

City of Cambridge Net Zero Action Plan

FY24 Report



Decarbonizing Cambridge

Overview of the Net Zero Action Plan

The Net Zero Action Plan (NZAP) was adopted by the City Council in 2015 following an 18-month stakeholder process to identify a phased set of actions to reduce greenhouse gas emissions from new and existing buildings and develop a renewable energy supply strategy for Cambridge buildings.

As part of the 2015 NZAP, the Task Force proposed that the whole suite of actions be reviewed every five years. Driven by the principles laid out in the Net Zero Action Plan and with extensive stakeholder input, both the full set of actions and the timeline of the original plan were revisited in the 2021 review. In addition, the process of reviewing and identifying adjustments to the plan considered the implications of actions with respect to equity and social justice; meaning the actions are to be implemented in a way that ensures resources are accessible to all residents and businesses and do not place undue burdens on vulnerable populations. In accordance with the governance plan, the study's purpose was to review the overall strategy to ensure that the framework continues to evolve in the desired manner.

This report highlights the activity made during Fiscal Year 2024, which ran from July 1, 2023 through June 30, 2024.

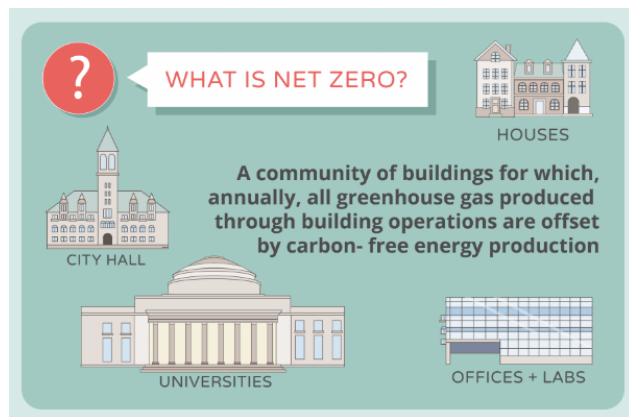
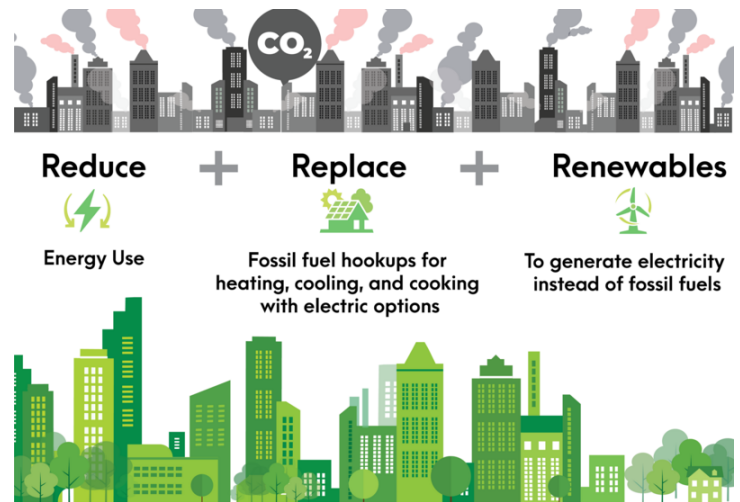


Net Zero Action Plan

Reduce, Replace, Renewables

There are several key ways to reduce emissions from buildings, as the graphic here illustrates. We must use less energy by investing in energy efficiency (Reduce), use cleaner energy by replacing fossil fuel-based appliances and building systems with electric versions (Replace), and ensure that all our electricity is generated with renewable, zero emissions sources like solar and wind (Renewables).

Cambridge's Net Zero Action Plan uses these three strategies to reduce emissions. Action Areas 1 and 2 focus on Reducing and Replacing, while Action Area 3 focuses on Renewables. Action Area 4 is crosscutting and supports all actions by securing funding and capacity for implementation.



Net Zero Action Plan

Defining Net Zero

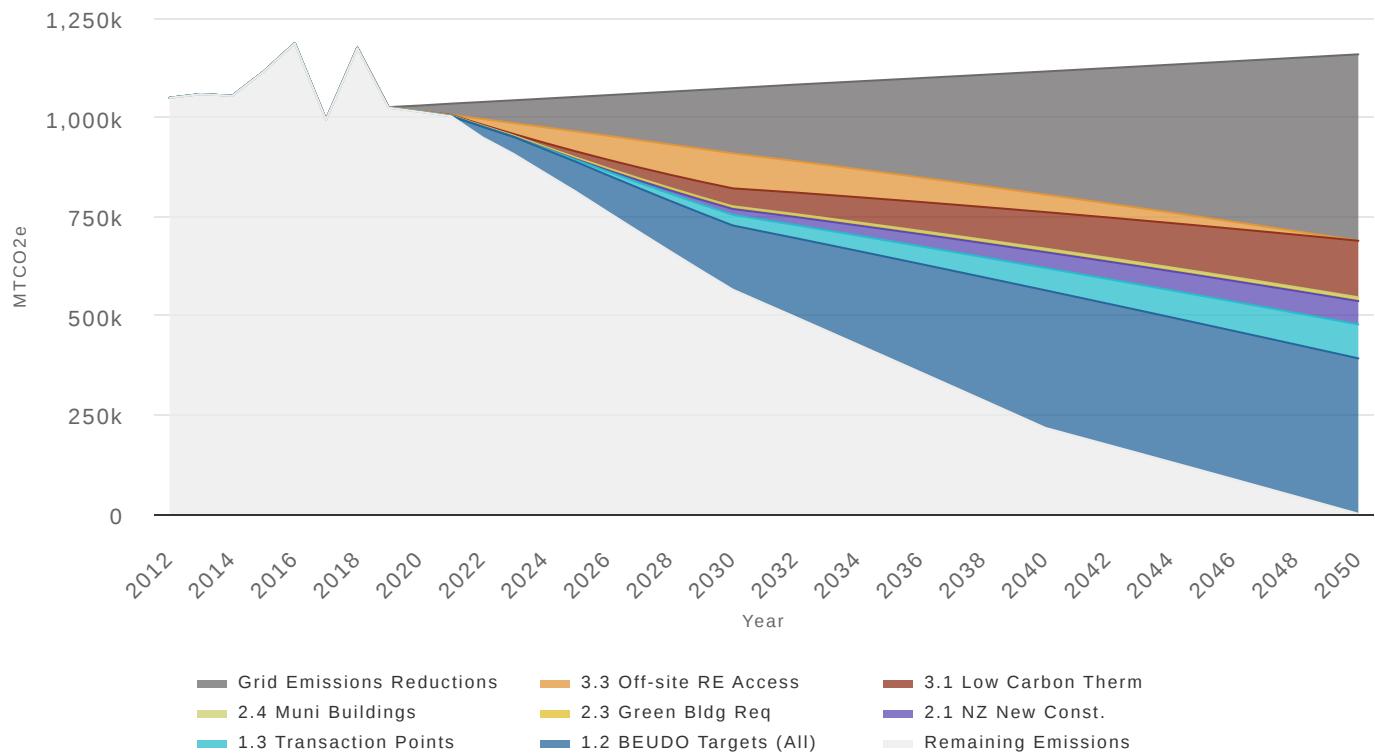
Residents, universities, businesses and the City collaborate to reduce energy use in buildings and increase access to renewable energy. Cambridge has set a "net zero" target for all buildings in the community and has created the "Net Zero Action Plan" to outline strategies to help each building reach net zero emissions. You can see how we define net zero in the graphic to the left.

Net Zero Action Plan

Cambridge Emissions Reduction Strategies

Each of the actions in the NZAP has the potential to reduce the City's GHG emissions over time. Hover over the different colorful wedges on the graph below to understand the estimated emissions reductions associated with each action! Note that, like all models, this graph is meant to portray rough estimates versus precise predictions.

Notably, per an analysis done in 2021, the Targets associated with the Building Energy Use Disclosure Ordinance (1.2 BEUDO Targets, the blue wedge) are estimated to reduce emissions by approximately 7 million metric tons of carbon dioxide equivalent (MTCO₂e) between now and 2050. Together, the implementation of all NZAP measures has the potential to reduce emissions by approximately 12 million MTCO₂e.



Net Zero Action Plan

Fiscal Year 2024 Status Report

The City of Cambridge has made progress on the goals of the Net Zero Action Plan since it was introduced. This report outlines the progress and next steps of the NZAP actions from July 2023 through June 2024.





Net Zero Action Plan Implementation Status Indicators

To track the progress of each Action in the NZAP, Cambridge has assigned a graphic that will appear in the "Implementation Status" component of the Action. The implementation status means how far along we are in implementing each action relative to the timeline that was created for that action. The timelines were formally adopted in January 2023 with the updated 5-Year Plan.

The green light (top left) indicates that the action is on track with the timeline adopted in 2023.

The yellow light (top right) indicates that the action is delayed in its timeline from 2023 but is making progress.

The red light (bottom left) indicates the action is stalled and is not currently making progress.

The parking sign (bottom right) indicates that the action has been paused.

Net Zero Action Plan Equity and Resilience Badges

Every 5-years the city will evaluate and review the Net Zero Action Plan. As part of the most recent review, which was adopted in January 2023, City Staff assessed NZAP actions to ensure the plan's benefits and burdens were equally distributed. As a result of the review, actions were updated and the overlap between implementation and cross-cutting themes was taken into consideration. These themes were equity and resiliency. Each of these themes was carefully considered when thinking through possible adjustments. Continuously reflecting upon these issues allowed us to create actions that work to enhance a fair and just clean energy transition, improve resiliency in the community, and have in place resources to implement this plan.

These badges seen in each Action Area overview indicate that the actions covered bring resilience and equity opportunities to Cambridge.



Resilience



Equity

Net Zero Action Plan

FY24 Action Summary Table

This table shows the current status of each action and whether or not each action has an equity and/or resilience impact.

Action	Status	Equity	Resilience
1.1 Custom Retrofit Program			
1.2 BEUDO Performance Requirements			
1.3 Transaction Points			
2.1 Net Zero Requirements for New Construction			
2.2 Address Embodied Carbon through Reporting Requirements			
2.3 Net Zero Requirements for Municipal Buildings			
3.1 Carbon Free Energy Supply			
3.2 On-Site Renewable Energy Access			
3.3 Off-Site Renewable Energy Access			
4.1 Financing and Capacity Building			

Overview

Action Area 1: Energy Efficiency (Existing Buildings)

Cambridge has grown a lot in recent years. This has led to a big increase in energy demand. The transition to a low-carbon energy supply cannot happen without the more efficient use of energy in existing buildings. As people switch from equipment that use fossil fuels on-site to equipment that use electricity, such as heat pumps, induction cooktops, and electric water heaters demand for grid-supplied electricity will continue to grow.

Our goal is for the full decarbonization of the building stock in Cambridge. Achieving this requires the installation of energy efficient equipment and ensuring that buildings across the city are well insulated and weatherized. Three actions within the Energy Efficiency Action Area work toward increasing the efficiency of our buildings through a variety of mandatory and voluntary programs and policies. These actions were assigned SMART goals which were adopted as part of the NZAP 5-year update.

This section covers activity that happened in FY24 which ran from July 1, 2023 through June 30, 2024.

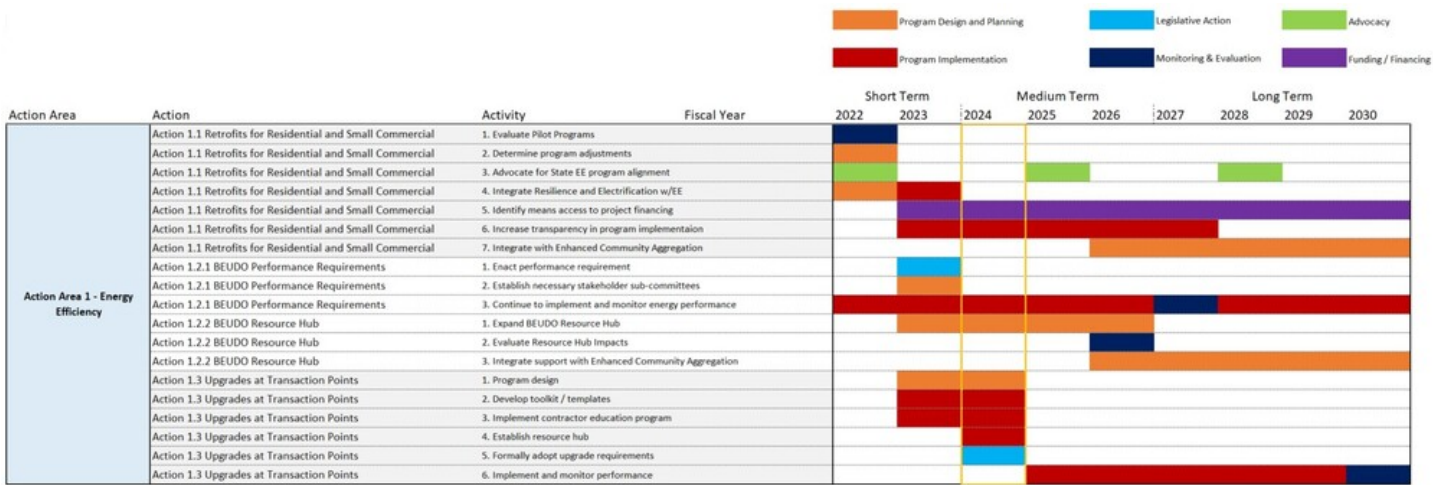
Action 1.1 Custom Retrofit Program Ensure small/medium residential & small commercial buildings operate optimally and maximize energy efficiency through voluntary retrofit advising services and transition off fossil fuels.	Action 1.2 BEUDO Emissions Reductions Requirements Establish performance standards for large existing buildings over 25,000 square feet and residential buildings of 50+ units. Represents over 50% of the square footage and 70% of GHG emissions from buildings.	Action 1.3 Upgrades at Transaction Points Leverage transaction points to achieve energy improvements & decarbonization in a financially feasible way by tapping into financing streams that are only available at time of sale, lease, renovation, or permit application. Grey to indicate not yet started
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Activities for Action 1.3 have not been started. Therefore, Action 1.3 is not covered in this report.

Timeline

Action Area 1: Energy Efficiency (Existing Buildings)

This timeline was adopted with the most recent update of the NZAP in 2023.



SMART Goals: Action 1.1

- 750 Units engaged in program per year
- 10 buildings retrofitted through financing pilot
- Develop retrofit tracking approach to set conversion targets by end of 2023

Implementation Status**On Track**



Equity Resilience

Custom Retrofit Program for Residential and Small Commercial

Action 1.1 Implementation Status

The activities for this action are currently on track.

In January 2023, with the adoption of the 5-year NZAP update SMART goals were assigned to Action 1.1. In FY24, staff launched two programs, [Electrify Cambridge](#) and a financing pilot program with [BlocPower](#).

Custom Retrofit Program for Residential and Small Commercial

Action 1.1 Progress, Current Retrofit Program

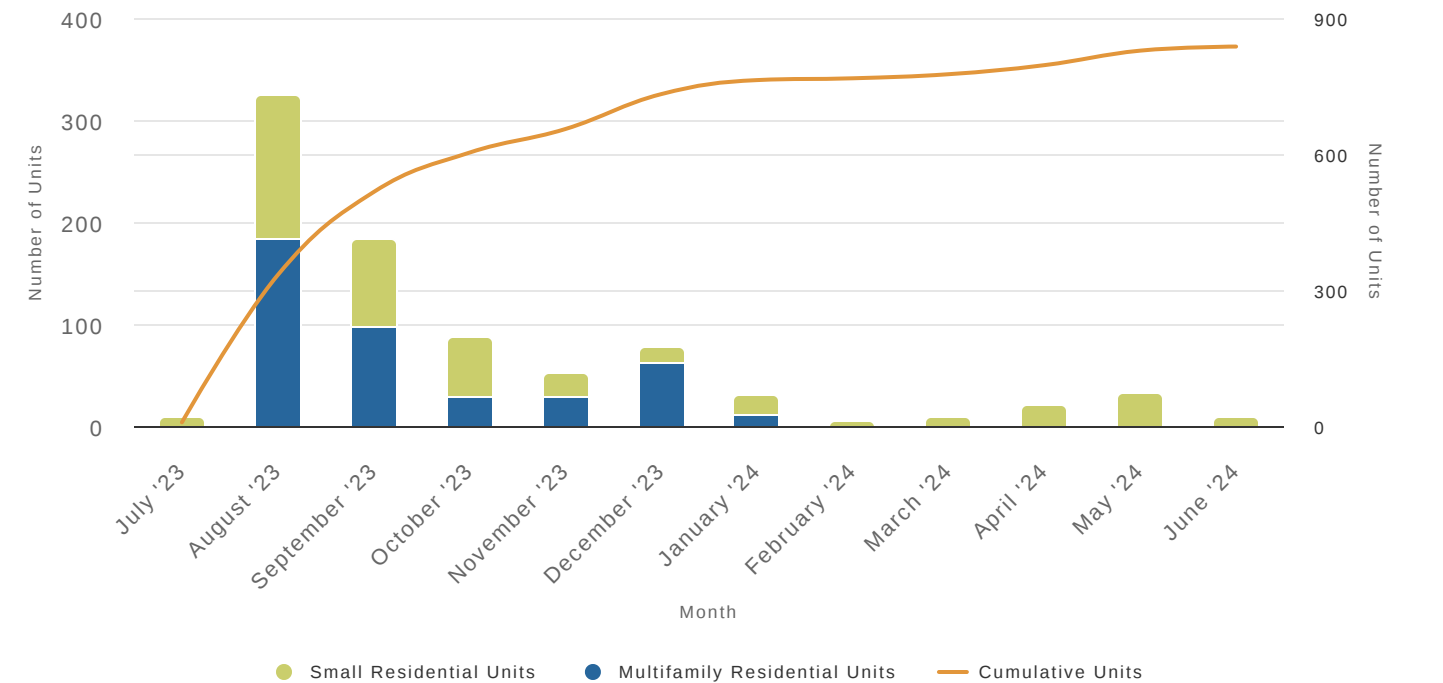
To measure progress for this action we track the number of buildings and units that engaged with the [Electrify Cambridge](#) program and the buildings engaging with the [BlocPower pilot program](#).

Electrify Cambridge provides no-cost technical assistance for residential buildings to both plan for specific projects and plan for the long-term electrification for building systems. Participants are also provided additional coordination with the Mass Save program, when appropriate. Electrify Cambridge provides assistance for single, specific projects as well as long-term building electrification planning. BlocPower offers a tool that can instantly create an electrification project proposal, called an [Instant Building Report](#). BlocPower will also help buildings finance projects with \$0/down, offer volume-discounted procurement and coordinate with available incentives. The Cambridge-BlocPower partnership received an [\\$800,000 grant](#) from the [Massachusetts Clean Energy Center](#) (MassCEC) to provide further incentives for buildings to decarbonize. However, since the drafting of this report the BlocPower pilot program has been concluded.

Since Electrify Cambridge launched in July 2023 the program has engaged with residential buildings covering 837 units. BlocPower has provided 94 Instant Building Reports and offered 16 lease quotes to buildings.

Electrify Cambridge saw a lot of engagement early in the fiscal year, especially with multifamily buildings. An introductory webinar was presented in early August to educate residents about the program and its offerings. This led to a large spike in participation that month. Engagement with multifamily buildings slowed due to various program offerings. longer timelines and complexities of electrification planning for large buildings. This data only represents the Electrify Cambridge program it excludes data from the BlocPower Pilot and BEUDO Custom Retrofit Program.

Electrify Cambridge Participation by Month



Data represents the total number of units that have been covered in consultations with [Electrify Cambridge](#)

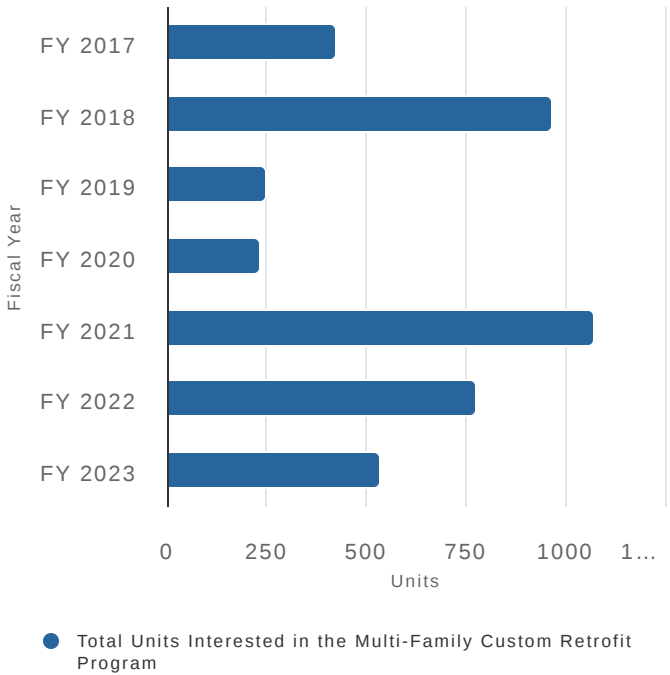
Non-Cumulative Units counted on Left Axis, Cumulative Units counted on Right Axis.

Custom Retrofit Program for Residential and Small Commercial Action Area 1.1 Past Progress, Program Participation

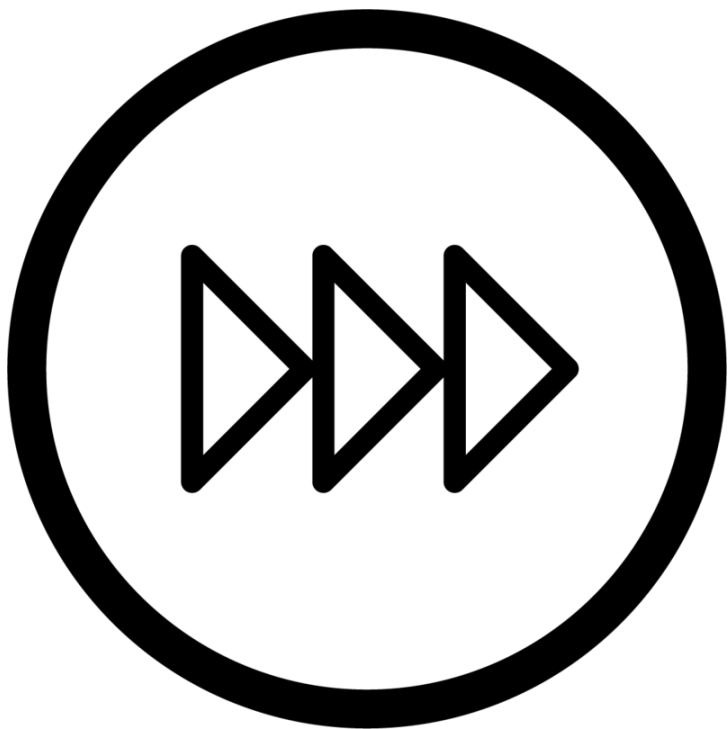
Prior to offering Electrify Cambridge and the BlocPower pilot, the city had other programs that residents could use to decarbonize and electrify their homes. The Multifamily Retrofit Advisor Program ran from 2017 through 2023 and provided buildings with 5 to 49 units with free technical assistance. For small residential, the Cambridge Clean Heat Program offered assistance with heat pumps by comparing quotes and coordinating installations.

FY21 saw the highest level of engagement due to increased outreach that was made possible through a grant by the MA DOER.

Multifamily Retrofit Advisor Participation



Data shows units covered through engagements with the Multifamily Retrofit Advisor Program (2017 - 2023)



Custom Retrofit Program for Residential and Small Commercial

Action 1.1 Next Steps, Challenges, and Opportunities

Next Steps: Electrify Cambridge will continue to provide services as currently designed and re-engage with buildings that participated over the last year. The BlocPower Pilot Program has been extended for an additional year to provide services through FY2025. However, since the drafting of this report the BlocPower pilot has been concluded.

Challenges: It can take months or even years for residents to go from project consultation to the completion of an electrification project, so we are working to re-engage participants to help keep their projects on track. In addition, individual project costs for many electrification measures remain expensive, even with incentives. The BlocPower after program for multifamily buildings is helping address the challenge of upfront costs by providing \$0/down financing. Additionally, it can be challenging to coordinate an all-electric replacement when a failing piece of equipment needs immediate replacement, but our goal for the long-term decarbonization plans provided by Electrify Cambridge is that they help people plan for electrification in advance of such situations.

Local grid capacity has also been a challenge and barrier for some buildings to electrify. The installation of a transformer on-site substantially increases project cost and there are no current MassSave incentives to cover these costs. Installing a transformer on-site can also present challenges with available space.

Opportunities: Staff has provided comments and suggestions as part of the next iteration of the Mass Save 3-Year Plan.

SMART Goals: Action 1.2

- BEUDO buildings achieve required annual emissions reductions
- Resource Hub fully established by end of 2023

Implementation Status



Delayed

Delayed



Equity

Building Energy Use Disclosure Ordinance

Action 1.2. Implementation Status

The activities for this action are currently delayed.

This action covers activity related to the [Building Energy Use and Disclosure Ordinance \(BEUDO\)](#). Annual reporting has improved over the past several years where currently most required buildings (>90%) report. FY2023 has focused heavily on developing language and policies for the regulations, which will accompany the ordinance, specifically areas such as the promulgation of emissions factors and the criteria for purchasing renewable energy.

Building Energy Use Disclosure Ordinance

Action 1.2 Progress

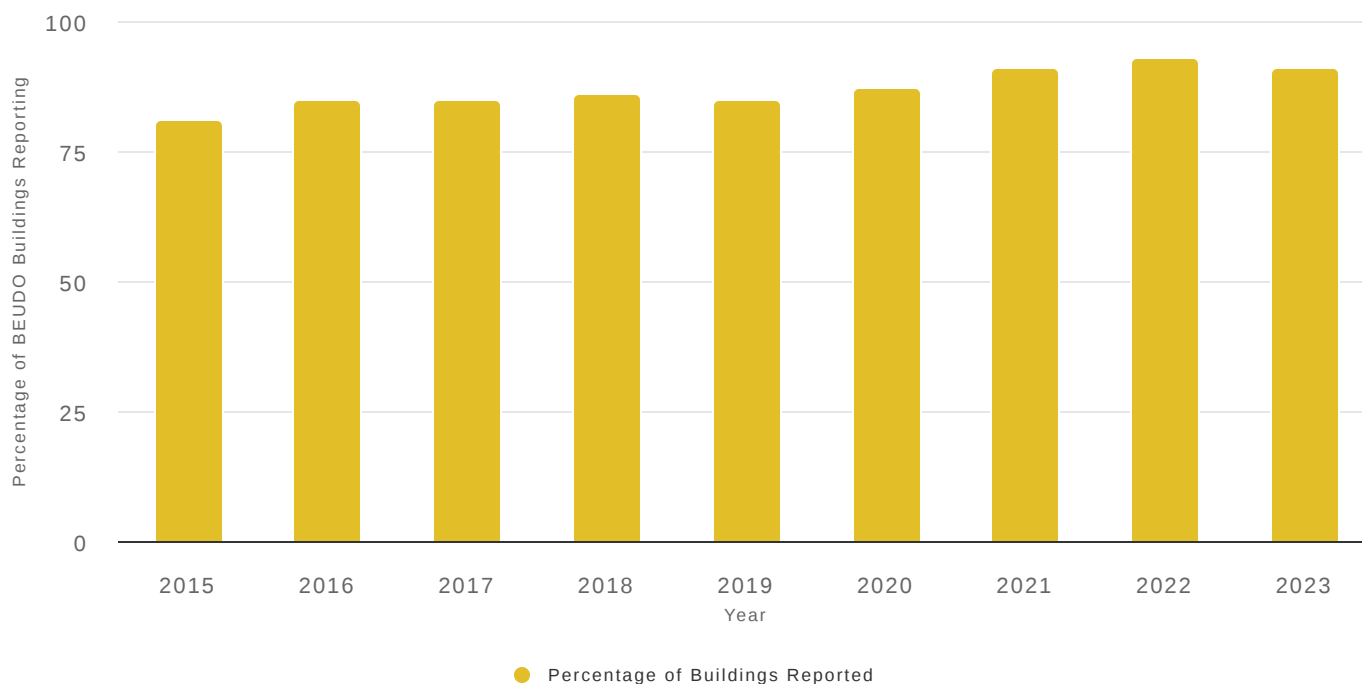
The BEUDO Ordinance requires energy and water reporting for existing commercial buildings larger than 25,000 square feet and residential buildings of 50 or more units. Progress towards this action is currently measured by the percentage of buildings that comply with the reporting requirements each year. Amendments to the ordinance were adopted in June 2023, which require non-residential buildings 100,000 sq/ft or larger to achieve net zero emissions by 2035 and non-residential buildings between 25,000 – 99,999 sq/ft to achieve net zero emissions by 2050. You can find the [amendment language](#), a [summarized memo](#), and [more information here](#).

In the future, compliance with GHG emission reduction requirements will be tracked in accordance with regulations.

This Action also aims to establish a resource hub to arm building owners with the knowledge and the tools to identify areas of improvement, take action, and achieve net zero emissions in their own buildings. The City currently offers the [Building Energy Retrofit Program](#) through a partnership with Eversource.

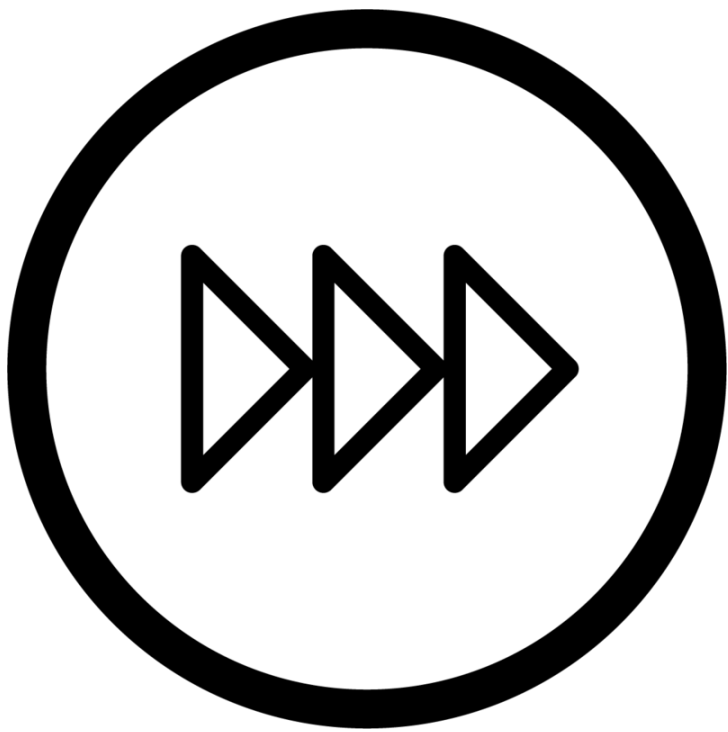
In FY23 staff established a new data platform for BEUDO reporting which will allow for more streamlined reporting, analysis, and disclosure of data under the current ordinance and potential future performance requirements. This platform continues to expand its capabilities in administering BEUDO and will soon have a public-facing dashboard. In FY24, a full-time employee was hired to help manage the BEUDO reporting, data management, and compliance process.

Annual BEUDO Building Reporting Compliance



By May 1 of each year, buildings subject to the BEUDO ordinance are required to submit data for the previous calendar year's energy and water use

Stay up to date with BEUDO by [joining the list serve](#)



Building Energy Use Disclosure Ordinance

Action 1.2 Next Steps, Challenges, and Opportunities

Next Steps: Staff are working on conducting stakeholder engagement and research which will lead to finalizing regulations per the adopted ordinance amendment. These regulations will provide guidance to building owners about how to calculate their emissions, procure renewable energy to reduce property emissions, and provide requirements for data verification, campus configuration, review board formation, carbon offsets and other aspects of administration. Cambridge and Boston have jointly applied for an IRA grant, along with MA DOER, which would fund a statewide resource hub to be managed by a third-party nonprofit.

Challenges: Prior to the amendment, BEUDO was already a challenging ordinance to track, administer and enforce. The building performance standards laid out in the amendment add further administrative complexities. Additionally, because of the diversity of stakeholders that are impacted by BEUDO, the need for a robust public engagement process adds time and complexity to the administration of the ordinance.

Opportunities: Despite the challenges, BEUDO presents the city with an opportunity to be a leader in building performance requirements. As other municipalities look to establish similar policies Cambridge can serve as an example. As the regulations are developed, and the Resource Hub is expanded, there will be opportunities to engage with property owners and help them understand their opportunities for decarbonization.

Overview

Action Area 2: Net Zero New Construction

Cambridge has been a leader in green design and sustainability in new construction. Most new construction and major renovations, with the exception of laboratories and certain medical facilities, are current required to be [fossil fuel free](#) and meet the requirements of the [Specialized Opt-in Energy Stretch Code](#). Non-residential projects over 50,000 sq/ft are required to report on [embodied carbon](#).

In 2022, City Staff participated in the public feedback and engagement process for the development of the updated energy code. This was done in coordination with other local communities. The City adopted the most up-to-date and stringent energy code offered by the Commonwealth, the Specialized Opt-in Energy Stretch Code, and it went into effect July 1, 2023. This stretch code was developed and released by the Commonwealth.

After submitting an application over the summer, it was in November 2023 Cambridge was admitted as one of the 10 initial communities into the Fossil Fuel Free Pilot Demo.

Additionally, the City of Cambridge adopted an amendment in March 2023 to its zoning ordinance to account for the embodied emissions of new construction for special permit projects as detailed in Action 2.2.

This section covers activity that happened in FY24 which ran from July 1, 2023 through June 30, 2024.

Action 2.1 Net Zero New Construction Meet net zero targets for new construction by building sector while aligning with state initiatives and standards.	Action 2.2 Address Embodied Carbon through Green Building Requirements Address embodied carbon in the construction and renovation of new and existing buildings.	Action 2.3 Net Zero Requirements for Municipal Buildings Continue implementation of commitment to net zero and renewable thermal objectives in municipal buildings to showcase for new technologies and how to achieve deep levels of savings through energy efficient design.
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Timeline

Action Area 2 Net Zero New Construction

This timeline was adopted with the most recent update of the NZAP in 2023.



SMART Goals: Action 2.1

- Adopt Net Zero Stretch Code by early 2023
- Adopt Fossil Fuel Free pilot by summer 2023
- Prepare resources to support developers when updates take effect

Implementation Status

On Track

Equity

Resilience

Net Zero Requirements for New Construction

Action 2.1 Implementation Status

The activities for this action are currently on track.

As part of the 5-year NZAP update, adopted in January 2023, SMART goals were assigned to action 2.1. During FY24, Cambridge was admitted into the [Fossil Fuel Free Pilot Demonstration program](#). In preparation for the program staff coordinated an outreach and education campaign, developed resources for developers and contractors, and worked with various city departments to administer the program.

Net Zero Requirements for New Construction

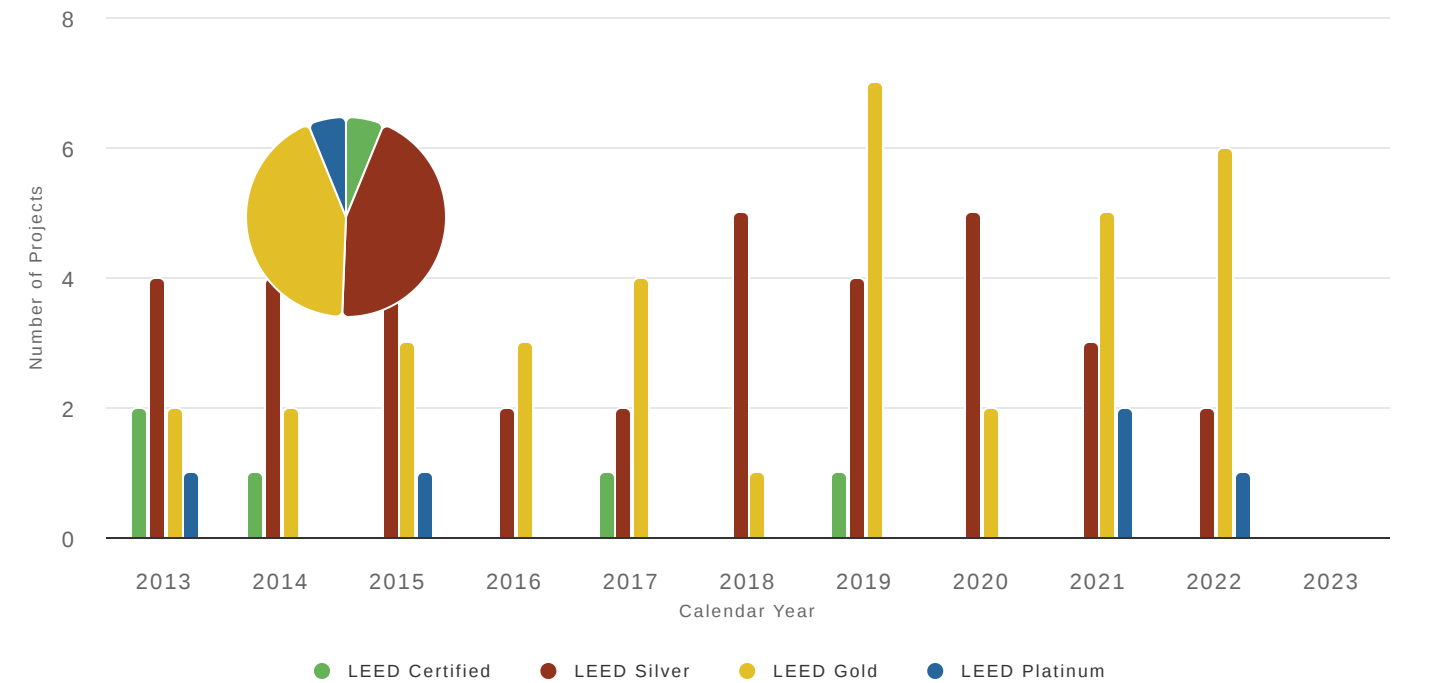
Action 2.1 Progress, Completed Projects

Over the past several years activity for this action has increased, both within the city and at the state. Cambridge is currently participating in the Fossil Fuel Free Pilot Demonstration program and implements the strictest energy code offered by the DOER.

For many years Cambridge has required new construction to follow environmentally sustainable and energy-efficient design and development practices as laid out in [Article 22 of the Zoning Ordinance](#). New construction in Cambridge is required to be built to LEED standards, however certification is not required. Cambridge has used LEED as a framework to ensure new buildings meet high standards of energy efficiency, energy use, and sustainability. Over the years, Cambridge has experienced a steady growth of LEED Buildings including a significant number of LEED Gold-level buildings, the second highest rating in LEED certification. As of the writing of this report, data shows that in calendar year 2023 no projects reached completion, but many are being constructed and more have been permitted. However, as data is updated this may be subject to change. Outside of the city's direct control exist influences that impact the activity measured by this action, such as economic and development cycles.

Since 2013, 5 LEED Certified, 36 LEED Silver, 35 LEED Gold, and 5 LEED Platinum buildings have been constructed in Cambridge. Another 20 projects have been permitted and 28 projects are under construction. Most of these permitted and active projects are being built to the LEED Gold standard.

Projects Completed since 2013, LEED Certifability



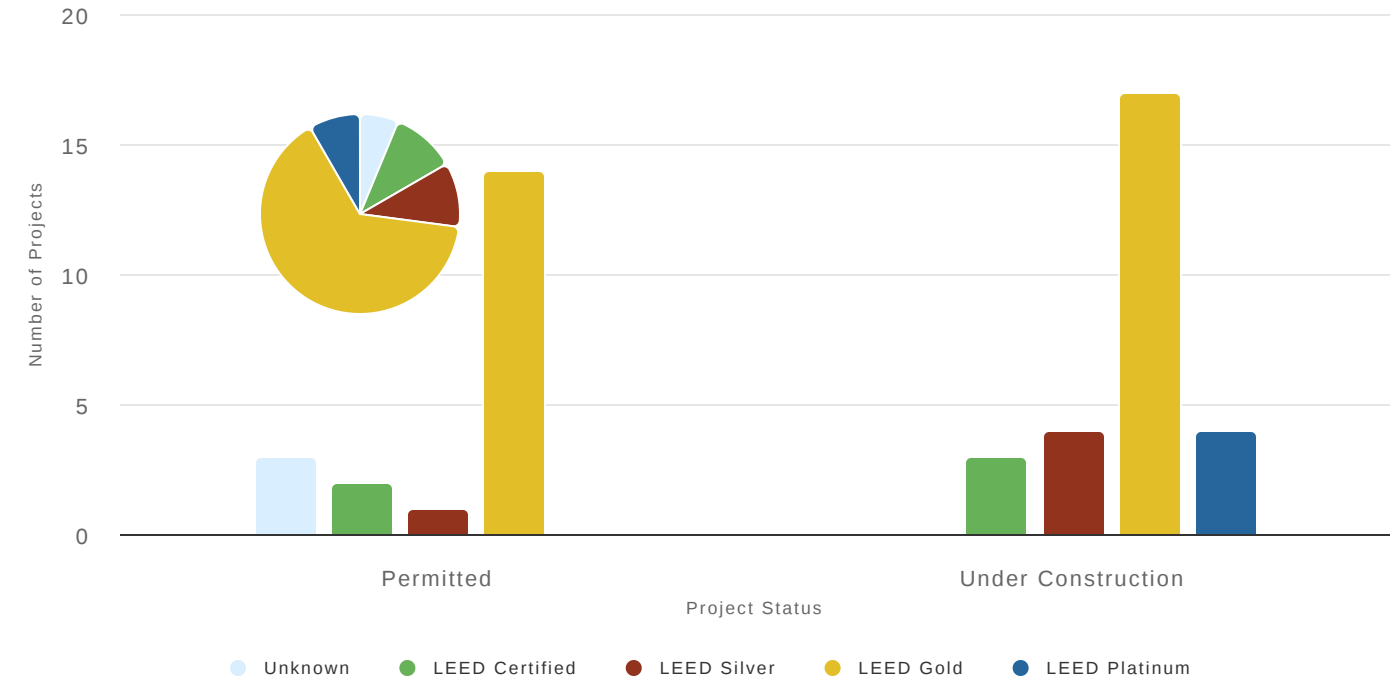
This shows the number of completed buildings per calendar year (2013 - 2023)
([Article 22 Green Building Review Projects, Open Data Portal, last updated February 2024](#))

Net Zero Requirements for New Construction

Action 2.1 Progress, Permitted and Under Construction Projects

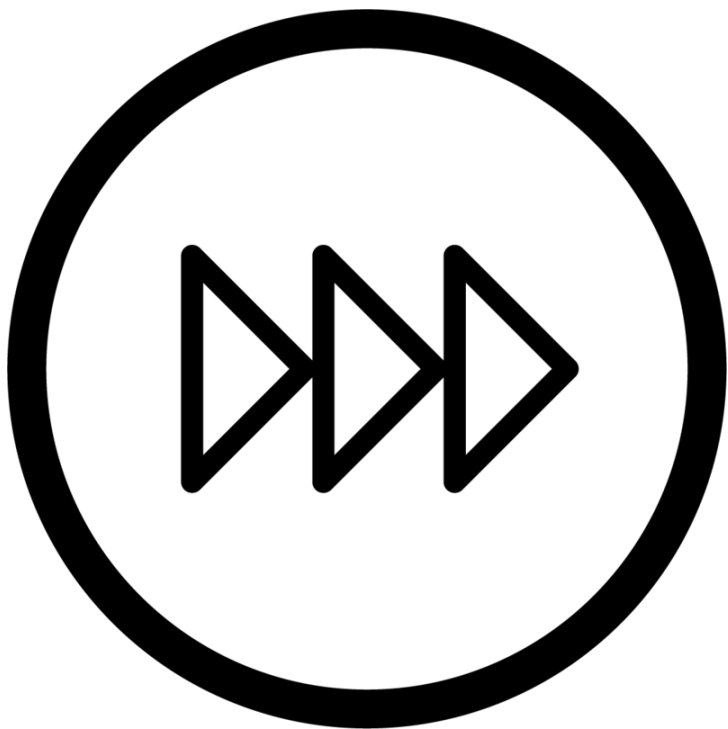
While 2023 had no projects reach completion, many projects are currently permitted and actively under construction. Nearly 65% of these projects will be built to the LEED Gold standard. There are currently 3 permitted projects whose anticipated rating is currently unknown.

Permitted and Under Construction Projects, LEED Certifiability



This shows the number of permitted and buildings under construction by the level of LEED certifiability

[\(Article 22 Green Building Review Projects, Open Data Portal, last updated February 2024\)](#)



Net Zero Requirements for New Construction

Action 2.1 Next Steps, Challenges, and Opportunities

Next Steps: Staff will continue to monitor performance of the current initiatives as laid out in the NZAP. Additionally, should opportunities arise for state-level advocacy Staff will continue to participate when appropriate.

Challenges: Ensuring that all stakeholders relevant to development in Cambridge are aware and knowledgeable of the requirements that have been created over the past several years will continue to be a manageable challenge.

Opportunities: Cambridge can continue to be a leader by requiring sustainable building practices. As more municipalities look to establish their own requirements, Cambridge can continue to be a wealth of knowledge and resource for others.

SMART Goal: Action 2.2

- Adopt carbon reporting requirements for special permit buildings by June 2023

Implementation Status



On Track

Address Embodied Carbon through Reporting Requirements

Action 2.2 Implementation Status

The activities for this action are currently on track.

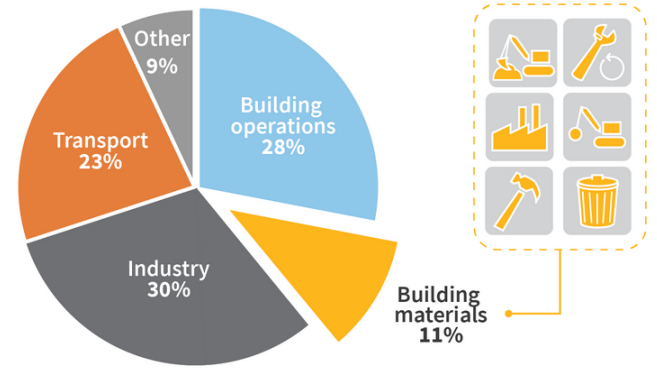
[Final regulations](#) for the embodied carbon reporting requirements were released in May 2024. Currently, non-residential special permit projects that are over 50,000 square feet are required to report on the embodied emissions for select materials as laid out in the zoning amendment. Potential future activities run the risk of falling behind as new developments in the city that would subject to reporting has been slow, thus resulting in a lack of data.

Address Embodied Carbon through Reporting Requirements

Action 2.2 Progress

While still on track, over the past fiscal year activity for this action slowed down. In FY23, City staff finished working with a consultant team to establish the [reporting framework](#) and developed [educational materials](#) to enable for the reporting of embodied emissions as laid out in the zoning amendment. These materials were released and given an initial pilot period where additional feedback was collected.

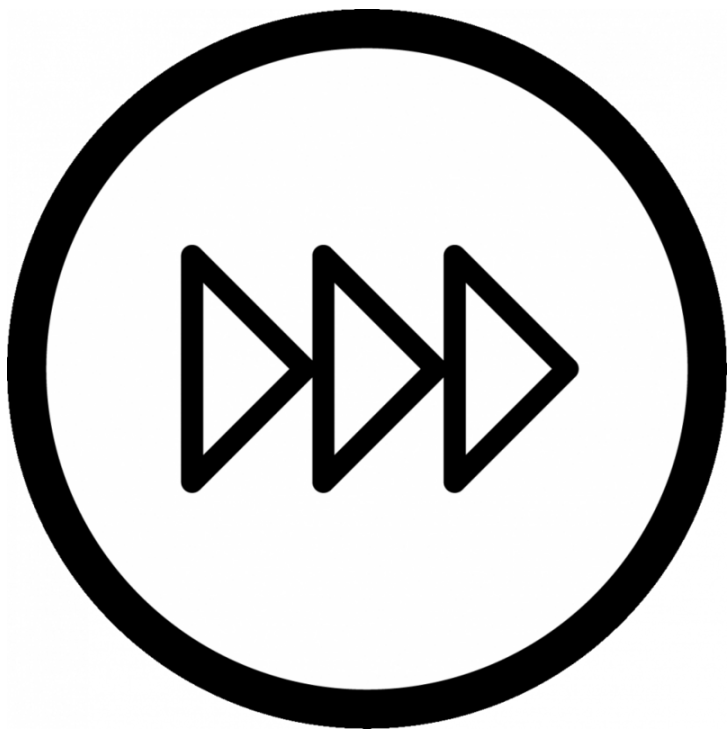
Over the course of FY24, Staff extended the pilot period several times allowing for additional time to collect feedback. Unfortunately, no additional comments were received. The city has seen a slow down in developments over the past year or so. [Final regulations](#) were released in May 2024.



Global energy-related CO₂ emissions.
Adapted from the UNEP 2019 Global Status Report

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Image provided by the Carbon Leadership Forum from
the Embodied Carbon Policy Toolkit:
<https://carbonleadershipforum.org/clf-policy-toolkit/>



Address Embodied Carbon through Reporting Requirements

Action 2.2 Next Steps, Challenges, and Opportunities

Next Steps: Staff will monitor new, special permit projects that are submitted to the city for review. Projects that meet the requirements for reporting embodied carbon will have their data collected and analyzed by Staff. Once determined to have enough data Staff will establish a baseline target for embodied carbon and work toward establishing reduction targets per the activities listed in the NZAP.

Challenges: As the embodied carbon requirement applies only to non-residential projects very limited data was collected during FY24 as most of the new developments in Cambridge have included residential. A challenge for this action is the current development landscape and environment for new construction in Cambridge as observations show that development overall has slowed compared to other recent years. This can be influenced by market trends, available funding and private capital, and incentives from local, state, and federal resources.

Opportunities: Cambridge is one of the first cities in the United States to pass an embodied carbon reporting policy. Industry experts, developers, and other municipal, state, and utility officials often cite the need for regional collaboration and coordination for reporting requirements and standards. Cambridge is already a leader in this space; however, the City should continue to engage with other local municipalities and the State for coordinating additional embodied carbon policies or making amendments to existing policies.

SMART Goals: Action 2.3

- All new and major renovation municipal buildings are net zero
- Update 2030 GHG reduction goal for municipal buildings by the end of 2023

Implementation Status



On Track

On Track



Resilience

Net Zero Requirements for Municipal Buildings Action 2.3 Implementation Status

The activities for this action are currently on track.

For several years, the city has been demonstrating leadership through designing and constructing new municipal buildings to be fossil fuel free. Municipal buildings are required to achieve net zero emissions by at least 2050. Municipal projects are subject to the adopted specialized opt-in stretch energy code, the fossil fuel free demonstration pilot, and BEUDO.

The city recently updated its [Municipal Operations Greenhouse Gas Emissions 2030 target](#).

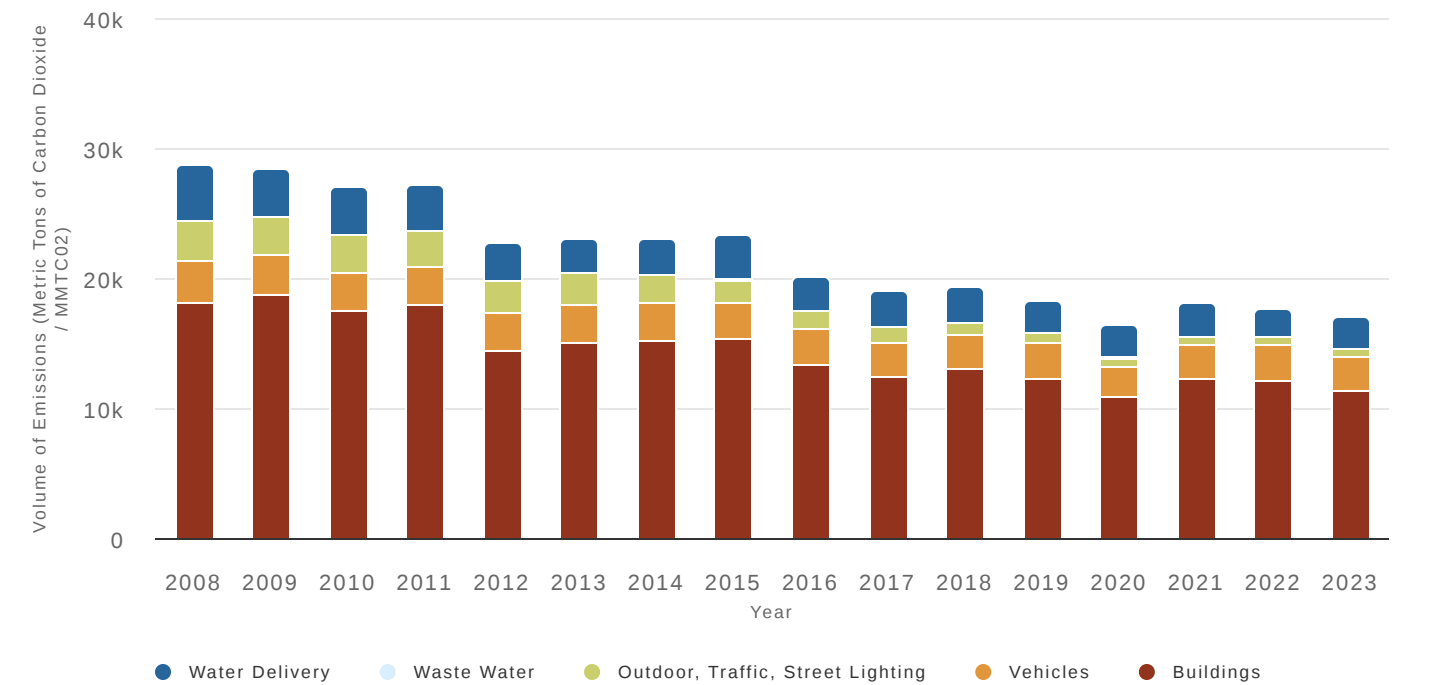
Net Zero Requirement for Municipal Buildings

Action 2.3 Progress, Cambridge Municipal GHG Emissions

Greenhouse gas emissions from municipal buildings and operations have been consistently declining since 2008. In FY24, a new [2030 municipal emissions target](#) was adopted. Cambridge aims to reduce emissions for municipal buildings and operations by 75% against a 2008 baseline.

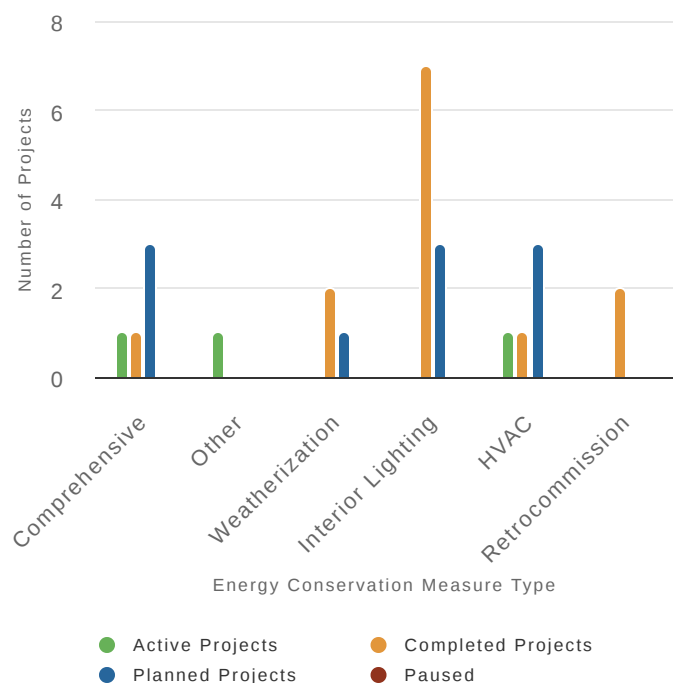
These declining emissions can be attributed to many activities. Such as conversion of building heating systems from oil or natural gas to electricity, reconstruction projects for higher performing more-efficient buildings such as the King Open/Cambridge Street Upper Schools, and the MLK school, the installation of solar, the purchase of renewable electricity, and other smaller scale building improvements across the city.

Emissions from Municipal Operations



Cambridge Municipal GHG Emissions (Calendar Year, 2008 - 2023)

Municipal Buildings Retrofit Projects

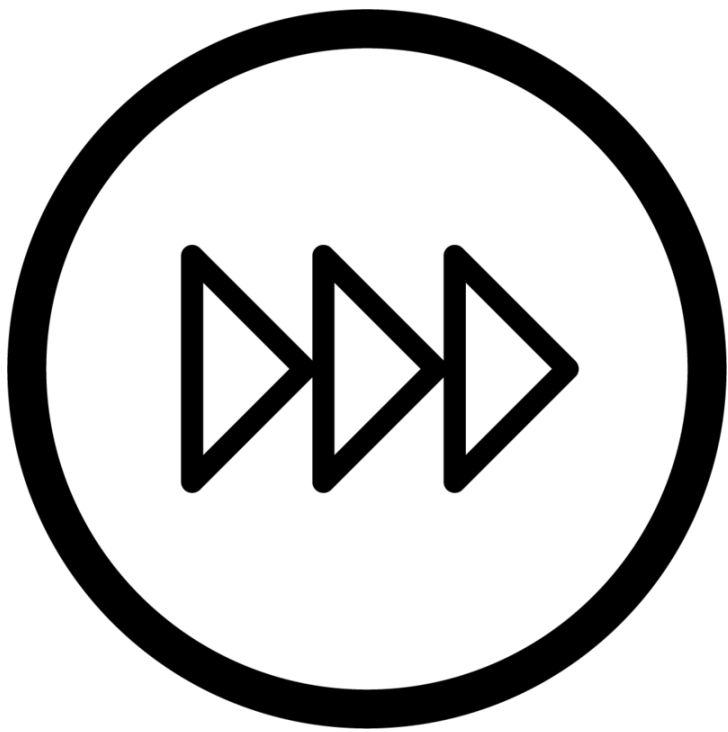


Data informed by annual Green Communities reporting
(October 2023)

Net Zero Requirements for Municipal Buildings Action 2.3 Progress, Municipal Building Projects

To manage all of the work being done to municipal buildings a new city department was established, the Capital Buildings Projects Department. This department along with the Department of Public Works is currently conducting two studies to understand and develop pathways for schools and other buildings to be compliant with BEUDO and other net zero requirements.

Electrification and energy efficiency are priorities for every project. In FY24, there were several municipal building projects underway across the city that include energy conservation measures and other upgrades. This work includes the Department of Public Works Simard Building renovation, the River St Firehouse and Fire Department Headquarters, the Lombardi Building roof replacement, and the Tobin School.



Net Zero Requirements for Municipal Buildings

Action 2.3 Next Steps, Challenges, and Opportunities

Next Steps: The city will continue to make progress on on-going construction and renovation projects, as well as start other planned projects. Currently planned projects include 105 Windsor St, which will start with a public engagement process, and the Moses Youth Center, which will replace its HVAC systems.

Challenges: While each project has its own individual challenges, some exist outside the direct control of the city. For example, the electrical grid will be constrained as more building systems are converted to all electric. Operational changes can help alleviate some electric demand; however, these challenges may not be easily accommodated.

There are also very long lead times for electrical infrastructure equipment have very long lead times from order to installation, some such as transformers, sometimes up to 18 months. Additionally, construction in the City of Cambridge is expensive and the city needs to ensure that the budget is balanced. Projects may end up being delayed, put on hold, or abandoned due to costs. Due to the complexity of HVAC electrification projects and related infrastructural improvements, project duration can be lengthy.

Opportunities: Cambridge will continue to be a leader in reducing greenhouse gas emissions from its operations. New Construction, building renovations and retrofits demonstrate leadership and the generation of electricity on site through solar and procurement of 100% renewable energy strongly advance our goals.

Overview

Action Area 3: Low Carbon Energy Supply

The heating and cooling of buildings in Cambridge is the largest source of emissions across the city. To achieve net zero emissions, buildings need to become more efficient, receive electricity from renewable source and be fossil fuel free. Successfully decarbonizing the energy supply systems is a complex matter with many components that are outside of the control of the city. Doing so will require a combination of approaches over time, meaningful engagement with stakeholders, and clear communication to businesses and residents.

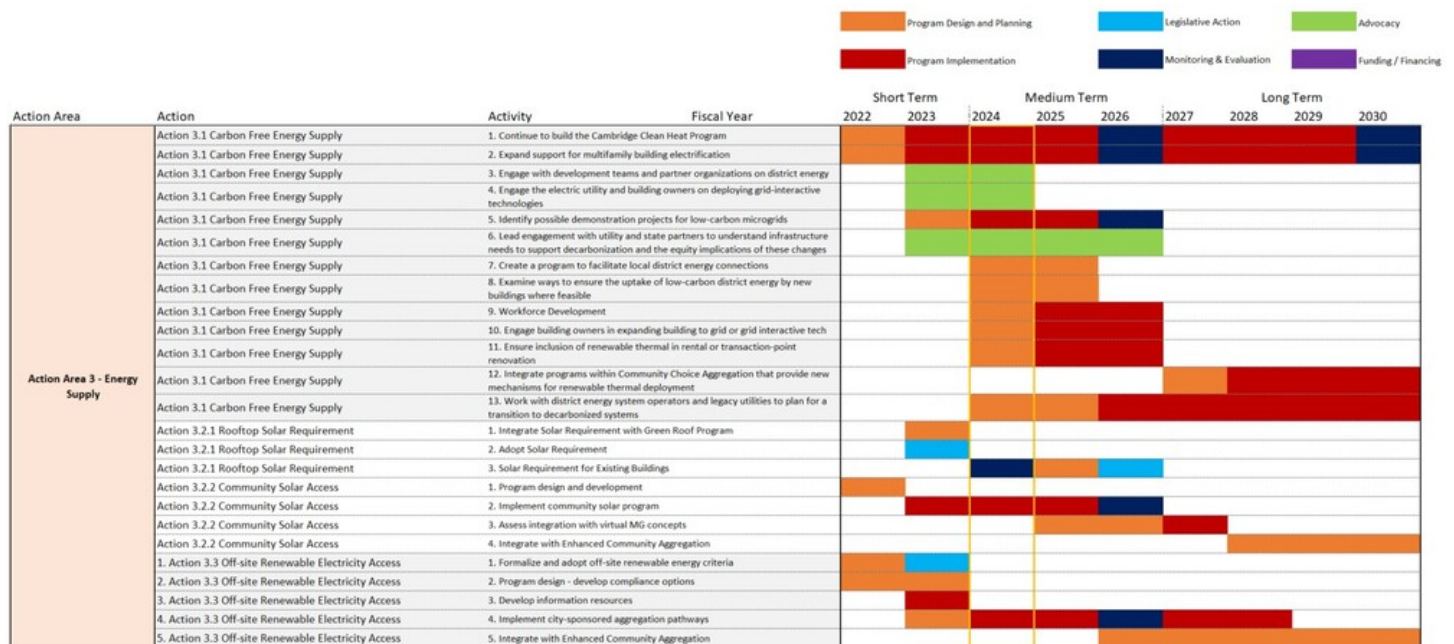
This section covers activity that happened in FY24 which, ran from July 1, 2023 through June 30, 2024.

Action 3.1 Carbon Free Energy Supply Continue to support the electrification of individual buildings' heating and hot water systems, as well as enable low-carbon district energy systems where suitable. Engage and lead on planning for an equitable, effective transition to renewable thermal energy supply.	Action 3.2 On-Site Renewable Electricity Access Promote on-site renewable energy systems and provide support to building owners who may install these types of systems. May include rooftop photovoltaics (PV), solar thermal, battery storage or fuel cells - systems capable of supplying renewable electricity to the host building.	Action 3.3 Off-Site Renewable Electricity Access Adopt City's Off-Site Renewable Energy Criteria to guide corporate entities and others to enter into renewable power purchase agreements that meet the standards of the City. Provide residents and small businesses access to renewable energy through aggregation.
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Timeline

Action Area 3 Low Carbon Energy Supply

This timeline was adopted with the most recent update of the NZAP in 2023.



SMART Goals: Action 3.1

- Establish fossil fuel free conversion rate targets for buildings by end of June 2023
- Complete feasibility study for geomicrodistrict by June 2024
- If feasible, install pilot serving 500 units plus two public buildings in 2025

Implementation Status



On Track



Equity



Resilience

Carbon Free Thermal Energy Action 3.1 Implementation Status

This activities for this action are currently on track.

Activities listed on the NZAP timeline are currently progressing, however, the SMART goals have yet to be achieved. Conversion targets have not been established as more data is needed to meaningfully set those targets. A feasibility study for a geomicrodistrict is planned to start this fiscal year, FY25.

On Track

Carbon Free Thermal Energy

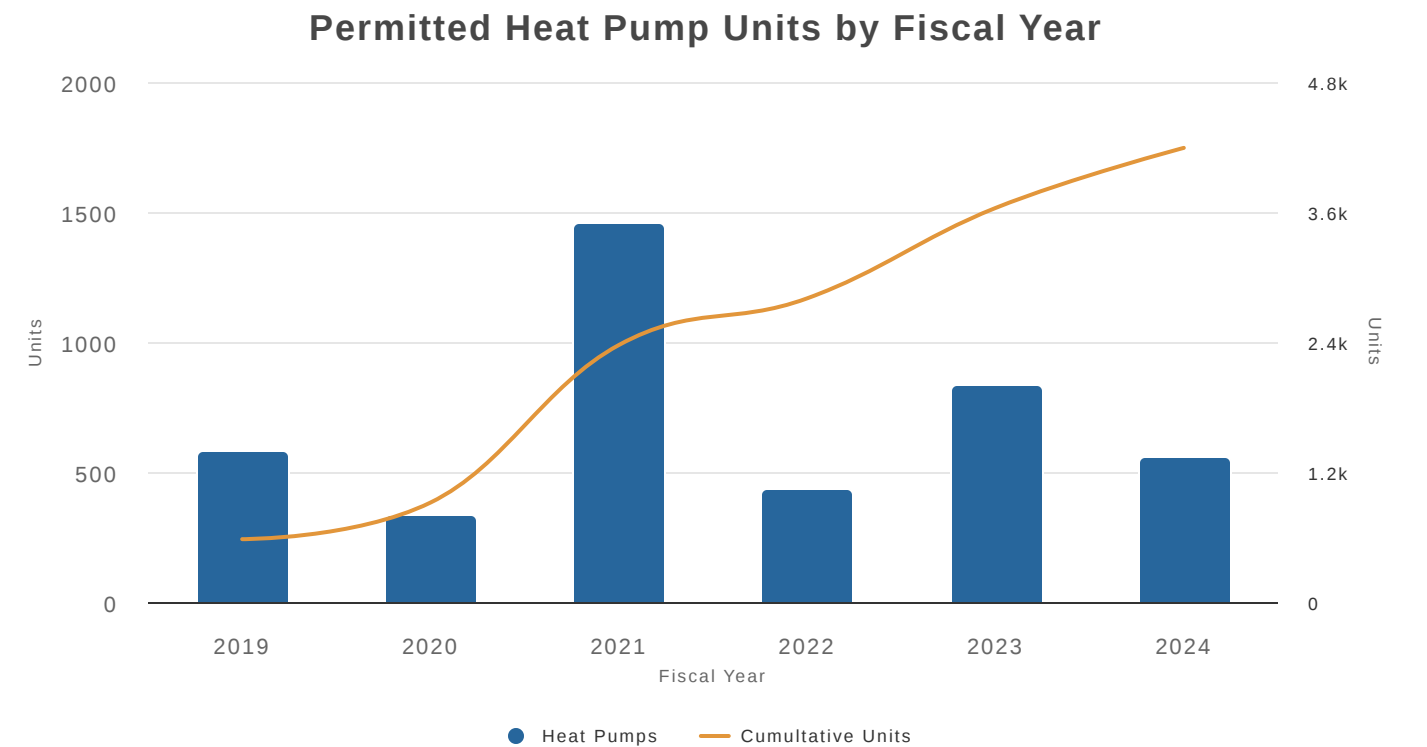
Action 3.1 Progress

Current progress towards this action is informed by heat pump installations, which is defined by the number units identified on mechanical permits filed with the city. In FY25, an RFQ will be released for design services for a geogrid microdistrict feasibility study. As that project progresses additional data will be used to inform progress for this action.

[Electrify Cambridge](#) offers a heat pump quote comparison service, like the prior Cambridge Clean Heat program, and helps residents plan for future heat pump installments. Additionally, [BlocPower](#) had also provided assistance for heat pump installations. Please note that the BlocPower pilot program has since concluded. While data tracking is continually being improved for those programs, the best data to understand the volume of carbon free thermal energy is through permit databases.

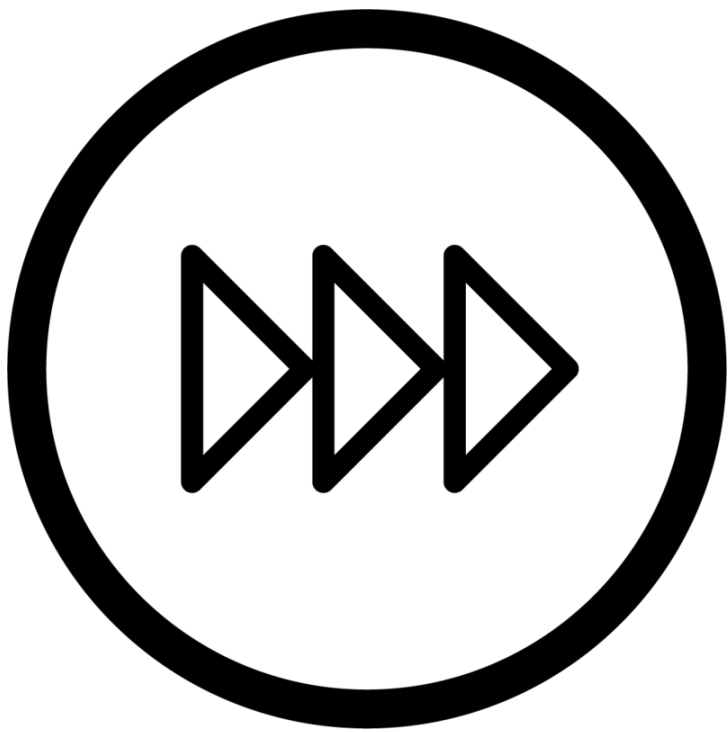
Progress also continued on the [Neighborhood Energy community microgrid initiative](#). The initiative has engaged a wide range of organizations in The Port neighborhood – including community centers, houses of worship, and health centers – on identifying ways to improve energy resiliency for critical buildings and thus for the community as a whole. Outreach to residents of The Port has continued through multiple channels and in multiple languages, and many have provided input on the neighborhood’s key energy resiliency needs.

Since FY19 there have been 4,192 heat pumps permitted with 555 of those happening in FY24.



Graph represents the number of heat pumps permitted each fiscal year (left axis) and the total number of units permitted since 2019 (right axis)

([Mechanical Permits, Open Data Portal, pulled June 2024](#))



Carbon Free Thermal Energy Action 3.1 Next Steps, Challenges, and Opportunities

Next Steps: The city will release a request for quotes to procure services from a consultant for design of a geothermal feasibility study. This study will provide the city with a pathway for the implementation of a pilot planning program.

Challenges: Data for this action is primarily informed by the mechanical permit database. Permit data can be cumbersome to analyze and often contains gaps, missing or incomplete data, and is usually in some state of flux as permitted work can span fiscal years. Staff work continuously with other city departments, program administrators, and the contractor and developer community to improve and educate about permitting processes.

Opportunities: Over the coming year, the geothermal demonstration study will provide insight and highlight opportunities for a connected geothermal project in Cambridge. This could lay the groundwork for establishing more geothermal systems throughout the city that would provide more efficient, low-carbon heating and cooling.

SMART Goals: Action 3.2

- Achieve 55 MW of solar in Cambridge and city properties by 2030.
- Adopt a solar installation requirement for new construction by June 2023
- Launch community solar program in 2023
- Install 5.5 MW of community solar in Cambridge by 2030

Implementation Status



On Track

On Track



Equity



Resilience

Rooftop Solar and Community Solar Access

Action 3.2.1 and Action 3.2.2 Implementation Status

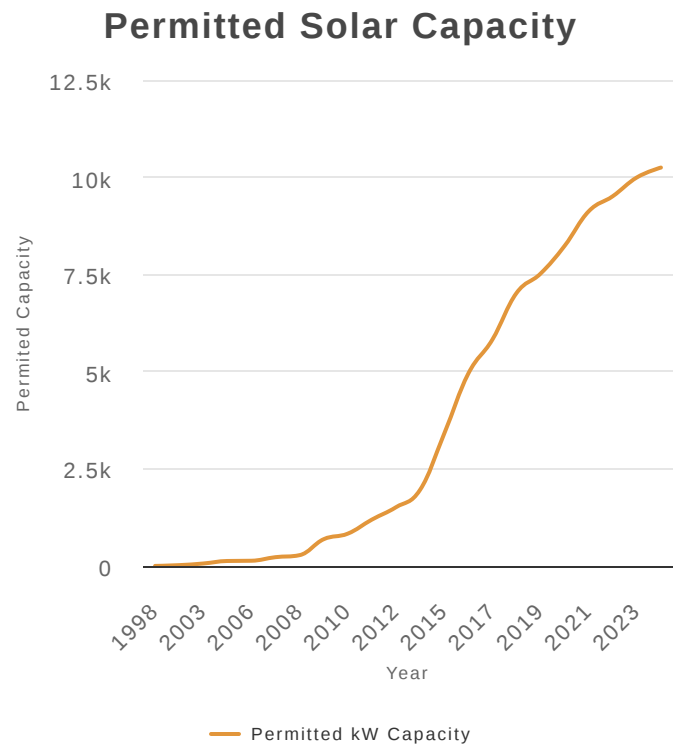
The activities for this action are currently on track.

There are many challenges exist to achieve the SMART goals for installed solar capacity. Residents have several ways to benefit from community solar, and a new program will be launching in FY25 to help identify, design, and install community solar projects in Cambridge. Complexities with system ownership and the building stock of Cambridge make rooftop solar difficult.

The City has a '[Green Roof Requirement](#)' which requires buildings or structures over 25,000 square feet to have a green roof or solar energy system.

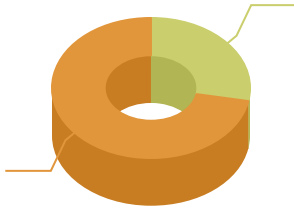
Rooftop Solar Action 3.2.1 Progress, Permitted Solar Capacity

Since 1998, Cambridge has permitted just under 10,000 kW of solar generation capacity. Significant year over year growth will be needed to achieve 55 MW's by 2030 per the SMART goal. Building owners have several city programs, which they leverage to install solar on their roof. Residential and small commercial buildings can access EnergySage, Sunwealth (low-income), Electrify Cambridge and BlocPower, and large commercial buildings can use resources available through the [BEUDO Building Energy Retrofit Program](#).



[Explore roof-top solar for your home](#) and see installations on the [Cambridge Solar Installations Map](#)

([Solar Permits](#), [Open Data Portal](#))



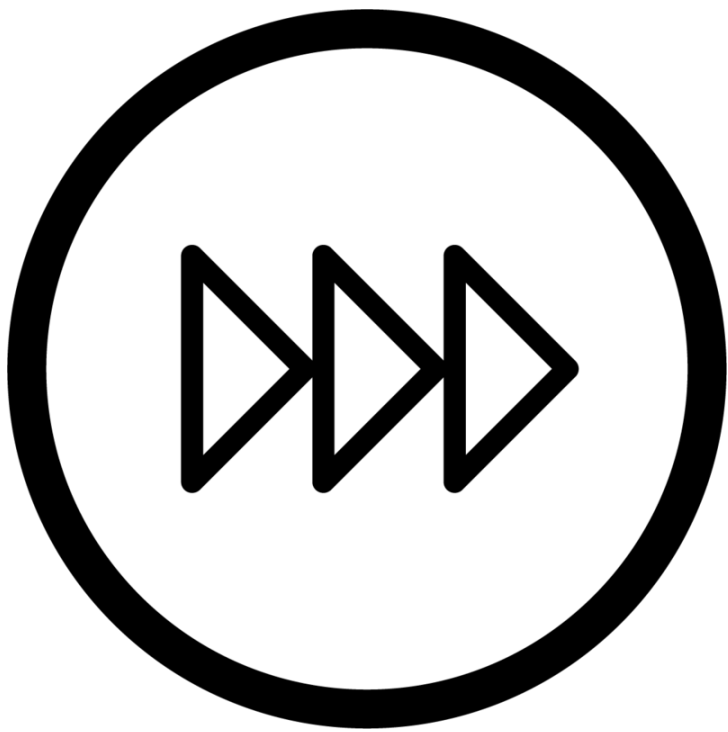
Cambridge has partnerships with [EnergySage](#) and [SunWealth](#) to help residents access community solar

Community Solar Access Action 3.2.2 Progress, Community Solar Programs Enrollment

Many residents of Cambridge are renters and live in multifamily buildings; therefore, they do not own the space in which they live or have direct control of their roof. The current market for rooftop solar works really well for single-family homes, but not for multifamily buildings. Cambridge has few single-family homes and many multifamily buildings. Given the complexities of rooftop solar for multifamily buildings, renters and building owners who cannot afford to install solar can still access the benefits by subscribing to a community solar project. There can be long lead times from expressing interest in joining a community solar project to receiving the benefits. This makes tracking enrollment in real time difficult, especially with multiple options available to residents.

Cambridge residents are able to subscribe to community solar projects, including those that offer a greater savings for income-qualifying residents. There may be changes coming to the billing structure for community solar on utility bills, while out of the control of the city, staff are monitoring the on-going talks at the state.

In FY25, a program to help install community solar projects in Cambridge will be launched.



Rooftop Solar Requirements Action 3.2.1 and Action 3.2.2 - Next Steps, Challenges, and Opportunities

Next Steps: Staff will continue to work internally to launch the Community Solar Administrator Program, which is expected to launch in FY25. Remaining work includes coordination with the City's Legal Department to develop acceptable term sheets for projects, site host agreements, and other necessary documentation.

Challenges: Rooftop solar in Cambridge is a challenge as many of the buildings in the city are multifamily, commercial or institutional. Rooftop solar is a straightforward process for single-family buildings, but not for multifamily. Complexities around incentives, consensus among condo association members, and financing are just a few of the challenges solar faces in Cambridge. To reach the goal of 55 MW of installed solar capacity by 2030, there would need to be about 7.5 MW would need to be installed each year. This would be a significant change to the current year over year trend and will require additional resources to support.

Opportunities: The Community Solar Administrator Program is a big opportunity for more solar to be installed in Cambridge. This unique and innovation program aims to open the door for more buildings to host community solar. There is legislation at the State-level providing an opportunity for consolidated billing for community solar subscribers. As mentioned as a challenge, the current model of dual billing is confusing and there is progress being made so that subscribers would only receive one electricity bill. It is unclear at the time of this report whether this will pass during the current legislative cycle.

SMART Goals: Action 3.3

- Adopt off-site renewable energy criteria through BEUDO in 2023
- Achieve 50% renewable energy for Cambridge Community Electricity aggregation by 2025 and 100% by 2030.

Implementation Status



On Track

On Track



Equity

Off-site Renewable Electricity Access Action 3.3 Implementation Status

The activities for this action are currently on track.

This action provides residents and primarily small businesses access to renewable energy through the City's electricity aggregation program. In FY24, the city continued and expanded the [Cambridge Community Electricity \(CCE\) aggregation program](#) with an energy supply contract that runs through January 2026. Staff is working on figuring out how BEUDO buildings can be served through the aggregation program and/or other power purchase agreements.

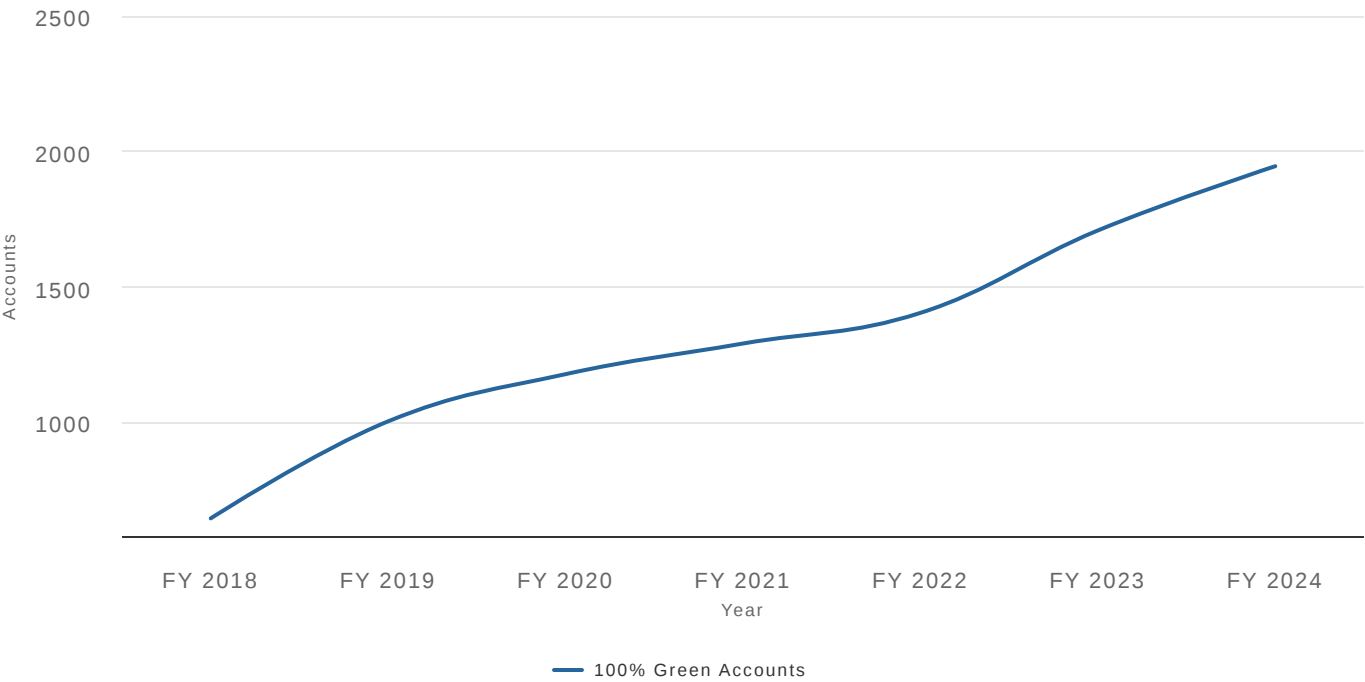
Off-site Renewable Electricity Access

Action 3.3 Progress

The aggregation program leverages the combined purchasing power of the City for the community. The current contract for the aggregation runs through January 2026. This energy supply contract increased the amount of Massachusetts Class 1 Renewable Energy Credits (RECs) in our supply mix. New and existing electric utility accounts in Cambridge are automatically enrolled and receive 50% of their electricity from MA Class 1 RECs. Residents can opt up to get 100% renewable electricity or opt down to the standard mix as required by the Massachusetts Renewable Portfolio Standard (RPS).

Over 40,000 electricity accounts participate in the [Cambridge Community Electricity Program](#) with almost 2,000 opting for 100% renewable electricity. Customers of the aggregation program from July 2023 through the end of June 2024 used 394,742,438 kWh of electricity. Over the lifetime of the program, residential and business accounts have saved close to \$100 million combined compared to Eversource Basic Service.

Cambridge Community Electricity Program 100% Green Enrollment



Sign up to get 100% renewable electricity through the [Cambridge Community Electricity Program](#)



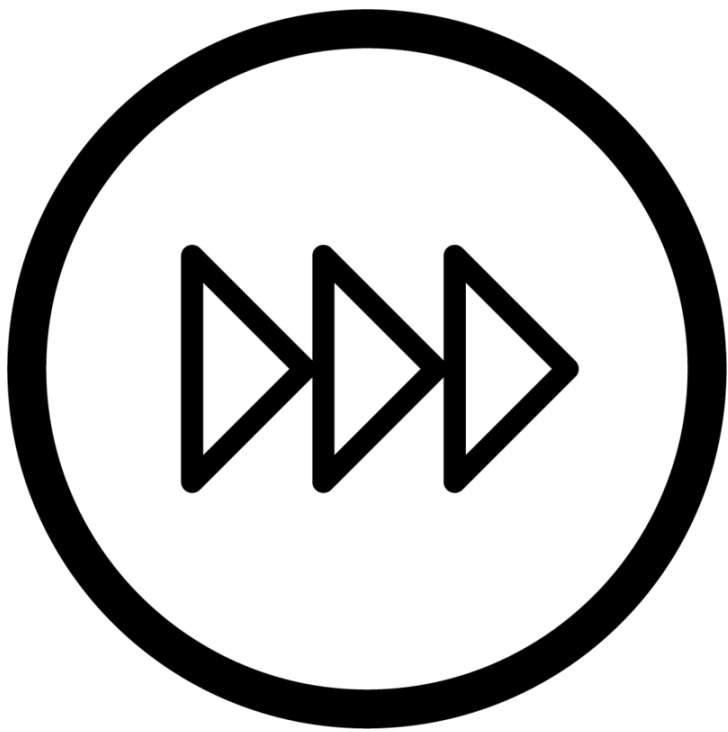
Graham and Parks School

Did you know?

All the [Cambridge Community Electricity Program](#) participants pay a \$0.002 charge on each kWh of electricity they use and their collective impact has added over \$2 million dollars to our Renewable Energy Fund. In March 2022, a new 243 kW local [solar project was installed on Graham and Parks School](#) using Renewable Energy Fund money. This solar project is collectively “owned” by all the Cambridge Community Electricity Program participants! It is expected to generate at 280,000 kWhrs of energy per year.

[Opt up to 100% Renewable Energy](#)

<https://www.masspowerchoice.com/cambridge>



Off-site Renewable Electricity Access

Action 3.3 Next Steps, Challenges, and Opportunities

Next Steps: Outreach will continue across the city to educate residents about the program, such as its typically lower prices and higher renewable energy content compared to Eversource and other competitive suppliers. Aggregation will continue to add more renewable electricity through virtual power purchase agreements with the goal to reach 100% renewable as its standard offer.

Challenges: Continuously growing enrollment remains a challenge. Since the inception of the aggregation the total number of enrolled accounts has remained relatively stable, meaning that overall enrollment numbers haven't grown much. There are several factors for this such as the transient nature of Cambridge residents, but more importantly third-party competitive suppliers that compete with the aggregation. Competitive suppliers often target the most vulnerable populations by offering lower costs immediately after enrollment, then increasing prices sustainably shortly thereafter. Regulating these competitive suppliers would need to be coordinated by the State.

Opportunities: At the state-level there are big opportunities for aggregation programs, community solar programs, and how utility billing is done. The Department of Public Utilities (DPU) is examining whether or not community solar may be included in aggregation programs. Moving to a system of single billing would have a significant impact on the ease of implementation and education around the benefits of community solar.



Resilience



Equity

Overview

Action Area 4: Financing and Capacity Building

This revised action is aimed at providing building owners the resources they need to make informed decisions about energy improvements and a means to access financing or funding for their projects. Further, this action is intended to lay the groundwork for various aspects of an enhanced Community Choice Aggregation program (CCA 3.0). The CCA 3.0 model is intended to allow residents and businesses the opportunity to own distributed energy resources (DER) using “green bond” financing to purchase the distributed energy systems and have customers opt to buy shares in the DERs, thereby conferring an ownership share to the participants and allowing the participants to realize the cost savings that occur with DER installations. By buying shares in DERs, customers can participate in DER ownership without high upfront capital costs or good credit, or even participate as renters. CCA 3.0 resolves to disengage from, rather than mitigate the impacts of fossil fuel power plants by planning and facilitating voluntary investment in local renewable energy and energy efficiency technologies. Furthermore, CCA 3.0 facilitates voluntary investment in small DERs on homes and businesses that reduce demand for grid and pipeline resources, rather than centralized renewable generation that adds to infrastructure demand. CCA 3.0 achieves equitable energy ownership, as opposed to equitable consumption of energy.

Action 4.1
Local Carbon Fund
(Enhanced Community
Aggregation Program)

Create a single point from which financial and technical resources may be deployed in order to support the emissions reductions in the other actions, thereby creating greater flexibility and coordination of compliance with those actions

Grey to indicate not yet started

Activities for Action Area 4 have not started. Therefore, there is no FY24 progress reported.

Timeline

Action Area 4 Financing and Capacity Building

This timeline was adopted with the most recent update of the NZAP in 2023.

