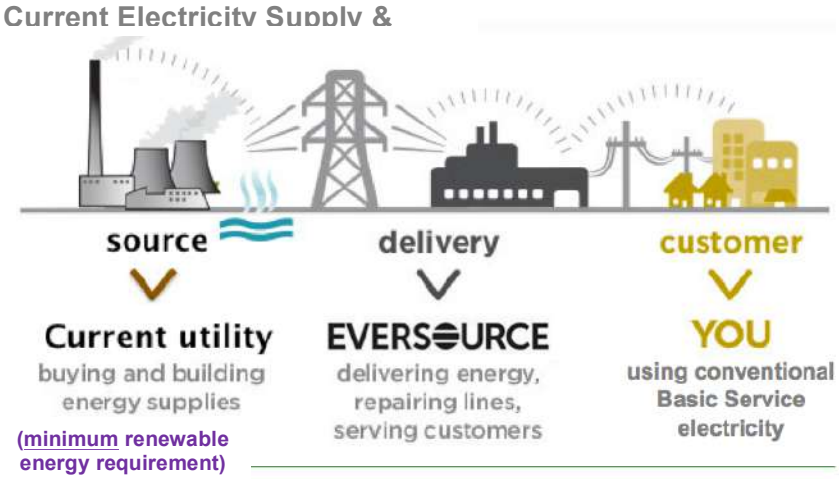
Community Choice Aggregation

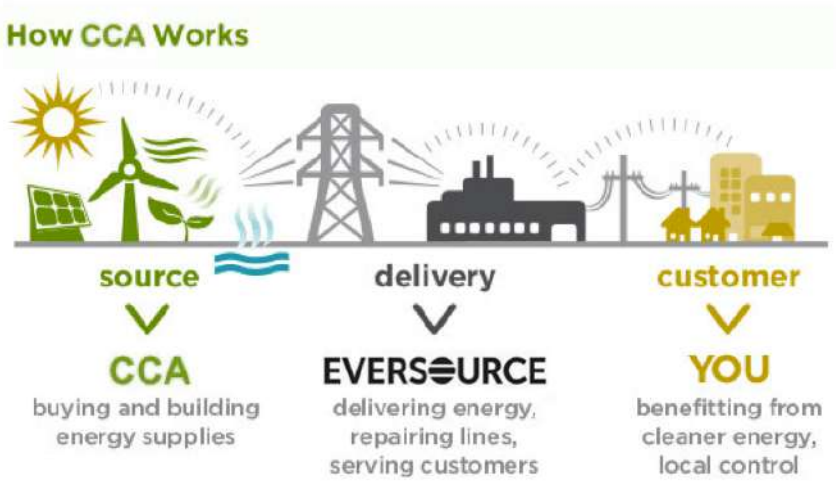
What is Community Choice Aggregation?

Community Choice Aggregation (CCA) is basically bulk buying for electricity. It is a process by which municipalities can aggregate and switch the electricity of the households and small businesses from basic service over to cleaner energy.

An energy broker is employed to ensure the municipality can purchase the amount and types of energy needed, and residents may opt out at any time. The electricity is still distributed and billed through the original utility, i.e. Eversource.

CCA allows residents and small businesses to seamlessly switch to more renewable energy, and do the right thing on climate change.





Basic Outlin **:e Aggregation Approval Process:**

- Town Meeting approval to pursue CCA

- Broker creates aggregation plan (at no cost to town)
- Board of Selectmen approves aggregation plan
- Department of Energy Resources reviews aggregation plan
- Department of Public Utilities approves plan
- Broker issues RFP for competitive supplier
- Town selects competitive supplier
- Broker publicizes CCA to residents and small businesses, and handles all opt-out requests

If no plans or energy prices are deemed acceptable, there is no obligation for the town to proceed.

if your city or town has a city council, they would take the place of the town meeting, and the mayor plays a similar role to the Board of Selectmen.

Sample Enabling Language: (from municipalities who have already approved CCA)

Dedham:
To see if the Town will vote to authorize the Board of Selectmen to research and develop a plan to participate in a contract or contracts, to aggregate the electricity load of the residents and businesses in the Town of Dedham and for other related services, independently or in joint action with other municipalities, in accordance with the provisions of Chapter 164 of the Acts of 1997, which provision established a competitive marketplace through deregulation and restructuring of the electric utility industry; and further authorize the Town Manager to establish, and/or appoint representatives for a committee to oversee such independent or joint action, or take any other action relative thereto.

Lexington:
To see if the Town will vote to authorize the Board of Selectmen to enter into a Community Choice Aggregation Program and contract for electric supply for Lexington residents and businesses as per MGL 164, Section 134, or otherwise act thereon.

Melrose:
Be it be ordered that the Melrose Board of Aldermen authorize the Mayor and appropriate department(s) to research and develop a plan to participate in a contract, or contracts, to aggregate the electricity load of the residents and businesses in the City of Melrose, and for other related services, independently, or in joint action with other municipalities, and further authorizes the Mayor to execute all documents necessary to accomplish the same.

Local Solar Energy

Solar is incredibly popular in Massachusetts, with more than 84% of people saying that Massachusetts should rely more on solar power. Solar is also a burgeoning jobs engine, employing more than 15,000 people in Massachusetts alone. You can get your energy from the sun AND save money - some towns anticipate savings of almost $400,000 annually.

What is Local Solar?

Solar produced in your town or city is an important tool for a community to get to 100% renewable energy for all. Getting more of your power from the sun can take many forms: municipal policies that promote solar power in public and private development; “solar-ready” requirements on new construction; renewable energy development on public buildings; and community-wide opportunities such as the Solarize Massachusetts program.

Why is it important?

Local solar is not only clean energy, it also helps people understand that these solutions work in cities and towns across the Commonwealth and across the country. Seeing solar panels every day when picking up kids from school or the drive home from work will continue to remind your friends and neighbors that clean energy works here, and is happening in your backyard.

How can we expand solar power in my community?

We suggest considering three options:

1. Connect residents and businesses with affordable solar options through programs like Solarize Mass or other bulk purchase programs.
2. Install solar panels on municipal buildings and properties, including capped landfills, parking lots, and school buildings.
3. Require new buildings to be built “solar-ready,” so that solar panels can be installed later.

1. Connect residents and businesses with affordable solar options

The Solarize Mass program, a partnership between the Massachusetts Clean Energy Center (MassCEC) and the Green Communities Division of the Massachusetts Department of Energy Resources, aims to increase the adoption of small-scale solar installations through community outreach campaigns.

Since it was launched in 2011, the program has led to nearly 3,000 families and businesses signing contracts for solar installations. Most cities and towns that have participated in Solarize Mass have doubled the amount of solar installed in their community.

Once selected to participate in the program, municipalities select a designated solar installation company, and local volunteers work to spread the word in the community. Typically, residents and businesses that sign up through Solarize Mass are able to install solar at a lower cost than would otherwise be available. Some installers also offer solar installations under a lease or power purchase agreement (PPA), allowing families to switch to solar without any upfront cost.

Some cities and towns have chosen to create their own solar outreach program, rather than participate in Solarize Mass, in order to better meet the needs of their residents.

Resources

- The Solarize Mass website has instructions for communities applying to participate in the program. Solarize Mass is currently accepting applications on a rolling basis, and hopes to enroll up to 10 communities or groups of communities in 2017.
- Sunny Cambridge is a good example of an alternative model for solar outreach, with a special emphasis on making it easier for residents of condominiums and other multi-family homes to switch to solar.

2. Install solar on municipal buildings and properties

Many local governments have installed solar panels on municipal properties as a way to save money on their electricity bills while promoting the adoption of renewable energy. Schools, fire and police departments, and municipal office buildings often have large, sunny roofs that are ideal for rooftop solar installations. Solar installations on school buildings can also serve an educational function, integrating into lesson plans around renewable energy, climate change, physics, and chemistry.

Installing solar panels on underutilized land, such as capped landfills, is also a smart way to increase clean energy adoption. Some communities are also looking at solar canopy installations over parking lots, which serve the dual purpose of generating clean energy and providing shade for parked cars.

Resources

- The Massachusetts Department of Environmental Protection (MassDEP) provides resources for communities that are considering installing clean energy on capped landfills.
- The Solar Energy Industries Association (SEIA) has assembled statistics and case studies of solar installations on school buildings across the country.
- The Green Communities Division of the Massachusetts Department of Energy Resources (DOER) assists communities with energy efficiency and renewable energy projects. Regional clean energy experts are available to answer questions.

Some regional planning agencies, such as the Metropolitan Area Planning Council, assist cities and towns with planning renewable energy installations on municipal properties.

3. Require solar-ready buildings

Some towns have started requiring that new buildings, or buildings that are having substantial renovations done, have their roofs be “solar ready”. If architects and contractors don’t plan ahead, roofs can end up being unsuitable for solar, with issues like vents in the wrong place or the roof facing the wrong direction.

The goal is that even if the solar system is not installed in the short run, buildings are being built or rebuilt so that eventually most roofs in town will be suitable for solar.

There are two ways a town can do this: by focusing narrowly buildings owned by the town (schools, municipal office buildings, etc) or by going more broadly and changing the town or city code to make sure all buildings in town are solar ready.

Resources

- The National Renewable Energy Lab, or NREL, put out this oldie but goodie in 2009: http://www.nrel.gov/docs/fy10osti/46078.pdf
- For in depth discussion and sample language for solar zoning, see this resource: https://www.planning.org/research/solar/briefingpapers/localdevelopmentregulations.htm
- We can help you craft locally appropriate language if solar ready is your goal!

Success stories

Solar power from a landfill

The city of Northampton has decided to create a 3.3MW solar array on top of the former Glendale Road Landfill. This solar array will be a great way for the city to further promote their dedication to clean energy and to save the city a great deal in energy savings. When completed, the new solar array is expected to provide nearly 40% of the city’s annual municipal electricity use and save the city nearly $9 million over the next 20 years in energy savings and income!

Solar and schools

In Braintree, a plan to construct solar panels on two public schools is set to commence to give residents access to clean electricity. Panels on the roofs of Braintree High School and East Middle School will generate 1.3 million MW of electricity. The schools are set to receive $15,000/year for the space. Additionally, residents are offered solar electricity generated from the schools through a Community Solar Program where participants would be able to lock in a rate of 15cents per KW for 10 years, saving significant money on annual energy costs!

Solarize program

The launch of the new Solarize Somerville project to promote solar energy to clean up the grid in Somerville has been received with great enthusiasm. Today, nearly 70 households have switched to solar energy and numerous other neighbors are taking advantage of the solar energy site assessment. Customers who switch to solar energy enjoy multiple tax-based incentives including a possible $1000 personal income tax credit!

Electric Vehicles (EVs)

The transportation sector is responsible for approximately 40% of Massachusetts' greenhouse gas (GHG) emissions[1]. Identifying and employing strategies to electrify our transportation sector is a critical step to reducing our dependence on fossil fuels and achieving 100 percent renewable energy.

By encouraging the transition to electric vehicles (EVs), local governments can improve local air quality, decrease respiratory ailments such as asthma, boost the local economy by reducingfuel costs, and set a positive example for residents to follow.

According to Union of Concerned Scientists, transitioning to EVs can help cut projected U.S. oil use in half over the next 20 years.[2]" Additionally, as we continue to integrate more renewable energy into our electric grid, EVs will get cleaner in lockstep with this greener grid.

How can municipalities encourage the transition to EVs?

Lead By Example

Electrify the Municipal Fleet

One of the most powerful motivators to anyone making a change is seeing someone else do it first. Many municipalities are already adding battery-electric and plug-in hybrid electric vehicles to their fleets, simultaneously leading their citizens while enjoying the benefits of reduced maintenance and lower fuel costs.

The Department of Environmental Protection, through MassEVIP[3], will provide incentive funding for municipalities to offset the initial costs of purchasing battery-electric or plug-in hybrid electric vehicles. Over the lifetime of the vehicle, a municipality stands to save thousands of dollars in fuel costs by operating EVs in place of petroleum vehicles, while also cutting pollution and increasing air quality for it's residents.

Battery-Electric Zero Emission Buses (ZEBs) - School Buses and Public Transit

Diesel, hybrid-diesel, and CNG buses, although initially cheaper, present large operating and maintenance costs. Each battery-electric bus can cost hundreds of thousands of dollars less per year to fuel than diesel and CNG buses, as well as being easier to maintain. ZEBs also produce no tailpipe pollution, whereas diesel exhaust contains more than forty toxic air contaminants that in some cases can cause and/or worsen diseases such as asthma and cancer.[4]

Municipalities can work to electrify school district bus fleets, municipal transit fleets, and encourage regional transit authorities (RTAs) to do the same. Battery-electric school buses are

already being operated in four Massachusetts school districts through the DOER's Vehicle-to-Grid Electric School Bus pilot program. Riders of the Worcester RTA currently enjoy quietly efficient ZEBs traveling their routes, and other RTAs across the state are considering ZEBs as well.

Federal funding is available through the Federal Transportation Authority in various forms, such as the Congestion Mitigation and Air Quality (CMAQ) program, and the Low or No Emission (Lo-No) Vehicle Program. Visit https://www.transit.dot.gov/grants to learn more.

Reduce Barriers

Install Public Charging Stations

EV battery ranges continue to increase each model year, with many models becoming comparable in range to petroleum vehicles; "range anxiety" is being supplanted by "range confidence." However a lack of clearly visible and accessible charging stations can still be a deterrent. Municipalities can help by installing charging stations in city or town centers, retail areas, malls and other locations conducive to visitors, as charging can take anywhere from 30 minutes to two hours.

Municipalities can also encourage local business leaders to install charging stations so employees can easily and conveniently charge during the workday. Employers can see charging stations as an additional strategy to attract and retain quality employees, while businesses such as restaurants and shopping centers can attract patrons to charge during their visit.

MassEVIP will provide incentive funding for municipalities and private employers to offset the cost of installing Level 2 dual-head charging stations - the most common for public charging.

Educate Citizens

Just as very few people would buy a vehicle before test-driving it, similarly people are much more likely to consider buying an EV after being given the chance to drive one. Municipal programs can play an important role in giving citizens the experience of driving electric while also providing the chance to educate on the economic, environmental, and social benefits of EVs.

Municipal programs such as Braintree Drives Electric do just that. The state has done similarly by providing educational material and guides, and hosting "EV Ride & Drive" events across the state through the MassDriveClean program. These programs have been shown to be effective in increasing EV adoption. Since the launch of Braintree Drives Electric, the city has seen an increase of 650% in EV adoption.

[1] http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/ma-ghg-emission-trends/
[2] http://www.ucsusa.org/sites/default/files/attach/2015/11/Cleaner-Cars-from-Cradle-to-Grave-full-report.pdf
[3] http://www.mass.gov/eea/docs/dep/air/community/massevipfs.pdf
[4] https://www.sierraclub.org/sites/www.sierraclub.org/files/uploads-wysiwig/1099%20Zero%20Emission%20Bus%20Factsheet%2005_x1a.pdf

Writing a Net Zero Plan

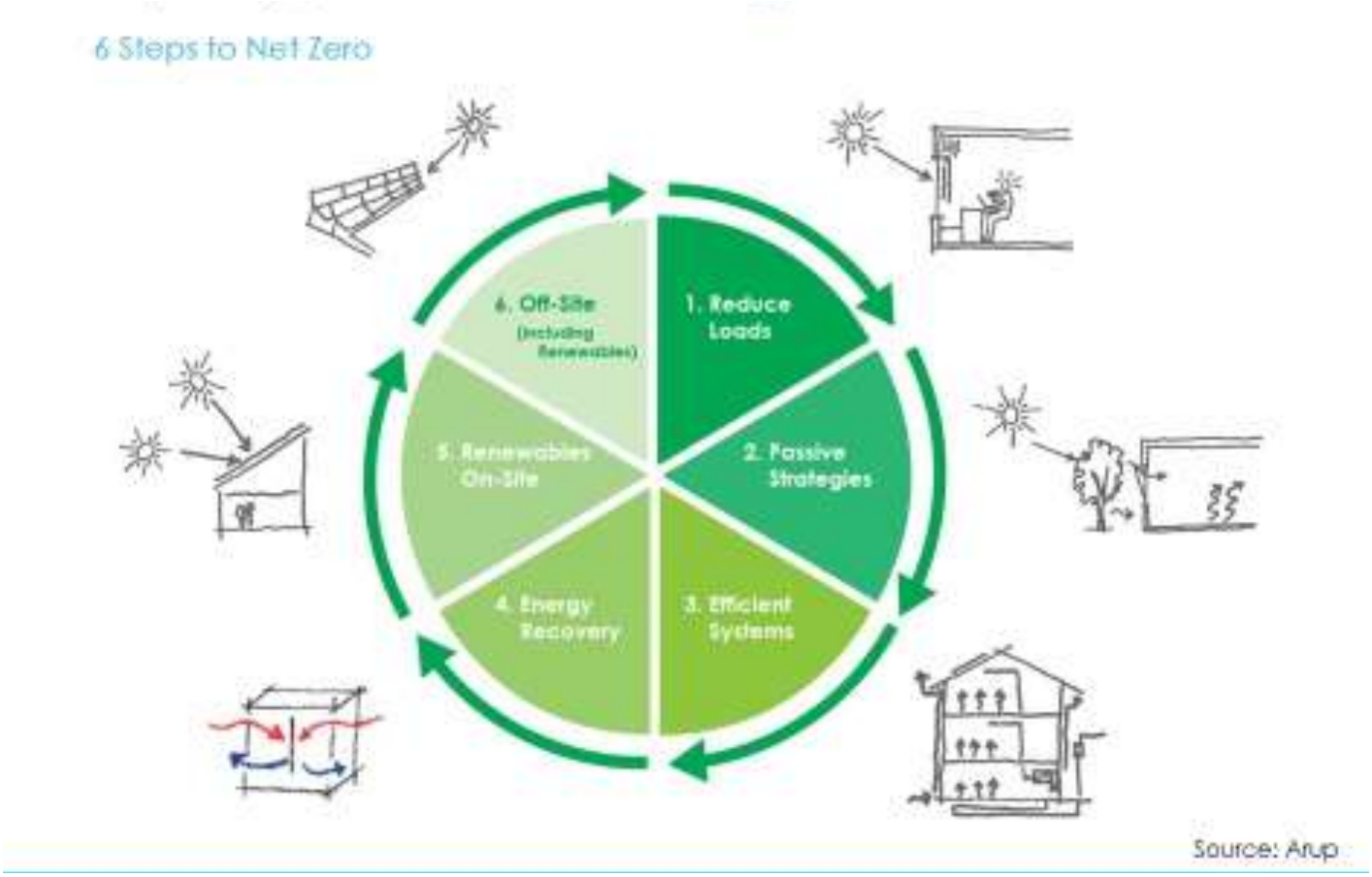
What is Net Zero?
A Net Zero municipality produces zero net carbon pollution, the pollution that causes climate change. This means the community gets as much electricity from renewable sources as it uses. Getting to net zero usually comes from a combination of energy efficiency improvements, local clean energy production, and purchasing of renewable energy.

Why would a town want to be Net Zero?
MA made a commitment in state law (the Global Warming Solutions Act of 2008) to cut our climate change-causing pollution 80% by 2050. Cleaning up our energy supply and using less electricity in our buildings is key, and cities and towns are taking action.

What is the process for a town to get to Net Zero?

1. Create a Net Zero Team of advocates
    - Talk to people, groups, or businesses in town who you know will support going net zero
    - Talk to supportive town officials and see if you can find a champion who will help shepherd this through the process
2. Introduce an initiative at town meeting or to city or town council
3. Create a Net Zero Task Force that includes town officials, advocates, and stakeholders
4. Conduct education and outreach on Net Zero to all stakeholders, including climate and neighborhood groups, business and industry
5. Do a greenhouse gas inventory for the town if one hasn't been done already
6. Adopt Net Zero goals for the town
    - Construct all new municipal buildings, such as schools, to be Net Zero
    - Enact financing programs for new Net Zero commercial buildings
    - Streamline permitting processes for energy efficiency and solar projects
7. Conduct public forum and meetings with stakeholders

What is a Net Zero plan?
A Net Zero Plan is a long term roadmap for steps a city or town will take to reach net zero**.** It gives a timeline with short and long term goals, and priority actions. The plan should be created based on visioning and input from the community and all stakeholders.



What actions should you consider including in a Net Zero plan?

- Figure out how you can reduce emissions based on the Greenhouse Gas Inventory
- Set targets and come up with strategies for improving energy efficiency in existing buildings
- Identify targets and strategies for Net Zero new construction
- Create incentives and identify financing for energy efficiency (including deep retrofits) and net zero new construction
- Develop and enact local ordinances and zoning favorable for producing renewable energy, such as for rooftop solar ready and for ground mounted solar
- Identify ways to buy additional green power, such as through Community Choice Aggregation
- Set goals and develop strategies for reducing emissions from vehicle use
- Look into setting up a local carbon fund
- Come up with strategies for long-term community and stakeholder engagement
- Develop strategies to measure and verify emissions reductions.

Success Stories

Cambridge-
Cambridge has been a leader in going net zero, having started the process in 2013. A net zero team filed a citizen's zoning petition requiring that all new buildings be net zero. According to Quinten Zondervan, the main goal of doing this was to get the public's attention, to start considering a net zero goal for the city. From that point forward, the team conducted outreach to businesses, property owners, and other stakeholders, and then put a representative net zero task force together. Working groups were set up to focus on:

- Engagement and behavior change
- Incentives and financing tools
- Regulation and planning approaches
- Energy supply and offsets

The proposed actions to meet the net zero objective are categorized into five key areas:
1. Energy Efficiency in Existing Buildings
2. Net Zero New Construction
3. Energy Supply (low carbon and renewable energy)
4. Local Carbon Fund
5. Engagement & Capacity Building (communication and resources)

Within each of these areas, the plan identifies short, medium, and long term actions, as well as what the projected greenhouse gas emission reductions are for each action.

Lexington-
The net zero team in Lexington began the process by holding a meeting open to the public and having Quinton Zondervan and Henrietta Davis from Cambridge present about their net zero process in Cambridge. According to Lisa Fitzgibbons and Mark Sandeen from the Lexington Global Warming Action Committee, this "established doability in the minds of the town," and demonstrated a clear path toward achieving net zero. It also reassured the town that they didn't need to reinvent the wheel in order to do it. The response from the first meeting was overwhelmingly positive, and after receiving a lot of input from the Board of Selectmen, the Planning Board, and various committees, the team wrote a warrant article asking for funding to hire a consultant to establish a baseline of greenhouse gas emissions. They presented the article at town meeting, it passed, and they have hired Peregrine Energy as a consultant. Once they have detailed emissions data they will move forward on writing a net zero plan.

Climate Planning for Social Equity and Environmental Justice

Environmental injustices arise when a group or community are heavily impacted by pollution, lack of natural resources, or environmental degradation caused by outside parties or corporations. Commonly, indigenous communities, communities of color, and low-income communities are disproportionately affected by environmental injustices. Many communities have turned to grassroots organizing in order to share their plight and fight for the clean environment they deserve.

By addressing the root causes of environmental degradation and accurately representing the demands and rights of communities affected, climate planning strategies that incorporate social equity can be hugely fortuitous.

How to Address Environmental Justice Issues in your community:

1. **Identify the problems facing your community**

   Whether there is one large polluter or decades of resource depletion, identify what the largest obstacles are and how the environmental pollution is affecting your society. Approaching the problem from multiple perspectives, including but not limited to environmental concerns, social equity, and sustainable development and job creation will help to identify where the problems exist.

2. **Identify the stakeholders and the people you need to involve in your initiative**

   Work with the stakeholders, including community organizations, resident groups, government officials, corporate parties and other entities. Keep an open door policy, utilize facilitated discussions, and create space for public comment and feedback to understand the needs of your community. Create a unified voice that can better address the problem. This will help ensure a win-win situation for all!

3. **Organize and develop your goals**

   Once you have your party together, start developing your main goals and priorities. Develop a clear unified goal and be able to show how cleaner energy alternatives or sustainable job growth will help promote social equity in your community. Clear incentives to promote social equity through cleaning the environment will not only help to spread the word but will help educate people on how greener living can create a more just community. Having the facts behind you will help convince stubborn corporations or government officials.

4. **Activate & Educate**

   Get out and spread the word! Once you have your team behind you and your goals clearly laid out, it's time to hit the street! Develop a plan to activate the community and educate people on cost-saving green living and sustainable job creation! Make sure to have a variety of events to attract people from every walk of life. Always utilize social media and make efforts to keep your

project goals and strategies accessible to everyone. Receiving public comments is helpful in gaining public trust and support!

5. **Keep researching and practice adaptive management**

Overtime, keep up with changes in your community and study similar campaigns in other areas and learn from their successes/failures. Keep adapting your own strategy to see what resonates the best with your community and keep an open mind. Make sure to establish a measurement system to track your success and be sure to learn from everyone you talk with.

Some great Mass Organizations addressing Environmental Justice:
Alternatives for Community and Environment: http://www.ace-ej.org/
Neighbor to Neighbor Massachusetts: http://www.n2nma.org/en/
Chelsea Greenroots: http://www.greenrootschelsea.org/

How to plan for Social Equity:

1. **Identify your constituents and clarify their goals for attaining equity**

Identifying your constituents and the increasing your knowledge of the demographics in your area will help set the stage for an equity movement that accurately fights for the goals of your community. By hosting a variety of events with public comment opportunities you'll be sure to reach a vast group of people and identify their equity aspirations.

2. **Consider access and inclusion in your movement**

Allocate funding or develop creative transportation and accessibility solutions to ensure that previously underserved or marginalized neighborhoods can voice their opinions.

3. **Examine recruitment and advancement policies within businesses**

Encouraging the examination of business models for inclusion and accessibility for all demographics is key to promoting equal growth and opportunity in business. Try integrating a review of equity within business models to track progress and address weak areas. Make sure to promote equitable salary and promotion structures.

4. **Promote sustainable job development**

Incorporating environmental justice campaigns into equity planning will work to address environmental injustices occurring in marginalized neighborhoods (commonly communities of color, indigenous communities, and low-income areas). Including green infrastructure and protecting natural resources will help the entire community, ease environmental degradation, and address potentially unequal access to resources.

5. **Follow through and track your progress**

Tracking and monitoring your program's progress is key to ensure that your project is implemented in a timely and effective manner. Also, continue allowing for public comment to guarantee you continue to address your community's changing needs.

Springfield, MA

Grassroots organizers in Springfield, MA have a substantial environmental justice agenda that demands change not only for the environment but for human health and wellbeing. Following a conference on climate justice, the *Springfield Climate Justice Coalition* (SCJC) began pushing for a "Springfield Climate Action Plan" that addresses air pollution in the city, increases energy efficiency, expands access

to public transportation and housing, increases healthy food options, adopts better waste management, and lastly empowers the community through education. Groups like *Arise for Social Justice* and the *Pioneer Valley Planning Commission* pushed Springfield's Mayor, City Council and other stakeholders to implement a Climate Action Plan and appoint a full-time Environmental Coordinator. When the city applied for a resiliency grant, the SCJC positioned itself as a useful ally to city leaders in pushing the local environmental agenda.

Detroit, MI

In Detroit, MI communities are fighting countless environmental polluters, including coal plants, oil refineries, waste incinerators, and Superfund sites, which have created a highly polluted atmosphere for residents of the city. Detroit suffers from one of the nation's highest rates of asthma among children and clean sustainable energy and jobs are not readily accessible. Community members have started to organize for a grassroots urban renewal with recycling programs, food security, pollution reduction, and the promotion of sustainable jobs. The *East Michigan Environmental Action Council* has become an anchor to unify the local movement to work cross-sectorally and build community resilience to climate change.

Renewable Heating and Cooling

Do you want your home to be cooler in the summer or warmer in the winter? Are your heating or cooling bills too high?

About 3 in 10 Massachusetts families still heat their homes with oil, and most of the rest use natural gas. Heating is responsible for a greater share of Massachusetts' global warming pollution than electricity. The fossil fuels we burn to heat our homes and businesses and produce hot water also contribute to harmful air pollution that affects human health.

The good news is that we have alternatives. We can heat our water using thermal energy from the sun. And with efficient air source heat pumps, we can keep our homes and businesses at a comfortable temperature with clean, renewable electricity. Switching to these technologies will help reduce the use of fossil fuels and promote a 100% renewable future for Massachusetts.

Even better, these systems have lots of incentives so that you can get them installed and be heating your home with renewable energy for a lot less. The incentives are at both the federal and the state level. There are also programs that help you make choices about what kind of heating is right for you and help you find an installer.

Renewable heating technologes

- Solar water heaters use energy from the sun to provide hot water. These systems use "collectors" on the roof of a home or business to collect heat from the sun, which is then used to heat water. The hot water is kept in a tank that is connected to the plumbing system and can be used in the same way as hot water from an oil or gas boiler.
- Solar energy can also be used for space heating.
- Air source heat pumps use electricity to heat or cool a home efficiently. Thanks to recent improvements in technology, air source heat pumps are now able to heat homes effectively even in cold climates like New England. A study from the Northeast Energy Efficiency Partnership found that air source heat pumps are significantly more cost-

effective than oil heaters or electric resistance heating. And because these heat pumps run on electricity, they can be powered by renewable resources like the sun and wind.
- Ground source or geothermal heat pumps provide heating, cooling, and water heating by using the temperature of the ground, which is nearly constant throughout the year.

What incentives are available?

Incentive programs from the state and federal government can help make a system in your home more affordable.

- The Massachusetts Clean Energy Center (MassCEC) lists the incentives available for residents, businesses, government agencies, and nonprofits to install renewable heating technologies.
- MassCEC offers rebates for solar hot water systems, up to $4,500 or 40% of the installed cost. MassCEC has created a guide for residential solar hot water systems.
- MassCEC also offers rebates for air source heat pumps.
- MassSave offers zero-interest loans for replacing your heating system with efficient technologies, including air source and ground source heat pumps.

What can local communities do to promote renewable heating?

This year, MassCEC is running a pilot project to promote renewable heating as part of its Solarize Mass program. Solarize Mass program, a partnership between the Massachusetts Clean Energy Center (MassCEC) and the Green Communities Division of the Massachusetts Department of Energy Resources, increases the adoption of small-scale solar installations through community outreach campaigns. As part of this pilot program, up to two communities will be selected to promote solar hot water, air source heat pumps, or electric vehicles alongside solar electricity.

Communities that are looking to increase the adoption of renewable heating technologies could seek to join MassCEC's "Solarize Mass Plus" program. Alternatively, a community could choose to create its own outreach and bulk purchasing program for renewable heating technologies, along the model of the Solarize Mass program.