Clean Energy Future Committee

Date: Friday December 18, 2020
Time: 8:00 a.m.
Location: Conducted via remote participation

To register for the Zoom Meeting:
https://us02web.zoom.us/meeting/register/tZ0tde2uqzwuEt1zOXYQ1HT6XVvhDfY-aRUK

After registering, you will receive a confirmation email containing information about joining the meeting.

Members of the public are asked to send written comment to: kpruitt@town.arlington.ma.us.

Notice to the Public on meeting privacy
In the interests of preventing abuse of videoconferencing technology (e.g. "Zoom Bombing") all participants, including members of the public, wishing to participate via Zoom must register for each meeting and will notice multi-step authentication protocols. Please allow additional time to join the meeting. Further, members of the public who wish to participate without providing their name may still do so by telephone at 929-436-2866 Meeting ID: 890 2465 7489.

Documents related to the below agenda items follow as attachments to this document.

Agenda

8:00 – 8:05: Meeting ground rules

8:05 – 8:10: Review & Approve Minutes from 11/20/2020 meeting

8:10 – 8:30: Potential 2021 Town Meeting Warrant Article (Pasi Miettinen)

8:30 – 9:00: Review draft Getting to Net Zero chapter of Net Zero Action Plan

Next meeting: January 22

Attachments:
1) Governor Charles Baker's 3/12/2020 Executive Order Suspending Certain Provisions of the Open Meeting Law
2) Draft minutes from 11-20-2020 meeting
3) Warrant article discussion text from Pasi Miettinen
4) Draft Getting to Net Zero chapter

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COMMONWEALTH OF MASSACHUSETTS
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CHARLES D. BAKER
GOVERNOR

KARYN E. POLITO
LIEUTENANT GOVERNOR

ORDER SUSPENDING CERTAIN PROVISIONS OF THE OPEN MEETING LAW, G. L. c. 30A, § 20

WHEREAS, on March 10, 2020, I, Charles D. Baker, Governor of the Commonwealth of Massachusetts, acting pursuant to the powers provided by Chapter 639 of the Acts of 1950 and Section 2A of Chapter 17 of the General Laws, declared that there now exists in the Commonwealth of Massachusetts a state of emergency due to the outbreak of the 2019 novel Coronavirus ("COVID-19"); and

WHEREAS, many important functions of State and Local Government are executed by "public bodies," as that term is defined in G. L. c. 30A, § 18, in meetings that are open to the public, consistent with the requirements of law and sound public policy and in order to ensure active public engagement with, contribution to, and oversight of the functions of government; and

WHEREAS, both the Federal Centers for Disease Control and Prevention ("CDC") and the Massachusetts Department of Public Health ("DPH") have advised residents to take extra measures to put distance between themselves and other people to further reduce the risk of being exposed to COVID-19. Additionally, the CDC and DPH have advised high-risk individuals, including people over the age of 60, anyone with underlying health conditions or a weakened immune system, and pregnant women, to avoid large gatherings.

WHEREAS, sections 7, 8, and 8A of Chapter 639 of the Acts of 1950 authorize the Governor, during the effective period of a declared emergency, to exercise authority over public assemblages as necessary to protect the health and safety of persons; and

WHEREAS, low-cost telephone, social media, and other internet-based technologies are currently available that will permit the convening of a public body through virtual means and allow real-time public access to the activities of the public body; and

WHEREAS section 20 of chapter 30A and implementing regulations issued by the Attorney General currently authorize remote participation by members of a public body, subject to certain limitations;

NOW THEREFORE, I hereby order the following:

(1) A public body, as defined in section 18 of chapter 30A of the General Laws, is hereby relieved from the requirement of section 20 of chapter 30A that it conduct its meetings in a public place that is open and physically accessible to the public, provided that the public body makes provision to ensure public access to the deliberations of the public body for interested members of the public through adequate, alternative means.

Adequate, alternative means of public access shall mean measures that provide transparency and permit timely and effective public access to the deliberations of the public body. Such means may include, without limitation, providing public access through telephone, internet, or satellite enabled audio or video conferencing or any other technology that enables the public to clearly follow the proceedings of the public body while those activities are occurring. Where allowance for active, real-time participation by members of the public is a specific requirement of a general or special law or regulation, or a local ordinance or by-law, pursuant to which the proceeding is conducted, any alternative means of public access must provide for such participation.

A municipal public body that for reasons of economic hardship and despite best efforts is unable to provide alternative means of public access that will enable the public to follow the proceedings of the municipal public body as those activities are occurring in real time may instead post on its municipal website a full and complete transcript, recording, or other comprehensive record of the proceedings as soon as practicable upon conclusion of the proceedings. This paragraph shall not apply to proceedings that are conducted pursuant to a general or special law or regulation, or a local ordinance or by-law, that requires allowance for active participation by members of the public.

A public body must offer its selected alternative means of access to its proceedings without subscription, toll, or similar charge to the public.

(2) Public bodies are hereby authorized to allow remote participation by all members in any meeting of the public body. The requirement that a quorum of the body and the chair be physically present at a specified meeting location, as provided in G. L. c. 30A, § 20(d) and in 940 CMR 29.10(4)(b), is hereby suspended.

(3) A public body that elects to conduct its proceedings under the relief provided in sections (1) or (2) above shall ensure that any party entitled or required to appear before it shall be able to do so through remote means, as if the party were a member of the public body and participating remotely as provided in section (2).

(4) All other provisions of sections 18 to 25 of chapter 30A and the Attorney General's implementing regulations shall otherwise remain unchanged and fully applicable to the activities of public bodies.

This Order is effective immediately and shall remain in effect until rescinded or until the State of Emergency is terminated, whichever happens first.

Given in Boston at 5:49 PM this 12th day of March, two thousand and twenty.

CHARLES D. BAKER
GOVERNOR
Commonwealth of Massachusetts

Clean Energy Future Committee
Meeting Minutes

Draft – for approval at the 12/18/2020 meeting

November 20, 2020
8:00 – 9:30 a.m.
Virtual Meeting – Hosted on Zoom

Members present: Jim DiTullio, Ken Pruitt, Dave Levy, Emily Sullivan, Shelly Dein, Dan Amstutz, Pasi Miettinen, Ryan Katofsky, Coralie Cooper, Nellie Akenhead, Marc Breslow

Also attending: Anne Wright, Pat Hanlon, Amos Meeks

Members not present: Dianne Mahon, Adam Chapdelaine

The meeting convened at 8:05 a.m.

Video Meeting Procedures
Mr. Pruitt read a set of prepared remarks explaining the procedures that the Committee would follow to hold a virtual meeting. Governor Baker signed an Executive Order in response to the COVID-19 pandemic allowing virtual meetings, which suspended the usual Open Meeting Law requirement that a quorum of committee members be physically present in order to hold an official committee meeting.

Meeting Minutes
Mr. Pruitt displayed the Minutes from the October 23rd Meeting. He highlighted two specific edits suggested by Mr. Amstutz as he displayed the changes in the Minutes. Mr. Pruitt asked for any further changes from the Committee Members. No changes were brought forward. Mr. Katofsky motioned to approve the Minutes as amended. Ms. Dein seconded the motion. A roll call vote was taken. The Committee unanimously approved the October 23rd Meeting Minutes.

Agenda Item 1: Discussion of Warrant Article Number 5 (Approved by Special Town Meeting)

Mr. Pruitt summarized Warrant Article Number 5, which was approved by the Special Town Meeting on November 18. Mr. Pruitt noted Mr. Pat Hanlon and Mr. Amos Meeks presented the article. He also said that CEFC members Mr. DiTullio and Mr. Levy spoke passionately in favor of supporting the article. Mr. Pruitt then commented that several

Town Meeting Members spoke in favor of it, one Member moved the question and the motion passed with about 93% of Town Meeting voting in favor of it.

Mr. Pruitt noted that this is the first of the 31 items in the CEFC's Draft Net Zero Plan to have had positive action. Mr. Pruitt invited Mr. Hanlon and Ms. Wright to discuss the ramifications of passage of Warrant Article 5 and what comes next.

Ms. Wright thanked all those who contributed to the effort. She noted that there was a good ground game getting people information about the Warrant Article, making sure it was briefed in the Precinct Meetings, and noting there was considerable outreach to the business community and housing advocates.

Ms. Hanlon then commented on the Warrant Article itself. He noted it was both a home rule petition and a bylaw. The bylaw, which would restrict fossil fuel infrastructure in new construction and major renovations, cannot go into effect until the home rule petition is approved by the state legislature. Mr. Hanlon also noted that the home rule petition gave the Town of Arlington authority to make further changes for fossil fuel use if the Town deems it appropriate (via Town Meeting vote). The next step is for Arlington's legislative delegation to introduce the legislation and then help advocate for its passage. Mr. Hanlon did speak to Representative Sean Garballey, who is expected to be an active supporter, working with State Senator Friedman and Representative Dave Rogers on introducing this piece of legislation in January.

Mr. Hanlon noted that the Town of Lexington may seek a similar home rule petition in the spring of 2021. Mr. Hanlon noted that State Senator Cindy Friedman also represents Lexington.

Ms. Cooper asked if the bylaw in Warrant Article 5 was similar to the previously drafted Warrant Article 13. Mr. Hanlon said that it is almost identical.

Ms. Wright noted that Brookline and some other cities and towns are thinking about similar actions. Ms. Wright speculated that there could be further requests to the legislature if more cities and towns pass local legislation in similar fashion.

Ms. Wright also noted that other towns and cities are passing zoning incentives for electric only construction and other similar efforts.

Mr. Hanlon then discussed what more could be done in Arlington. He noted he wants to improve efforts to reach out to various constituencies, improving knowledge, etc. Mr. Hanlon believes more can be done to discuss how heat pumps can be used in new buildings, etc. He stressed more can be done in education, etc. on this topic.

Mr. Miettinen noted how successful the campaign was to get this effort passed. He echoed how important education will be, highlighting the example of how many furnaces, air conditioners, etc. break in Arlington per month. Mr. Miettinen noted that education is critical to get people to think about heat pumps as an alternative for their heating system. Mr. Katofsky noted that the new high school is also using air source heat pumps and wanted to highlight this.

Mr. Hanlon noted that Town Meeting Member Mr. John Warden incorrectly stated at Town Meeting that the new High School design would rely on natural gas-fired furnace for heating, since geothermal heat pumps had been eliminated from the design. In fact, the High School will be heated exclusively with air source heat pumps, and Mr. Hanlon wanted that corrected for the record. After some discussion, Mr. Hanlon and Ms. Wright agreed to email all Town Meeting members after Town Meeting had ended with this correction.

Agenda Item Two: Review of the draft Net Zero Roadmap

Mr. Pruitt returned to the proposed initiatives in the Net Zero Roadmap based on stakeholder feedback. He highlighted some small changes to Net Zero Buildings measure 3, which calls for changes in zoning to allow for net zero buildings. The changes would explicitly include commercial buildings in the measure. The committee had no objection to this change.

Mr. Pruitt then highlighted Net Zero Buildings measure 5, which previously called for all municipal buildings to be more energy efficient, but now also calls for new municipal buildings and major renovations to be fossil fuel-free. Mr. Katofsky noted that certain buildings may not have the technology or other options for fossil fuel free abilities to be feasible, adding that there should be some language about feasibility.

Ms. Cooper raised a concern that she did not want to create too much of an “out.” Mr. Levy asked if buildings should be all electric or net zero? He objected to the statement “to the extent feasible.” Mr. Miettinen suggested a better requirement than all electric would be “fossil fuel free.” It was agreed to substitute “fossil fuel-free” for “all electric,” and not to include “to the extent feasible.”

Mr. Pruitt then turned to NZB11, which would require solar panels on new commercial and multi-family buildings. It is modeled after Watertown’s 2018 solar ordinance. Mr. Pruitt noted it is a judgment call on what the right number of units for residential buildings will be in terms of an applicability cutoff. He emphasized that one of the most important factors is building ownership – the more owners, the more complex it is to apportion solar net metering credits.

Ms. Cooper asked if the “complexity” of net metering is due to a current rate structure or will it be fixed in future versions of the Mass. solar regulations? Mr. Pruitt noted the rules could change on this point but there is no indication that they will change.

Mr. Amstutz wondered if this debate (the cutoff for multi-family applicability) should be tabled and considered in the future. Ms. Dein noted that she doesn’t want this to be an issue that a lot of people object to in the Net Zero Plan. From a feasibility perspective, Ms. Dein noted unless there is a professional building manager, issues like this can cause significant problems.

Mr. Levy noted it should be done across all apartments.

Mr. Miettinen highlighted that from an emissions standpoint, this is not a particularly impactful measure, because solar generation credits can be realized outside of Arlington.

Mr. Katofsky expressed his support of removing the number of units referenced in this measure, so that the cutoff would be determined later during implementation of the measure. Mr. Pruitt agreed to make that change. The Committee expressed no objection.

Mr. Pruitt then asked for CEFC members to help review new introductory sections that he recently wrote for the Mobility and Energy sections.

Mr. Pruitt noted that Mr. Amstutz made a comment about transportation and parking, including free parking, noting parking is a free resource and should be constrained in order to get more people to walk, bicycle and take public transportation. Ms. Dein and Ms. Cooper suggested a global search for the word “electric vehicle” in the Mobility section and to replace that term with “zero emission vehicle”. The Committee expressed no objection to either Mr. Amstutz’s change or Ms. Dein and Ms. Cooper’s changes. Mr. Amstutz offered to email specific language to Mr. Pruitt after the meeting.

Mr. Pruitt then noted a series of other small changes to the Roadmap that did not require discussion and concluded his remarks on the Roadmap.

Mr. Pruitt noted that while the goal is to finish the Net Zero Plan by end of 2020, it may end up being completed in early 2021 given the timing to schedule certain stakeholder feedback and other logistics. Mr. Pruitt then noted that the “Getting to Net Zero” chapter is forthcoming, and he will circulate to Committee members for comments. Mr. Pruitt then noted that Mr. Levy is working on a one-page “Letter From the Future,” which is intended to be the first chapter of the Net Zero Plan. Mr. Pruitt noted that the Committee is fairly close to having a draft of the whole plan, but that he is doubtful the plan can be approved formally by the Committee at its December 18 Meeting.

Mr. Katofsky made a motion to adjourn and Ms. Cooper seconded the motion. The Committee unanimously approved the motion.

The Meeting ended at 9:31am. The next meeting will occur on December 18, 2020.

Submitted by Dave Levy.

Proposed Zoning Bylaw Change for Spring Town Meeting

Drafted by Pasi Miettinen

12-15-20

Basis in Net Zero Roadmap:
Net Zero Buildings measure NZB3: "Change zoning or other bylaws that hinder the renovation or construction of net zero energy capable homes. Create incentives to encourage renovation and new construction projects to result in net zero energy capable buildings."

Background and the reason for the proposed bylaw change:
The current Arlington zoning bylaw enables replacement homes to be built on non-conforming lots only if the replacement homes are built on top of the existing foundation and two walls of the existing building are left standing. On the other hand, existing conforming lots, for example typical R1 zoned parcels with at least 50 feet of frontage and 5,000 square feet of area, do not have such a restriction and an old building can be replaced with a new building from the ground up. Because the frontage and size requirements vary between the R0, R1 and R2, the following will simply refer to conforming and non-confirming parcels rather than specify the differences between them.

Therefore, while the current bylaw allows new replacement homes to be built on non-conforming lots, it has effectively prohibited new insulated foundations on new replacement homes, and therefore prohibited the most energy efficient homes to be built because they require basements to be insulated from the exterior and from underneath.

The proposal below would change the bylaw to address this by allowing new replacement homes to be built on non-confirming lots as long as they meet very high energy efficiency standards (e.g. PHIUS+ 2015 Passive Building Standard). The proposed change would only affect existing residential buildings and would not enable any new lots to be created nor would it allow homes to be built if a lot currently does not have a principal building. In other words, it would not create smaller lots nor create more buildings in town. It would only allow existing buildings to be replaced with high efficiency buildings. The proposed change would also make Arlington homeowners on non-conforming lots equally eligible to conforming lot owners for certain federal and state incentives and tax credits that are only available for those who build homes to higher efficiency standards than the current building code.

The proposed change is in line with previous precedent and there are two specific amendments that relax the conforming lot definitions in the Arlington Zoning Bylaw. First, lots on certain streets are considered conforming even if they have just 2,000 square feet of area. New replacement homes can be built on those lots. Second, a new home can be built on empty non-confirming lots in the R0 district if those lots were registered on or before February 21, 1991.

This proposed change is one of the most impactful carbon emissions reduction legislation that The Town Meeting can pass because the current zoning bylaw prohibits very high efficiency

buildings from being built on 30% to 40% of Arlington non-conforming lots. Without this enabling legislation, The Town cannot meet its 2050 net zero carbon emission goal.

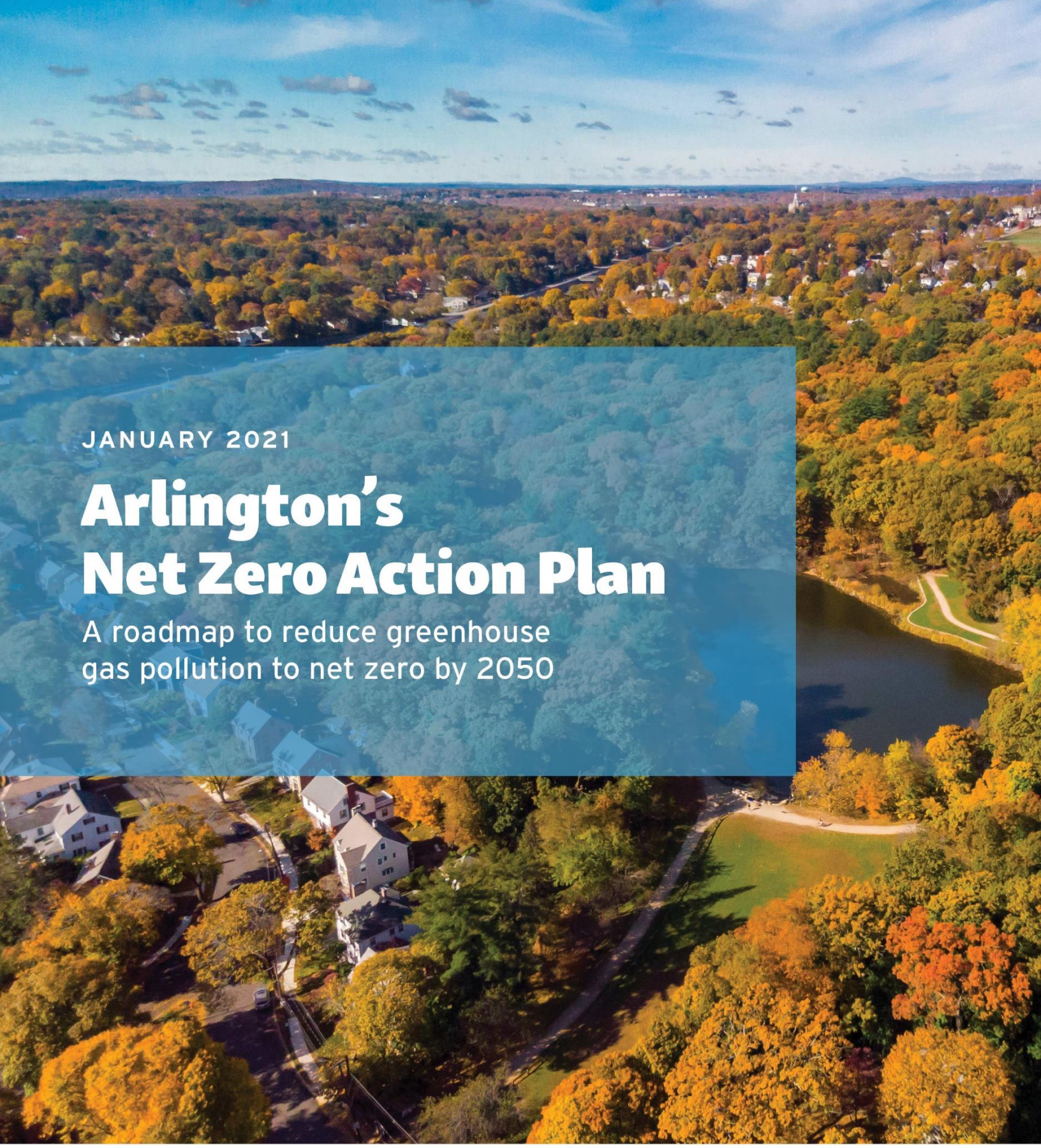
New zero emission zoning bylaw concept:

Any R0, R1 or R2 parcel, with an existing principal building, that is not considered conforming because it does not meet frontage or area square footage minimum requirements, shall be considered conforming if a new home meeting the PHIUS+ or other equivalent standard replaces the existing principal building, and:

1. The new building is built within the existing building footprint, or

2. The new building is built within the current dimensional requirements including setbacks and minimum open space requirements, or

3. by special permit.



JANUARY 2021

Arlington's Net Zero Action Plan

A roadmap to reduce greenhouse gas pollution to net zero by 2050

TOWN OF ARLINGTON MASSACHUSETTS

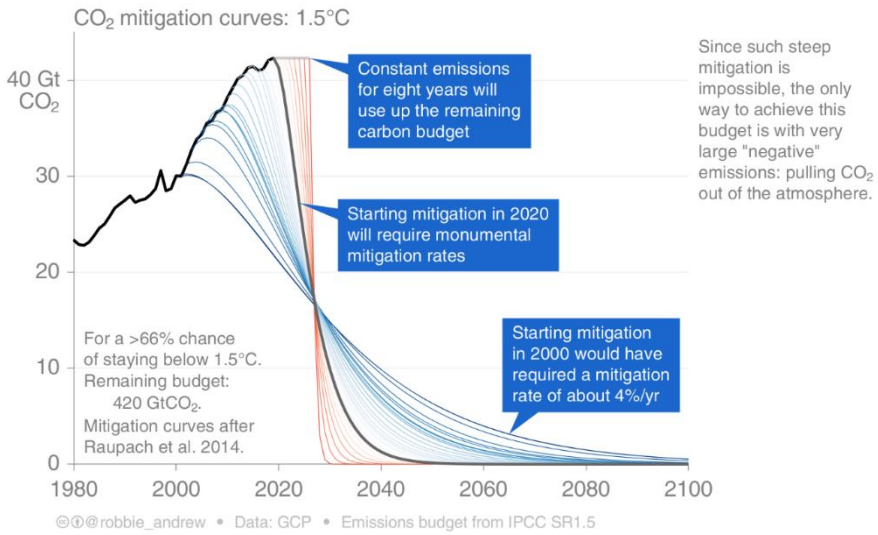
MAPC
METROPOLITAN AREA PLANNING COUNCIL

Getting to Net Zero

The Town of Arlington has committed to reaching net zero greenhouse gas (GHG) pollution by 2050. What exactly does this mean for our community? Why does our local goal matter? What does Arlington need to do to reach that goal? This Net Zero Action Plan aims to answer these questions and to create a roadmap for Arlington to reach net zero by 2050.

Why net zero?

Climate scientists have made it clear that the world needs to reduce global GHG pollution to net zero by 2050 to avoid catastrophic climate change. The planet has already warmed by about 1° Celsius since fossil fuels like coal, oil, and gas began being burned in large amounts beginning in the mid-1800s.[1] Scientists have projected that if we can keep warming below 1.5° Celsius, the worst impacts of climate change like extreme floods, wildfires, and droughts can be avoided.[2] The Intergovernmental Panel on Climate Change's 2019 special report, ***Global Warming of 1.5°C***, says that in order to give ourselves a chance to limit global warming to 1.5° Celsius worldwide we will need to reduce GHG pollution 45% by 2030 and to net zero by 2050. This means that there is a limited "carbon budget," or amount of GHG pollution that can afford to be put into the air without passing 1.5° Celsius of warming. Given this limited carbon budget and in order to start reducing our GHG pollution sooner rather than later, Arlington has committed to achieving net zero carbon emissions by 2050.[3]



This chart demonstrates the "carbon budget" concept, showing that the longer we wait to act, the less time we give ourselves and the harder it will be to avoid passing 1.5° Celsius of warming. Source: Robbie Andrew, CICERO Center for International Climate Research.[4]

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[1] https://earthobservatory.nasa.gov/world-of-change/global-temperatures#:~:text=According%20to%20an%20ongoing%20temperature,2%C2%B0%20Fahrenheit)%20since%201880.

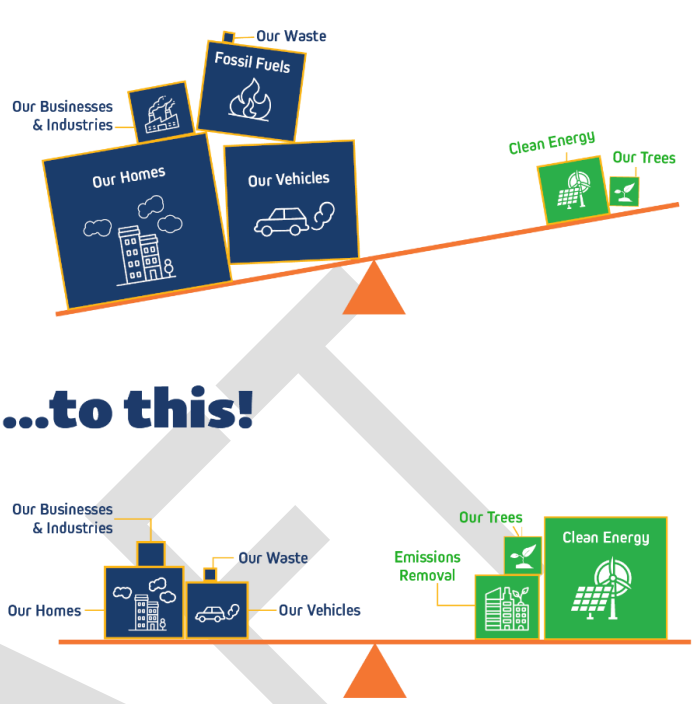
[2] https://climate.nasa.gov/news/2865/a-degree-of-concern-why-global-temperatures-matter/

[3] On January 22, 2018, Arlington's Select Board voted to commit the Town to achieving net zero greenhouse gas emissions by 2050.

[4] https://folk.universitetetioslo.no/roberan/img/GCB2019/PNG/s00_2019_Mitigation_Curves_1.5C.png

What does "net zero" mean?

Reaching "net zero" GHG pollution means that our community will reduce its GHG pollution as much as possible and remove or offset any remaining pollution by 2050 (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 achieving net zero GHG pollution, we can also have cleaner air, healthier people, and a more equitable and prosperous community for everyone.



Getting there equitably

Climate change is an existential challenge, but it is also an opportunity to re-imagine Arlington's future, and to make that future both safe and equitable for all who live and work in our community. Massachusetts municipalities are increasingly undertaking climate mitigation and adaptation strategies[5] and are starting to seek out ways in which to advance equity within those measures. By centering equity in this plan, we can build a future that is not only safer for all, but also allows each individual in Arlington to thrive. An equitable net zero carbon future must be our goal.

In equitable planning, we must be conscientious of the history of our region, the differences in how populations are able to respond to a changing climate, and the needs of residents and businesses. We recognize that the effects of climate change systemically impact Environmental Justice communities and other vulnerable populations inequitably. There are over 7,000 Arlington residents who live in Environmental Justice communities, or about 17% of the population.[6] According to the 2014-2018 American Community, more than 2,000 Arlington residents live below the poverty line.[7] Socially or economically disadvantaged people are likely to experience greater harm from climate change, especially from increased temperatures and the comparative inability to afford air conditioning.[8]

In this context, action to mitigate climate change by reducing GHG pollution will benefit socially or economically disadvantaged people. But we must also assess the potential social equity impacts of climate mitigation strategies and ensure those strategies do not negatively impact the most vulnerable among us, for example by significantly increasing the cost of housing or utilities. In addition, the action items in this plan,

[5] Climate "mitigation" refers to actions that reduce GHG pollution. Climate "adaptation" (often referred to as climate "resilience") refers to actions that help a community prepare for and minimize the negative impacts of climate change.
[6] Based on 2010 U.S. Census data available here: https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts
[7] American Community Survey, 2014-2018, accessed via MAPC Data Common: https://datacommon.mapc.org/browser/datasets/57
[8] *Environmental Justice and Climate Change*, California Office of Environmental Health Hazard Assessment: https://oehha.ca.gov/environmental-justice/climate-change

including community campaigns such as Electrify Arlington, should be structured and marketed so that all Arlington residents and businesses can take advantage of them. There are challenges to including the broadest possible range of people as Arlington markets the measures in this plan, including reaching those with a primary language other than English, homes without high speed (or any) Internet access, and the huge challenge of marketing energy efficiency and renewable energy programs to renters and landlords, who have a split incentive (tenants typically pay for utilities, but landlords typically pay for building upgrades). For our plan to be actionable and for our vision of the future to be equitable, we must center equity throughout the planning and implementation of our net zero strategies.

How do we get there?

A lot can change in 30 years. This plan is a starting point on our path to net zero that Arlington will revisit and adjust as we continue to move forward in the coming years. We know that we need to make our buildings and vehicles, the two major sources of GHG pollution in our community, much more efficient and powered by renewable electricity.

To reach our net zero goal, the Town will have to make some key changes including:

1. **Making our homes and buildings super-efficient**
2. **Electrifying heating and cooking**
3. **Electrifying transportation**
4. **Giving people choices about how they get around**
5. **Producing more renewable energy locally**

Making homes and buildings super-efficient. Massachusetts has some of the oldest homes in the US. More than half of the homes in Arlington were built before 1939,[9] meaning that if they have not been significantly upgraded and made efficient, many of them waste lots of energy through drafty windows and doors, spotty or non-existent insulation, out-of-date lighting fixtures, and aging heating systems that rely on heavily polluting fossil fuels like oil and natural gas. Making existing buildings much more energy efficient and building new buildings to high efficiency standards will help us reduce emissions and make energy bills more affordable for everyone over the long term.

Electrifying heating and cooking. Burning oil and natural gas to heat our homes and cook our food creates tens of thousands of tons of GHG pollution every year in Arlington.[10] Burning fossil fuels for cooking can also create harmful indoor air pollution.[11] Switching to electric heating and cooking appliances like heat pumps and induction cooktops immediately reduces carbon pollution and improves indoor air quality, and these benefits only get better as our electric grid gets cleaner. Oil

[9] 2016 Arlington Housing Production Plan, p. 24. https://www.arlingtonma.gov/home/showdocument?id=30611

[10] Town of Arlington 2017 Greenhouse Gas Inventory, Version 4.1. August 10, 2020. Metropolitan Area Planning Council.

[11] See *Indoor Air Pollution from Cooking*, California Air Resources Board https://ww2.arb.ca.gov/resources/documents/indoor-air-pollution-cooking. See also

and gas are cheap now, but they may not be in the future and the simple truth is that we need to stop burning fossil fuels as quickly as possible.

Electrifying transportation. Gasoline- and diesel-powered cars, trucks, buses, trains, and other forms of transportation account for more than a third of our community's GHG pollution. Electric cars and buses are cleaner, cheaper to run over time, and require less maintenance. Electric vehicles are no longer a niche market for early adopters, and the range of makes and models available at comparable prices to gasoline- and diesel-powered vehicles is set to increase immensely in the next five years. A community-wide transition to electric transportation means providing easily understandable information about electric vehicles to the public, access to local charging stations for EV owners, and creating electric transportation options for those who do not own vehicles.

Giving people choices about how they get around. Even though Arlington is a leader in promoting travel by foot, bicycle, and public transit (see "What Have We Already Done" – "Mobility Progress," below), driving remains the transportation mode of choice for most trips. We must further expand low-to no-carbon mobility options like walking, biking, and public transit since those are some of the best ways to reduce transportation pollution. By designing greener and people-centered streets and sidewalks, we can make walking, biking, and public transit as easy as, and more enjoyable than, taking a solo trip in a personal vehicle. These alternatives to driving will help reduce GHG emissions and air pollution while also making residents healthier and more connected to their community.

Producing more renewable energy locally. Renewable energy comes from endlessly sustainable sources such as wind, the sun's heat or light (i.e., solar), or the earth beneath our feet (i.e., (geothermal). Our electricity is getting cleaner and greener all the time thanks to state and local policies, including our community's successful Arlington Community Electricity (ACE) program. However, natural gas still provides most of our electricity in New England. Developing local renewable energy like rooftop solar photovoltaic and solar hot water and supporting renewable energy projects through the ACE program and state policy advocacy will help our community speed up the process of switching to clean energy.

How Much Will This Cost?

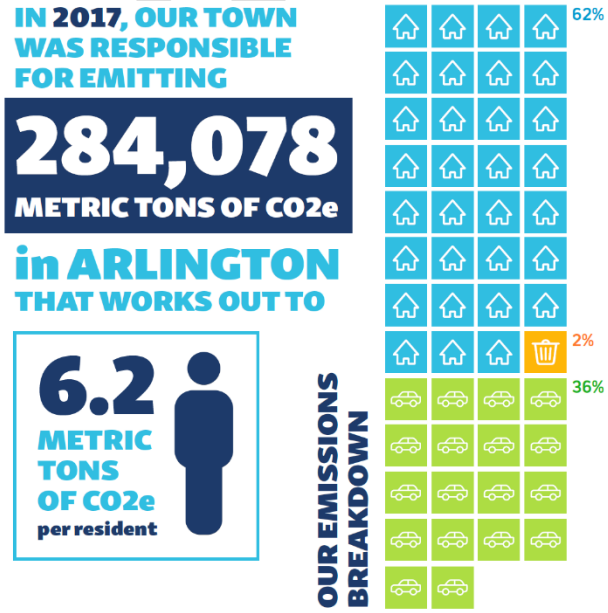
As we developed this Net Zero Action Plan a number of stakeholders asked an important question: how much will it cost for Arlington to reach its net zero goal by 2050? The short answer is: we don't know how much it will cost to implement this Plan. There likely will be added costs associated with certain measures, but there will also be cost savings. For example, at present the cost of building a new energy efficient, all-electric single-family home is comparable to the cost of a building heated with natural gas, and lifetime operating

costs to the owner are often lower.[12] This is true even if the federal or state government never implement carbon pricing or other fossil fuel restrictions, which would make the economics of all-electric construction even more favorable. Similarly, the cost of electric vehicles (EVs) has been steadily dropping, and EVs are actually expected to be less expensive than gasoline vehicles after 2025.[13] Also the costs of doing nothing, or too little, are very high in terms of public health, environmental and infrastructure damage, which is why the national governments of nearly every country, including the U.S., signed the Paris Climate Accord to reduce GHG pollution in 2015. It will likely cost us more if we do not take decisive action to curb climate change than if we do. However, as the Town implements the Net Zero Plan through 2050, we must be sensitive to financial impacts on government, residents and businesses and be prepared to modify or delay certain measures until proper incentives are available or costs drop further.

WHERE ARE WE STARTING?

We inventoried our community's greenhouse gas pollution in calendar year 2017 and here is what we found:

- Buildings are the largest source of GHG pollution (about 62 percent). Natural gas for heating accounts for about 50% of pollution from buildings.
- On-road transportation is another major source of GHG pollution, almost 36 percent.
- Buildings and transportation together accounted for almost all GHG pollution in Arlington in 2017 – about 97 percent of all pollution. Solid waste disposal accounted for most of the remaining 3 percent of GHG pollution.



[12] See Rocky Mountain Institute's 2018 study The Economics of Electrifying Buildings: https://rmi.org/insight/the-economics-of-electrifying-buildings/

[13] BloombergNEF 2017 study: https://about.bnef.com/blog/electric-cars-reach-price-parity-2025/

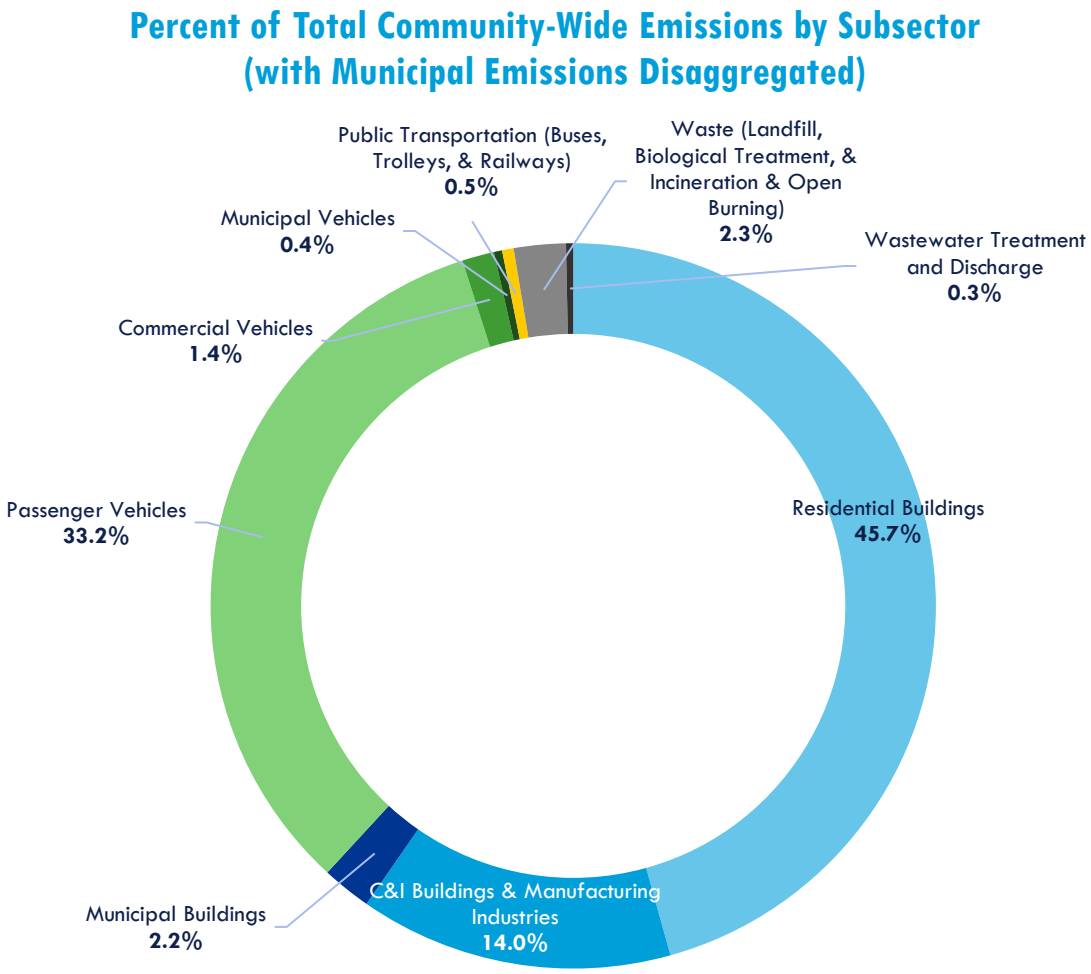


Figure 1. 2017 sources of greenhouse gas emissions from Arlington. Source: Produced using MAPC's Community GHG Inventory Tool version 4.1 – August 2020.

WHAT HAVE WE ALREADY DONE?

Arlington is already a leader in reducing GHG pollution. In 2000 Arlington joined the United Nations-sponsored Cities for Climate Protection. In 2005 our community adopted its first climate action plan, the Arlington Sustainability Action Plan (ASAP). The ASAP called for a 10% reduction in GHG pollution by 2010, and 20% by 2020, and based on available data the Town met both targets. In 2010 with a municipal pledge to meet five energy and climate commitments, Arlington was designated a Green Community by the state Department of Energy Resources. In 2012 Arlington ran a successful Solarize Arlington campaign to promote residential rooftop solar. In 2013 the Town committed resources to hiring a regional energy manager. This position was restructured in 2015 to become a full-time employee in Arlington who assists with energy reducing initiatives in Town-owned buildings. In 2017 the Town launched the Arlington Community Electricity program, which has resulted in a substantial increase in the percentage of clean electricity purchased by Arlington residents and businesses. In 2019 Arlington participated in a popular HeatSmart campaign to promote clean heating and cooling systems. And this year, in 2020, the Town is releasing this Net Zero Action Plan to achieve net zero GHG pollution by 2050.

Buildings progress – As noted above, Arlington became a state-designated Green Community in 2010. Since then the Town has received over $1.7 million in Green Communities grant funding and over $300,000 in utility funding for energy efficiency projects in Town-owned buildings. Collectively these projects save the Town over $400,000 per year in reduced energy costs and have reduced GHG pollution by more than 1,400 metric tons per year. Projects have included the installation of highly efficient boilers, advanced building automation systems, replacement of steam traps, steam pipe insulation, HVAC retro-commissioning, LED lighting and much more. The new 415,000 square foot Arlington High School, scheduled for completion in 2024, will be all-electric, with no on-site combustion of fossil fuels, and heated and cooled with electric heat pumps. As a result, the new school, the municipal government's largest energy user, will reduce its energy use and GHG pollution per square foot by more than half.

Residential buildings have also benefitted from Town-sponsored projects, including the 2012 Solarize campaign that promoted the installation of rooftop solar panels, and the 2019 HeatSmart campaign that promoted clean heating and cooling systems like heat pumps and solar hot water. Both campaigns resulted in hundreds of projects at homes throughout Arlington, saving homeowners money and reducing GHG pollution.

Mobility progress – Arlington is a leader in promoting travel by foot, bicycle, and public transit. The Minuteman Bikeway, which opened in 1992, is a 10-mile protected bicycle path that runs from Bedford to the Alewife MBTA station in Cambridge. The Bikeway is enormously popular; during just a four-month period in 2019 a total of 322,241 bicyclists and pedestrians used the Bikeway for recreation and to commute to work. The public transit network in Arlington is extensive, with nine MBTA bus routes that go through town, some of which stop at the Alewife T station, a major commuter line into Cambridge and Boston. In 2018 the Town ran a successful priority bus lane pilot project along the eastbound side of Massachusetts Avenue in East Arlington which significantly reduced commute times. In 2019 the priority bus lane was made permanent.

Arlington has been an early adopter of bike share programs, having partnered with dockless bike sharing vendor Lime in 2018 and with Bluebikes, which uses docking stations for its bicycles, in 2020. Arlington has had among the highest utilization rates of all communities with bike sharing programs.

Arlington has also been a leader in the adoption and promotion of electric vehicles, both for the municipal fleet and to provide public charging stations for the public. In 2010 Arlington adopted a municipal vehicle efficiency policy that requires Town departments to purchase fuel-efficient vehicles, and in many cases vehicles purchased have been hybrid, plug-in hybrid, and battery electric vehicles. The Town has also purchased and installed four dual-port publicly available EV charging stations capable of charging a total of eight electric vehicles simultaneously. The new Arlington High School, slated for completion in 2024, will add ten additional publicly available dual-port EV charging stations.

Clean energy progress – In December 2015 Arlington installed solar photovoltaic arrays on six school buildings. These six solar arrays generate approximately 821,000 kWh of carbon-free electricity per year, reducing GHG pollution by approximately 250 metric tons. The new Arlington High School will significantly expand the Town's solar production, with extensive installations of both rooftop and parking canopy solar arrays that will result in a more than doubling of solar production by the town to almost 2 million kWh per year.

In 2017 Arlington launched the Arlington Community Electricity program, which uses the bulk purchasing power of Arlington's residents and small businesses to negotiate favorable electricity supply rates and which includes more renewable energy than required by state law. In 2017 the default renewable electricity content was 5% above state requirements. Starting in December 2019, the default extra renewable electricity content increased to 11% above state requirements (for 27% total renewable electricity). In addition, over five hundred homes have voluntarily opted-up to either 50% or 100% renewable electricity

under the ACE program. Implementation of the ACE program has resulted in the purchase and use of 26 million kWh of extra renewable energy, which resulted in 8,000 metric tons less GHG pollution than otherwise would have been the case since the program started. On an annual basis, enough extra renewable electricity is purchased through the ACE program to completely offset the electricity used by 2,000 average Arlington homes.

WHAT HAVE WE HEARD FROM THE COMMUNITY?

As described above in *What have we already done?* Arlington has a long history of successful action to save energy and reduce greenhouse gas pollution. As we worked to draft this Net Zero Action Plan, we sought feedback from the community and key stakeholders to gauge support for both the net zero goal, and the specific measures in the Plan.

Initial lists of potential GHG pollution reduction measures were suggested by the Metropolitan Area Planning Council (MAPC), based on research into net zero plans from municipalities around the country. The CEFC, which includes representatives from several stakeholder groups in town, debated and revised these measures into shorter lists. In July 2020, MAPC and the Department of Planning and Community Development (DPCD) administered a community-wide survey to gauge public support for action to reduce GHG pollution and for different types of GHG pollution reduction measures under consideration (667 individuals participated). From October 26 through November 13, 2020, MAPC and the DPCD administered a Virtual Open House to solicit community input on the specific measures in the draft Net Zero Action Plan (approximately 320 individuals participated). Finally, from September through December 2020, the CEFC presented the draft Net Zero Action Plan to a wide range of stakeholder groups for their input, including Town boards and commissions, Town departments, local sustainability groups, property owners and developers, members of faith communities, and others (see the *Acknowledgements* chapter for a full list).

Community and stakeholder input were consistent: by an overwhelming majority, respondents view climate change as a serious crisis and support the goal of reducing GHG pollution in Arlington to net zero by 2050 (In the July 2020 survey, 87 percent of respondents rated climate change as "Extremely Important" to them personally). In addition, all 31 GHG pollution reduction measures in the Net Zero Action Plan were supported by a majority of survey and open house respondents, and during stakeholder discussions, with most measures receiving overwhelming support. Support was strong for building efficiency and electrification measures, for making walking, biking and public transit more attractive, for planting more trees, and for greening Arlington's electricity supply. Numerous people expressed gratitude and excitement about the Net Zero Action Plan in general – they were glad the Town was committed to net zero GHG pollution by 2050 and wanted to see the entire plan implemented as soon as possible.

A few other key takeaways from our community and stakeholder outreach:

- A significant number of respondents urged the Town to take stronger actions to reduce GHG pollution and for the actions to be implemented sooner than called for in the Plan.
- Quite a few people voiced strong support for the Plan but urged caution about added costs to residents and businesses. The CEFC shares those concerns (see "*How much will this cost?*" and "*Getting there equitably*" in this chapter). Arlington will need to be careful as it implements the plan to minimize added costs, and to help lower- and middle-income people afford any added costs.

The November Net Zero Plan Virtual Open House included an opportunity for participants to write a "Postcard from the Future" to themselves, like the one from the CEFC at the beginning of this Plan. There were many eloquent and inspiring responses, exemplified by this one:

"In 2050, Arlington has all of the great traits it does now with significant improvements. Buildings throughout the community are extremely efficient and powered by clean, electric systems which don't pollute, are very affordable to run, and results in a comfortable and healthy living environment. Individual cars and all of the space they took up with driveways and parking lots are a thing of the past, as most people walk and bike around green, shared streets to get around. There is a speedy electric bus system connecting the neighborhoods to Mass Ave and other arteries and from there into Cambridge and Boston. For longer trips, residents can easily hail an electric, self-driving car that meets their needs. As a result of these changes, there is a lot more green space throughout town for all people to enjoy, as well as significantly more affordable housing. Arlington is a diverse and welcoming community where people of a multitude of backgrounds feel comfortable and thrive. While the change from 2020 seems huge, it was all accomplished with the basic technology and policy tools available then, combined with an acceptance that change was both necessary and positive. I'm so glad that you've made it!"

Community and stakeholder input on the Net Zero Action Plan indicates a high level of support for both the net zero by 2050 goal, and the specific GHG pollution reduction measures in this Plan. This support bodes well for the next phase of Arlington's net zero journey: successful implementation of the 31 GHG pollution reduction measures in the Plan.

A Roadmap to Net Zero

The following chapter, the Net Zero Roadmap, lays out 31 measures that will reduce GHG pollution from our buildings, our transportation system, and our energy supply. These measures will set Arlington firmly on a path toward achieving net-zero GHG pollution by 2050. We should acknowledge, however, that even successfully implementing this Plan will not fully achieve that goal. There will ultimately need to be changes in state (and perhaps federal) law, new and improved technologies, lower costs for some existing technologies, and sustained public education to inform and change ingrained attitudes and perceptions. This plan is an excellent start, and implementing it will substantially reduce GHG pollution, build valuable knowledge and expertise, and help build public support for new actions that can be included in future updates of the Net Zero Plan. As noted earlier, the financial impacts of implementing the 31 measures in this plan are uncertain – some may result in net increases in costs, while others may save money. It will be important to carefully assess the fiscal impact of all measures as this plan is implemented.

Net Zero Action Roadmap

Implementing the Plan

While the Clean Energy Future Committee (CEFC) is charged with guiding Arlington to net zero GHG pollution by 2050, implementing the Net Zero Action Plan will require multiple Town bodies and private partners, including residents and businesses, to help achieve goals.

It will also require strategic use of limited resources over time. The 31 measures in this Plan cannot be implemented all at once and are not intended to be. In consultation with Town staff and key stakeholders, the CEFC classified measures included in this Plan as either "High Priority" or "Priority" to help make decisions about what to work on first, though other factors will be considered including available resources (grants, financing, etc.) and the availability of volunteers and Town staff to work on specific projects. High priority measures are those that the CEFC recommends Arlington should focus on implementing first because of their potential impact on GHG pollution and/or because they are important enabling actions that will make it easier to implement other priority actions later.

Measuring progress

- The key measure of success will be reductions in GHG pollution from all sources in Arlington. Depending on available resources, the Town will measure that success by regularly updating the Town's GHG inventory at least every five years. Further, the Town may also choose to establish a dashboard or other method of tracking and reporting progress on implementing individual GHG reduction measures in this Plan. Appendix A includes performance indicators for all GHG reduction measures.

Revisiting the plan

- This Plan is intended to be a living document that the Town may modify should circumstances warrant it. A change in state law, for example, may render one or more GHG reduction measures moot. Major technological innovations in heat pumps, battery technology or any number of other areas may also warrant amendments to the Plan. The CEFC recommends that this Plan be revisited and revised at a minimum once every 10 years (in 2030 and 2040).