
City of Cambridge Getting to Net Zero Action Plan Fiscal Year 2020 Progress Report

December 2020





City of Cambridge
CLIMATE PROTECTION ACTION COMMITTEE

November 12, 2020

Dear Mr. DePasquale,

The City of Cambridge's Climate Protection Action Committee (CPAC) is tasked with overseeing the City's Net Zero Action Plan (Plan) and assessing its progress on an annual basis. This letter serves as the fifth annual progress assessment (Assessment), which includes comments and recommendations regarding both the content of the Plan, as well as the implementation of the Plan by the Community Development Department (CDD) and other City officials. The Assessment is based upon the annual *City of Cambridge Getting to Net Zero Action Plan – Fiscal Year 2020 Progress Report* (Progress Report) drafted by CDD (attached), as well as other relevant City reports and the deliberations of CPAC. This Assessment also coincides with the commencement of the 5-Year Review of NZAP by a City Manager appointed task force, as stipulated in the Plan.

Since the Net Zero Action Plan was finalized and adopted by the City in 2015, the science surrounding climate change, the impacts of climate change and social awareness of climate change have all advanced and become more compelling, as have the frequency of severe weather events like heat waves, storms and flooding. Meanwhile, the implementation of some of the key actions within the Net Zero Action Plan have fallen seriously behind schedule. In fact, in the period from 2013 – 2018, the GHG emissions of the Building Sector have **increased** by about 13% for Commercial and 34% for Residential buildings - with a Business As Usual (BAU) trajectory projected to continue an upward trend. Given this context, CPAC encourages the NZAP 5-Year Review Task Force to aggressively revise the Plan and especially its implementation strategies to realistically achieve the City's 2050 carbon neutrality goal. In addition to a good plan, goal achievement will require increased resources, aggressive policies/requirements, local and regional coalition-building between the public and private sectors and a constant sense of urgency.

The following are specific comments and recommendations related to the status of Actions outlined in the attached *Fiscal Year 2020 Progress Report* and primarily targets Actions that represent the highest potential to reduce emissions or have high leadership value:

Building Energy Use Disclosure Ordinance (BEUDO)

Action 1.1.1: Custom Retrofit Program for BEUDO buildings

Action 1.1.2 Amendments to introduce performance requirements for BEUDO buildings

These are both potentially high-impact programs targeting BEUDO buildings that use 60% of energy and generate 70% total Building Sector GHG emissions in the City, and should be adopted, staffed and funded aggressively. Lessons learned from the Multi-family Retrofit Program include streamlining decision-making and providing a “concierge” advisory service to help clients assess improvements and available subsidies. Though enrollment in the audit phase of the Multi-family program was high, follow-through with retrofits was low. Adopting performance requirements for BEUDO buildings (see below) would increase follow-through for this program.

The BEUDO performance requirement amendment is a very high potential NZAP initiative but is 2 years behind schedule. The proposed requirement is to require buildings (with some exceptions) to reduce GHG emissions by 20% every 5-years via multiple possible pathways including through Energy Efficiency gains, Renewable Energy use, and Offset purchasing. (Clear protocols regarding meaningful Offset purchasing is key.) CPAC recommends that the City Council adopt this performance requirement amendment ASAP.

Separately, CPAC also recommends the 5-Year NZAP Review Task Force add to the policy by proposing future phases of performance requirements, (e.g., mandatory energy efficiency thresholds/pathways, accelerated GHG reduction rates, a penalties and rewards system to incentivize performance, as implemented in other large cities including New York).

Action 1.1.3 Required Energy Efficiency Upgrades at Time of Renovation or Sale

This moderate-high impact initiative has also stalled and is behind schedule. The 5-Year NZAP Review Task Force should review its status and recommend an action plan to advance it.

Action 2.1 Net Zero Small Residential (1-3 units) New Construction by 2022

Following the Municipal Building Net Zero deadline of 2020, the Small Residential deadline is fast approaching. Feasibility studies have been performed and the City should outline performance criteria and pathways ASAP so that developers have time to prepare for a 2022 implementation. Though this program does not represent high volumes of GHG reductions, it is the first private sector Net Zero new buildings requirement and is very important for visibility and leadership purposes.

Action 2.3 Amend Article 22 of Zoning Ordinance to Increase Green Building Requirements

In December 2019, the City Council adopted stricter Article 22 requirements, including LEED Gold requirement for buildings over 50,000 SF. The City should be commended for this action and the resulting 700,000 SF of compliant new development to date. Additional steps, to also be considered by the 5-Year NZAP Review Task Force, include developing a Net Zero New Building zoning ordinance, like the one Boston is developing, and/or adopting the pending Mass State Net Zero Stretch Building Code.

Action 3.1 Low Carbon Energy Supply

Access to sufficient amounts of affordable renewable electricity is a core factor in attaining the goals of the NZAP and carbon neutrality. Driving a transition to all-electric buildings reduces

carbon emissions only if the source of the electricity is non-fossil fuel based. For the City to be on trajectory to achieve carbon neutrality it needs to access renewable energy faster than the ISO-NE grid will supply it, and realistically, to purchase renewable energy from both inside and outside the City that meet the City's procurement goals. The 5-Year NZAP Review Task Force should study the options outlined in the Low Carbon Energy Supply study and endorse strategies that transition buildings off of fossil fuels, as well as strategies to purchase affordable renewable energy at scale. (It is our understanding that CDD has commissioned additional studies to address these opportunities.)

Other related recommendations from CPAC not directly tied to specific Actions noted in the *Fiscal Year 2020 Progress Report* are:

1. Collaboration and Alignment of City & Regional Climate Initiatives

CDD and the 5-Year NZAP Review Task Force should consider the various climate resiliency and energy efficiency initiatives occurring in the City and integrate them, where appropriate, into the Net Zero Action Plan to strengthen support for Plan goals and policies and to avoid redundancy.

Such initiatives include: Envision Cambridge (in particular the recommendations of the Climate and Environment Working Group), the Climate Resilience Zoning Task Force (recommendations expected in early 2021), and the Urban Forest Master Plan. The City's participation in various regional Climate initiatives, such as the Zero Cities Initiative and Metro Mayors Coalition, should also be monitored and integrated into the Plan as relevant.

2. Adopt Property Assessed Clean Energy (PACE) financing enabling legislation at City level

PACE financing allows a betterment lien to be placed on the title of a commercial or industrial property to help finance energy efficiency improvements. The PACE program commenced at the State level in 2020 and each City/Town that wants to participate needs local enabling legislation.

3. Set Interim Carbon Reduction Goals

To more effectively drive planning and near-term GHG reduction performance, decade goals should be set for 2030, 2040 and 2050 for the City's three main GHG emission sectors: Stationary Energy/Buildings, Transportation, Waste. To track progress against these interim goals, comprehensive data collection and management protocols need to be established. These interim goals might track to the Paris Accord/UNEP targets and/or Global Covenant of Mayors for Climate and Energy goals, to which Cambridge is a signatory.

4. Budgeting

The Plan released in 2015 was adopted with a 5-year budget that expired in 2019. CDD needs to propose, and the City Manager and Council approve, a reasonable Plan implementation budget to bridge between the expiration of the original Plan budget and the development and approval of a new 5-year Plan budget as part of the 5-year NZAP Review commencing this month. Examples of near-term funding needs include increased

staff to manage BEUDO data analysis and implementation of performance mandates, funding for implementation of the recommendations of the Low Carbon Energy Supply Strategy and funding for improved environmental data tracking and management systems.

CPAC applauds the substantial effort and resources the City has invested in trying to reduce Building Sector carbon emissions to date, including the successful development of multiple schools on a pathway to Net Zero. It also acknowledges the complexity and intransigence of many of the NZAP implementation hurdles at both the local and regional levels. That said, given the grave threat of Climate Change to the economic and social fabric of the City, Cambridge must re-double its efforts, solidify its political will and maintain a leadership role in the development and implementation of innovative carbon reduction strategies.

Respectfully,

A handwritten signature in black ink, appearing to read 'Melissa Chan', written in a cursive style.

Melissa Chan, CPAC Chair

Attachment: City of Cambridge Getting to Net Zero Action Plan – Fiscal Year 2020 Progress Report

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INTRODUCTION

Background

The City of Cambridge shares increasing global concerns about the crisis of climate change and the many challenges it presents. This crisis threatens the ability of the planet to support secure, healthy, productive, and enriching lives for current and future generations. The City of Cambridge has long been steadfast in addressing climate change. In 2002, the City adopted the Climate Protection Action Plan, our first attempt at proposing emissions reduction targets and recommendations to reduce greenhouse gas (GHG) emissions. Since then, the City has committed to a range of initiatives to support sustainable lifestyles and move the community toward greater resilience to climate change. In 2016, the City made a commitment through the Metro Mayors Coalition¹ to achieve carbon neutrality by 2050. In Cambridge, buildings are both the problem and the solution for addressing climate change: more than 80% of our greenhouse gas emissions result from building operations and, as a sign of our thriving economy, new building development steadily continues. If the city can get to net zero emissions in the building sector, we will have made major progress towards achieving the U.N.'s goal of carbon neutrality in our cities.

In 2013, in response to community concern that continued construction activity would make the goal of reducing greenhouse gas emissions harder, the City convened the Getting to Net Zero Task Force to foster a deep conversation among stakeholders to advance the goal of setting Cambridge on a trajectory to becoming a “net zero community,” with a focus on carbon emissions from building operations. **For Cambridge, ‘net zero’ refers to a building or a community of buildings for which, on an annual basis, all greenhouse gas emissions resulting from building operations are offset by carbon-free energy production.** Achieving the net zero objective relies on a combination of energy efficiency improvements, renewable energy production and, where necessary, purchase of carbon offsets or, potentially, credits (that meet specific criteria). After fifteen months of intensive discussions, outside expert analysis, and consultation across sectors including the general public, the Task Force delivered a 25-year framework for setting Cambridge on the trajectory to becoming a net zero community.²

¹ <http://www.mapc.org/metro-mayors-coalition>

² This language is drawn from the Getting to Net Zero Framework report, which can be found along with additional materials about the Cambridge Net Zero Action Plan at <http://www.cambridgema.gov/CDD/Projects/Climate/NetZeroTaskForce>

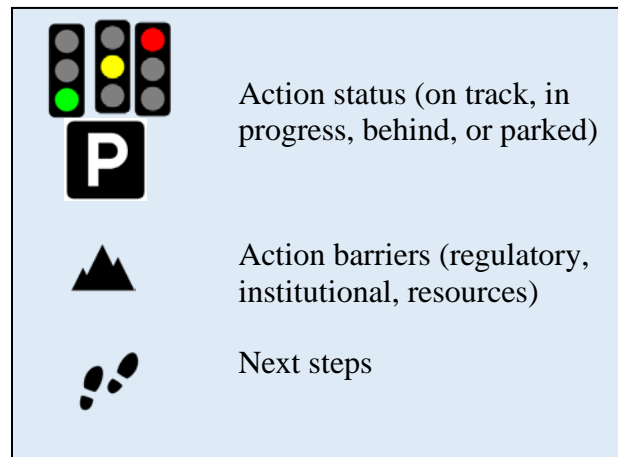
Annual Report Purpose and Structure

In accordance with the recommendations of the Net Zero Action Plan (see Action 5.2), the Cambridge Community Development Department (CDD) has committed to conduct ongoing monitoring and reporting of progress towards the Net Zero Action Plan goals. In collaboration with the Climate Protection Action Committee (CPAC) which has agreed to provide oversight of the Plan, CDD committed to providing an annual report to CPAC and the public to summarize progress towards each action slated for the previous fiscal year.³ This is the fifth such report.

Net Zero Action Plan annual reports are intended to provide an overview of each action planned for that year, including the action items, progress made, and next steps to reach the annual goals. The annual report will also provide quantitative outputs as appropriate for each action, for example the number of green buildings permitted during the past year, as well as broader outcomes such as changes in community-wide GHG emissions. The Net Zero Action Plan 5-Year Review (see Action 5.2) includes a broader impact assessment of the Plan as a whole, including an updated building GHG inventory for 2013-2019 and analysis of measurable impacts of each action. The impact assessment will recommend methods to more accurately track the GHG reductions attributable to individual actions going forward. The impact assessment will be published as part of the 5-Year Review process in FY21. Therefore, this report does not contain a summarized quantitative indicators section.

This report is structured to parallel the Net Zero Action Plan, with actions falling into five categories. In addition to detailed information, a summary box such as the one to the right is provided for each action. The green, yellow, or red light indicates the overall status of the action and whether it is on track, making progress but delayed, or behind, respectively. The parking symbol was introduced in FY18 to represent actions that are “parked” because they are completed or not being pursued at this time. They will remain parked in future reports unless

it is determined that they should be reinvestigated. Note that the progress status is based on what was accomplished towards the FY20 action items through fall 2020. The mountain symbol represents key challenges to successful implementation of the action including regulatory, institutional, and resource barriers. The footprints represent next steps for the action.



³ For the full Plan schedule, see Appendix 1 ; City of Cambridge fiscal years run from July 1-June 30

FISCAL YEAR 2020 ACTION PROGRESS UPDATES

Fiscal Year 2020 is the fifth year of Net Zero Action Plan implementation. Initial pilot activities have transitioned to programs and policy designs are ready for implementation. FY20 included actions in four out of five categories: Action 1 – Energy Efficiency in Existing Buildings, Action 2 – Net Zero New Construction, Action 3 – Energy Supply, and Action 5 – Engagement and Capacity Building.

Given the current 5-Year Review Process (see Action 5.2), this report focuses specifically on actions with significant updates since the FY19 Annual Report was published in February 2020. The remaining actions are listed in Appendix 2 and are unchanged from the FY19 Annual Report.

Key Actions Since FY19 Report

- *Action 1.1.1:* Launch a Custom Retrofit Program for BEUDO buildings
- *Action 1.1.2:* Prepare Building Energy Use Disclosure Ordinance amendments to introduce performance requirements for BEUDO buildings
- *Action 1.1.3:* Consider policy recommendations for Upgrades at Time of Renovation or Sale
- *Action 2.1:* Assess the technical and economic feasibility of net zero small residential new construction
- *Action 2.2.2:* Consider a recommended Height and FAR Bonus through zoning for buildings that achieve net zero emissions ahead of the required schedule
- *Action 2.3 & 2.5:* Amend Article 22 of the Zoning Ordinance to increase Green Building Requirements and remove barriers to increased insulation
- *Action 2.4:* Adopt Net Zero requirement for new construction of municipal buildings
- *Action 3.1:* Implement recommendations of the Low Carbon Energy Supply Strategy
- *Action 3.2:* Propose a rooftop solar installation requirement for new buildings
- *Action 5.2:* Conduct a program-wide review of the Net Zero Action Plan to evaluate progress to date and recommend adjustments moving forward

Action 1 – Energy Efficiency in Existing Buildings




The intent of this action is to ensure that all buildings are operating optimally and, where necessary, are retrofitted to maximize efficiency. In FY20, there was continued implementation of the Custom Retrofit Program for multi-family buildings and the launch of a voluntary retrofit program for larger residential and commercial buildings (Action 1.1.1) to complement additional Building Energy Use Disclosure Ordinance requirements (Action 1.1.2). Research was completed to consider policy options for required Upgrades at Time of Renovation or Sale (Action 1.1.3).

Action 1.1.1: Custom Retrofit Program

Introduction

With the Multi-Family Energy Pilot custom retrofit program in place for its third year, FY19 was determined to be an appropriate time to begin the design of an energy retrofit program for other building sectors in Cambridge, one year ahead of the original Net Zero Action Plan schedule. With a focus on those buildings subject to the Building Energy Use Disclosure Ordinance (BEUDO), the expanded custom

retrofit program is intended to provide buildings with a voluntary, cost-effective pathway to help achieve the energy savings and GHG emission reductions that will be required by upcoming BEUDO amendments (see Action 1.1.2). Lessons from the Multi-Family Pilot design and implementation were used as a starting point for an expanded program design, including (1) building trust between building occupants/owners and the utilities/energy efficiency providers by adopting a performance-based approach to building upgrades and payments; (2) easing administration of the assessment and retrofit process by assigning each building owner a single owner's agent to manage all aspects of the process; (3) connecting building owners to accessible financing options, including existing state and utility incentives; (4) integrating renewable energy solutions such as solar PV into the energy efficiency retrofit process to streamline the renovation process; and (5) conducting a targeted marketing process to efficiently identify and enroll prospective building owners.

	Multi-Family Energy Program and Custom Retrofit Program for BEUDO buildings in implementation
	Ongoing program tracking and evaluation
	Custom Retrofit Program tracking and adjustment

FY20 Action Items

Implement a Multi-Family Energy Program based on review of the Pilot. Launch an expanded custom retrofit program for other building types, including those subject to the Building Energy Use Disclosure Ordinance requirements.

Progress Towards FY20 Action Items

The Cambridge **Multifamily Energy Retrofit Program** transitioned from a pilot to a full program in FY20 with the help of a \$50,000 Innovate Energy Efficiency Department of Energy Resources (DOER) grant. The City has partnered with Eversource, New Ecology, Resonant

Energy, and Eversource’s multifamily contractor CLEAResult to offer additional resources to landlords and tenants to help them navigate the process of making their buildings more energy efficient. The program is designed for multifamily buildings with 5-49 units, and building owners and/or tenants can enroll in the program through the Cambridge Energy Alliance or through MassSave (Eversource/CLEAResult).⁴

New Ecology Inc, a green building nonprofit, continues to serve as the Retrofit Advisor. The Retrofit Advisor works with the owners/tenants from the beginning, helping them determine which type of energy assessment and which services will best meet their needs. Once building owners have a better understanding of the retrofit opportunities through an energy assessment, the Retrofit Advisor helps them understand how to identify qualified vendors, compare bids, review project financials, and connect with financing opportunities. The City has hired Resonant Energy as the program’s Solar Advisor to help provide solar assessments and guidance to buildings interested in installing solar. Marketing initiatives for the Program has included online media, street signs, BlueBikes station posters, flyers, and postcards, as well as canvassing through the Cambridge summer high school internship program. **As of September 2020, approximately 64 properties, encompassing 1670 units, have enrolled in the program since its inception.** Nearly all enrolled buildings have taken advantage of the opportunity to get a solar assessment through the pilot, collectively identifying a total of 1.2 MW of solar potential. Projects that the Retrofit Advisor has helped owners pursue include insulation, air sealing, high-efficiency heating and cooling, and investigating conversion to heat pump systems. The uptake of more in-depth measures and solar installation has proven challenging, as the upfront costs, decision-making processes in condominium associations, and limited bandwidth for self-managed buildings can present significant challenges. The COVID-19 pandemic interrupted program implementation, but since July 2020, program enrollment has picked back up.

On October 25, 2019, CDD in partnership with Eversource launched the Cambridge **Building Energy Retrofit Program**,⁵ an expanded custom retrofit program to serve buildings subject to the Building Energy Use Disclosure Ordinance (BEUDO). Based on a stakeholder-centered examination of the needs, barriers, and opportunities for achieving comprehensive energy savings in large buildings in Cambridge, CDD created a custom retrofit program for BEUDO buildings implemented collaboratively by CDD, Eversource, and the building stakeholders.⁶ The centerpiece of the program is a “concierge” service provided by Eversource to connect buildings to customized MassSave resources to help achieve their energy efficiency goals, supported by an energy efficiency “resource hub” website. The program is overseen by a steering committee of large building owners and operators who meet quarterly with CDD and Eversource to review program impacts, suggest adjustments, and assist with outreach to participants. Priorities from the first two steering committee meetings include expanding and creating networks among local stakeholders, creating case studies of comprehensive retrofits in Cambridge, and communicating

⁴ <http://www.cambridgeenergyalliance.org>

⁵ <https://www.cambridgema.gov/Services/buildingretrofitprogram>

⁶ For the full report of program development and implementation plan, see <https://www.cambridgema.gov/CDD/publications/alphabeticaldocumentfolders/B/buedocustomretrofitprogramdesigfinalreport>

about increased incentives offered through MassSave. These priorities are being implemented by way of introductions to local organizations/trade groups by steering committee members, working with Eversource's marketing team and local businesses to feature retrofit projects, and quarterly emails to the BEUDO listserv with program updates. **Since the Program launch, 228 projects attributable to 12,854,649 annual kWh and 587,649 annual therms savings have been completed in BEUDO buildings.** However, these projects did not originate specifically through the Program intake channels and may include some smaller buildings; better methods to distinguish projects in Eversource's database are being investigated.

Next Steps

The Multifamily Energy Retrofit Program is continuing to be offered through FY21 with continued support from the DOER grant that will enable the City to continue expanding the Program's capacity. Goals for the coming year include expanding participation through targeted outreach in collaboration with Eversource and working with interested buildings to implement comprehensive, multi-measure retrofits.

The City continues to collaborate with Eversource and the Steering Committee to increase the impact of the Cambridge Building Energy Retrofit Program. The Program has completed its first year, so priorities moving forward include evaluating the impact of the program to date and working with the Steering Committee to make adjustments as necessary. If building performance amendments to BEUDO are adopted, then additional opportunities to shape the Retrofit Program to support buildings in compliance will be investigated.

Action 1.1.2: Additional BEUDO Requirements

Introduction

The Cambridge Building Energy Use Disclosure Ordinance (BEUDO), enacted in 2014, requires parcels with non-residential buildings totaling 25,000 square feet or greater as well as parcels with residential buildings totaling 50 or more units to annually report and disclose their energy and water use.⁷ BEUDO did not initially include any required actions beyond the annual reporting because the Net Zero Action Plan was in development. This action aims to determine potential requirements to help BEUDO

buildings reduce energy and water consumption. Actions initially contemplated by the Net Zero Action Plan include audits, retro-commissioning, and operations and energy management plans to be completed on a regular basis.

FY20 Action Items

Complete the design of additional BEUDO requirements and amend the ordinance to begin implementation (originally targeted for FY19). Engage BEUDO stakeholders in the requirement design, including consideration of schedule, compliance pathways, and exemptions for participating buildings.

Progress Towards FY20 Action Items

Based on extensive research and stakeholder engagement in FY17-19, in FY20 CDD staff worked towards drafting BEUDO amendment language to codify the building performance standard structure agreed upon with stakeholders. This approach sets an individual baseline annual GHG emissions quantity for each building subject to BEUDO and then commits those buildings to reducing GHG emissions by at least 20% over each subsequent 5 year period until the building achieves net zero emissions. A GHG standard was chosen based on its alignment with the City's overall climate goals and because of the flexibility it gives to buildings for compliance, allowing on-site energy efficiency and renewable energy investments, along with off-site renewable electricity supply, and—potentially—the use of local carbon offsets. Specific compliance pathways are included for laboratories and campuses, along with exemptions for buildings experiencing financial hardship.



Amendment proposal is ready to move forward pending further legal and stakeholder review



Determining policy details and implementation logistics



Finalize proposal

Legislative action: City Council to adopt amendments to BEUDO Ordinance

⁷ 2015 reporting applied to parcels with 50,000 square feet or greater; Disclosure not required in 2015; for more details, see

<http://www.cambridgema.gov/CDD/zoninganddevelopment/sustainablebldgs/buildingenergydisclosureordinance.aspx>; See also the 2015 BEUDO Summary Report:

http://www.cambridgema.gov/CDD/zoninganddevelopment/sustainablebldgs/~/_media/809369A43E674BA485E6C546E1C11D8.ashx; For the full reported data set for 2016, see the Cambridge Open Data Portal:

<https://data.cambridgema.gov/Planning/2016-Cambridge-Building-Energy-and-Water-Use-Data-/72g6-j7aq>

During FY20, CDD staff worked with the Law Department to draft amendment language to incorporate the above principles into the existing ordinance. This process was delayed by the onset of COVID-19. CDD also hired a consultant to complete an updated business plan to inform the administration of the admendment, including data management, enforcement, and stakeholder engagement. This study has been completed in fall 2020 and can be used to inform the final amendment language.

Next Steps

Staff should complete draft amendments to the BEUDO language incorporating recommendations from the business plan along with legal and stakeholder feedback to submit to City Council for consideration.

Legislative Action

The proposed BEUDO amendment framework should be submitted to City Council for consideration in early 2021. Depending on when the amendment is advanced, the first performance compliance period could begin later that year.

Action 1.1.3: Upgrades at Time of Renovation or Sale

Introduction

Building renovations or sales can be valuable opportunities to increase the energy performance of the building in coordination with upgrades that are being undertaken. Typically, any requirements at time of renovation or sale are modest and target poor performers within a building class, though such transaction points may also represent opportunities for deeper energy retrofits. In the analysis of potential policies, careful consideration will be given to ensure that any proposed program or regulation will not result in adverse unintended consequences, such as decreases in housing affordability or further disinvestment in poorly maintained buildings



Time of Renovation or Sale requirement feasibility assessment complete. Potential policy adoption behind schedule.



Assess equity impacts to avoid unintended consequences



Review policy analysis
Legislative Action: If feasible, propose policy recommendations following BEUDO amendments

FY20 Action Items

Based on the feasibility study, determine the feasibility of advancing a time of renovation or sale upgrade policy. Considerations should include an appropriate scope of renovation to regulate, which building types would be included in the requirement, what measures are appropriate to require and over what time period, whether the retrofit would be the responsibility of the buyer or seller when properties are sold, and related equity impacts.

Progress Towards FY20 Action Items

Through the Urban Sustainability Directors Network Zero Cities project, in FY20 CDD continued work with Architecture 2030 and the Rocky Mountain Institute to a) assess current building transaction and renovation activity, b) develop projections for future building transactions and renovations, c) assess potential energy savings and emission reductions from existing buildings to meet potential energy upgrade requirements, and d) assess potential economic impacts of requirements for upgrades at time of renovation or sale. Initial findings showed that nearly all buildings in Cambridge will be sold or renovated multiple times between today and 2050, providing opportunities for energy upgrades, with smaller buildings undergoing more frequent sales and larger buildings more frequent renovations. Building off of these quantitative findings, Resource Media, a communications research organization, conducted stakeholder interviews to more fully understand the roles of building owners, occupants, energy efficiency providers, and financiers in upgrades at time of sale or renovation to inform policy recommendations. The interviews revealed a number of generalized opportunities and barriers for energy retrofits in the stakeholder community, and provided the basis for an equity analysis of potential policy impacts.

Next Steps

Building on the stakeholder findings, a final set of policy scenarios have been analyzed to measure the GHG and cost impacts on potential time of renovation or sale intervention points. These results conclude the feasibility study to inform policy options for further consideration and potential implementation in context of other Net Zero Action Plan measures.

Legislative Action
If requirements at time of renovation or sale are determined to be feasible, policy recommendations could be adopted as new requirements in 2021.

Action 2 – Net Zero New Construction

While newly constructed buildings contribute a small portion of Cambridge’s total GHG emissions, targeting net zero for new buildings is a bold step that will stimulate investments in net zero innovation that can benefit both new and existing buildings. The process and governance framework for new requirements is to ensure that meaningful financial analysis can take place and industry capacity is commensurate with the requirements. It is important to note that the recommended net zero target years will be evaluated at regular intervals and regulatory changes will be developed at least 24 months prior to final enactment.

Table 1 - Targets for net zero new construction by sector




Type:	Municipal	Residential	Multi-Family	Commercial	Institutional	Labs
Target Year:	2020	2022	2025	2025	2025	2030

The following set of actions are designed to support and incentivize achievement of net zero GHG emissions performance in newly constructed buildings in Cambridge.

Action 2.1: Net Zero New Construction

Introduction

The Net Zero Action Plan laid out a preliminary set of target dates for net zero new construction by building sector, beginning with municipal buildings in 2020, small residential (1-3 units) in 2022, multifamily, commercial, and institutional in 2025, and laboratories in 2030. The City committed to consult with industry and other key stakeholders at least two years in advance of each sector’s net zero requirement to assess the current technical and economic feasibility of achieving net zero emissions in that sector.

	Technical and economic feasibility study for net zero small residential buildings (1-3 units) completed
	Regulatory pathway needs to be determined
	Use feasibility study as basis for policy proposal Legislative Action: Adopt net zero small residential requirements by 2022

FY20 Action Items

Conduct a technical and economic feasibility assessment of net zero new construction requirements for new small residential (1-3 unit) buildings in consultation with stakeholders. The assessment should consider:

- The number of existing net zero buildings of that building type in Cambridge and Northeast
- Technical feasibility/industry capacity
- Access to renewable energy supply on-site or in the region
- Economics including a ‘net present value’ analysis
- Contribution to other goals such as resiliency

Progress Towards FY20 Action Items

In early 2020 CDD contracted with DNV-GL to complete the technical and economic feasibility assessment, assisted by Zero Energy Design and Mondre Energy and informed by a group of stakeholders with experience constructing small residential buildings in Cambridge including architects, contractors, inspectors, and affordable housing representatives. Over the course of the project, the team worked to:⁸

1. Identify criteria for small residential net zero new construction pathways
2. Evaluate the technical feasibility and industry capacity to build net zero emissions small residential buildings
3. Conduct an economic feasibility analysis of net zero small residential construction
4. Evaluate the resilience and equity implications of net zero small residential construction

The draft study concluded that there are multiple pathways to achieving net zero emissions in small residential new construction including high energy efficiency, use of no fossil fuels, and reliance on a combination of on-site and off-site renewable electricity supply. There is strong evidence of technical feasibility and industry capacity to build such buildings based on direct stakeholder feedback and survey data, and such buildings can be constructed for little additional upfront cost and net present value savings when considering operational expenses. There are also potential resilience benefits and increased equity in cases when vulnerable populations gain access to net zero housing.

Next Steps

The technical and economic feasibility assessment is currently being finalized with updated assumptions. Following its completion, the City and Net Zero Task Force will need to determine whether to move forward with the 2022 target date for small residential new construction and define the implementing policy accordingly. Legal review of the policy framework will be important to determine the appropriate implementation pathway.

Legislative Action

Based on the policy framework stemming from the strong feasibility assessment and following legal review of potential implementation pathways, the City Council could adopt small residential new construction requirements by 2022.

⁸ The full report will be provided to the Net Zero 5-Year Review Taskforce

Action 2.2.2: Height and FAR Bonus

Introduction

To generate early action, the City should explore the potential impact of offering additional floor area allowance (FAR) and extra height to projects that achieve net zero emissions. Projects will need to demonstrate and commit to net zero emissions through their design in order to meet eligibility requirements for additional FAR award.

Projects should also have to agree to share lessons on how net zero was achieved in their projects. FAR incentives have proven effective in other dense jurisdictions where building space is at a premium. For example, in Arlington County, Virginia, nearly all new “site plan” (similar to Cambridge Special Permit) projects have voluntarily pursued LEED certification since additional FAR was offered as an incentive beginning in 2008.⁹ However, density bonuses are limited in nature and run the risk of being over-utilized by competing program priorities so much be deployed strategically.



Determined not to be desirable as standalone policy



Competing priorities for density and proximity of NZ requirements



Seek net zero principles through Urban Design and additional Green Building Requirements

FY20 Action Items

Complete policy design for a density bonus for new buildings which achieve net zero emissions ahead of the required schedule. Adopt the policy through zoning and begin program implementation.

Progress Towards FY20 Action Items

While previous work provided a technical framework for criteria to determine building eligibility for a net zero density bonus, in FY20 it was decided not to continue pursuit of this policy approach. City Council expresses concern about granting additional density to new construction projects, and given that net zero emissions new construction standards are due to take effect within a few years, CDD staff concluded that a short-term density bonus was not worth the legislative effort to pursue.

Next Steps

The goal of the height and FAR bonus action was to incentivize earlier construction of net zero buildings in Cambridge. In the absence of such a policy, it is important to utilize other policy channels such as the Article 22 Green Building Review (Action 2.3) and the Article 19 Urban Design Guidelines to encourage new building projects to consider pathways to achieving net zero emissions. Buildings that do make progress towards net zero should be used as case studies to inform subsequent developments and lower knowledge barriers. The net zero new construction requirements (Action 2.1) will be necessary to ensure that all new buildings ultimately achieve net zero emissions.

⁹ <https://environment.arlingtonva.us/energy/green-building/green-building-bonus-density-program/>

Action 2.3: Increase Green Building Requirements in Cambridge Zoning Ordinance

Introduction

Article 22 of the Cambridge Zoning Ordinance, *Sustainable Design and Development*, promotes environmentally sustainable and energy-efficient design and development practices in new construction and renovation of buildings in the city.¹⁰

Article 22 currently requires that new buildings 25,000-50,000GFA (gross floor area) meet the requirements of the




Leadership in Energy and Environmental Design (LEED) Green Building Rating System at the level ‘Certified’ or better, and that new buildings 50,000GFA or greater meet the requirements of LEED ‘Silver’ or better. Increasing the Green Building Requirements in the Cambridge Zoning Ordinance was identified by the Net Zero Task Force as a measure with significant potential impact on future GHG emissions.

FY20 Action Items

Review Stage 1 green building requirements and consider Stage 2 updates that could achieve the equivalent of 46% energy improvement above ASHRAE 90.1-2007. The updated policy should be framed in terms of current building performance standards.

Progress Towards FY20 Action Items

On December 9, 2019, the City Council adopted amendments¹¹ to Article 22 which require eligible projects to achieve the equivalent of LEED Gold certification (Leed Silver for buildings 25,000-50,000sf) or to utilize Passive House or Enterprise Green Communities as optional standards, and to improve the efficiency and quality of the Green Building Review process,¹² including mechanisms to give input earlier in the design process and options for cost-effective third-party review of energy models. New buildings are also being asked to present a “Net Zero Narrative” decarbonization pathway plan along with their application, which acknowledges that while the buildings may not achieve net zero emissions today, developers should plan for a technically achievable pathway to do so within the life of the building. CDD developed a template Net Zero Narrative,¹³ and the revised requirements are currently being followed by new developments.

	Previously delayed requirements were adopted by City Council 12/9/2019
	Delay in Stage 1 amendments likely to delay Stage 2 due FY21
	Begin study of next round of green building requirements

¹⁰ See <http://www.cambridgema.gov/CDD/zoninganddevelopment/Zoning/Ordinance> for the full Zoning Ordinance

¹¹

https://library.municode.com/ma/cambridge/codes/zoning_ordinance?nodeId=ZONING_ORDINANCE_ART22.000S_UEDE

¹² <https://www.cambridgema.gov/CDD/zoninganddevelopment/sustainablebldgs/article22greenbldgrequirements>

¹³ <https://www.cambridgema.gov/->

/media/Files/CDD/ZoningDevel/GreenBuildings/greenbuildings2020update/netzeronarrativetemplate_pilot.pdf

In FY20, 5 projects were permitted following Green Building Review.¹⁴ All five are certifiable at the level of LEED Gold. Four are solar-ready and one will install solar panels. In aggregate, the projects represent over 700,000 square feet of development, all of which is non-residential.

Next Steps

In anticipation of the next round of green building requirements due in FY21, staff are researching options for performance-based building requirements that would increase the current green building standards without conflicting with the state building code. However, it is unlikely that such requirements will be ready for legislation in FY21. The City of Boston is currently pursuing a “Net Zero Carbon Building” zoning initiative which may provide a precedent for Cambridge to consider.¹⁵ Staff are also engaging in activity at the state level that could provide alternative pathways, such as a voluntary net zero stretch code. In May 2019, the City Manager of Cambridge along with the Mayors of Boston and Somerville submitted a letter to the state Board of Building Regulations and Standards in support of development of a net zero stretch energy code,¹⁶ and staff have continued to participate in the stretch code development process.

¹⁴ For more information, see the Green Building Dashboard:

<https://app.powerbi.com/view?r=eyJrIjoizTk0OWZmYTctZDljNy00N2MxLTg0OWUtYTEyYzZiZWY1YTNkliwidCI6ImMwNmE4YmU3LTg0NzktNGQ3My1iMzUxLTkzYmM5YmE4Mjk1YyIsImMiOiN9>

¹⁵ See <http://www.bostonplans.org/planning/planning-initiatives/zero-net-carbon-building-zoning-initiative>

¹⁶ <http://cambridgeenergyalliance.org/wp-content/uploads/Tri-city-letter-on-stretch-code-5-28-19.pdf>

Action 2.4.1: Net Zero Requirement for New Construction of Municipal Buildings

Introduction

To demonstrate leadership it is important that the City establish policies to pursue net zero emissions in municipal buildings.

Specifically, new construction should target net zero or be ‘net zero ready’ in the near term.

Net zero ready buildings are designed to achieve maximum energy savings (e.g. >80% more efficient than

code requirement) and accommodate 100% of annual energy consumption by on or off-site renewable sources through zero on-site combustion, recognizing that constraints such as site area or location may preclude access to sufficient onsite renewable energy to meet 100% of energy demand.¹⁷ This policy would also be applicable to “gut renovations” where a building is being completely renovated with new electrical, mechanical, interior, and envelope systems.



New municipal buildings being constructed to achieve net zero-ready and designed for net zero emissions



Detailing aspects of net zero definitions



Complete definitions for net zero standard

FY20 Action Items

Review the impacts of the net zero ready standard and implement a net zero emissions standard for municipal buildings constructed beginning in 2020.

Progress Towards FY20 Action Items

The Net Zero Action Plan adopted by City Council in 2015 serves as the policy guiding new municipal building construction. Staff have defined net zero-ready construction as highly efficient buildings that are fossil fuel-free to enable the consumption of renewable electricity. Municipal new construction projects completed in FY20 are “net zero ready”: the King Open School was completed in fall 2019 and is fossil fuel free, and the Taylor Square Firehouse is being renovated to rely on heat pumps for HVAC and with solar PV. New construction permitted beginning in 2020 will be designed to achieve net zero emissions, with high efficiency, no on-site fossil fuel combustion, and on and off-site renewable electricity supply. The Tobin Montessori and Vassal Lane Upper School reconstruction project will meet these standards. Staff have continued to meet regularly to define detailed criteria for the net zero emissions standard.

Next Steps

Staff should complete the detailed definition of the net zero emissions standard for new municipal buildings including criteria for energy efficiency and renewable energy, incorporating findings from the small residential net zero feasibility assessment (Action 2.1) and off-site renewable electricity criteria (Action 3.1).

¹⁷ As defined on page 16 of the Net Zero Action Plan Summary of Proposed Actions:




[http://www.cambridgema.gov/CDD/Projects/Climate/~media/BF531928BB7D4526AE2D8538E025E0BA.ashx](http://www.cambridgema.gov/CDD/Projects/Climate/~/media/BF531928BB7D4526AE2D8538E025E0BA.ashx)

Action 2.5: Removal of Barriers to Increased Insulation

Introduction

One strategy to improve building efficiency is to increase the amount of insulation on the exterior of buildings. Because the addition of insulation effectively increases the footprint of a building and may incur into side yard set-back requirements, the Zoning Ordinance can introduce regulatory barriers to this retrofit. Currently, Article 22 of the Zoning Ordinance allows Yard Exceptions for existing buildings to install exterior insulation as long as it does not

increase the thickness of the exterior wall by more than 4 inches or result in the wall being less than 7 feet, 2 inches from the nearest property line.¹⁸ This action calls for development of an approach to remove barriers in the Zoning Ordinance to enable the addition of exterior insulation with the purpose of improving the energy efficiency of residential buildings.

	Previously delayed requirements were adopted on 12/9/2019
	
	Ongoing monitoring of policy impact and adjustments as needed

FY20 Action Items

Review policy to remove barriers to increased exterior insulation during residential building renovations and recommend policy adjustments as needed.

Progress Towards FY20 Action Items

On December 9, 2019, the City Council adopted amendments to Article 22 of the Zoning Ordinance to allow for increased flexibility in the installation of exterior insulation: insulation can add up to 8” of thickness to the exterior wall (vs. 4”) as long as the original wall is at least 3’ away from the property line (vs. 7’2”). Exceptions may be granted by Special permit (vs. zoning variance).

Next Steps

The impacts of this zoning amendment should be tracked as feasible, and the Net Zero 5-Year Review Task Force should determine an appropriate interval after which the policy should be reviewed and adjusted as needed.

¹⁸ Article 22.43.2: Yard Exceptions for Added Exterior Insulation

Action 3 – Energy Supply

While maximizing building efficiency is the first priority of the Net Zero Action Plan and will lead to the most GHG savings, to achieve net zero and improve community resiliency will also require a significant shift in the supply of the remaining energy needs of Cambridge buildings away from fossil fuel-based sources and toward low- or zero-carbon sources. This will include realizing a significant portion of the city’s solar potential (both PV and thermal), taking advantage of all opportunities to harvest waste heat, and expanding and developing additional district energy capacity. As part of a regional grid served by a regional utility, it is also important for Cambridge to engage with this utility in order to secure its cooperation and support to help Cambridge achieve its Net Zero goals.




Action 3.1: Low Carbon Energy Supply Strategy

Introduction

The Low Carbon Energy Supply Strategy enables the City to understand the opportunities and pathways to achieve a transformation of its energy supply system.

Key conclusions of the Low Carbon Energy Supply Strategy study include:¹⁹

- Limited renewable energy supply resources within Cambridge requires the import of clean energy resources from outside the city
- Electrification of buildings with grid-supplied renewable electricity is a key means of enabling this transfer of clean energy
- Use of district energy systems in high energy demand areas increases system efficiency, resilience, and flexibility of energy sources, while lowering implementation expenses
- Regional collaboration is essential to achieve the clean energy supply transition

	Implementation of multiple study recommendations in progress
	Transition away from fossil fuel energy supply system
	Complete and implement recommendations of Resilient and Renewable Thermal Analysis

FY20 Action Items

Continue implementation of Low Carbon Energy Supply Strategy study recommendations.

Progress Towards FY20 Action Items

In FY20, staff have taken a number of actions to advance the key findings listed above:

¹⁹ See the full report at www.cambridgema.gov/low-carbon

- *Renewable electricity supply*

A prerequisite to increasing the renewable electricity supply brought into Cambridge from outside sources is to define a set of criteria for these electricity sources.

“Renewable” electricity is available through many different pathways with varying levels of impact on new renewable sources added to the grid and corresponding GHG emission reductions. In FY20, CDD completed a process working with a consultant and stakeholders to lay out a set of considerations and establish potential criteria for off-site renewable electricity. The process included a literature review of existing guidance, targeted stakeholder interviews, and two stakeholder working group meetings. The resulting potential criteria are listed below and could guide what off-site RE is used for compliance with a range of net zero policies, including a 100% RE supply strategy for municipal buildings currently under development:

- a. The off-site renewable energy procurement has an impact on the renewable energy market: renewable energy projects are new.
- b. Projects that are located where the energy can be delivered to the building site by ISO New England are favored.
- c. The building owner shall maintain transparent accounting that clearly assigns renewable energy production in the form of RECs in MWh to the building or aggregated portfolio of buildings in Cambridge.
- d. The renewable energy generating source shall be photovoltaic systems, solar thermal power plants, wind turbines, geothermal power plants, hydropower, or other renewable energy generating sources that may be submitted for review.

- *Building electrification*

In FY20, CDD continued the Resilient and Renewable Thermal Analysis to develop a roadmap for resilient and equitable electrification of the Cambridge building stock. The analysis includes identification of typical building typologies and the technical and economic pathways to electrifying these buildings; assessment of the resilience and equitability implications of these pathways; and development of program strategy and policy recommendations. The Analysis has been advised by a steering committee of building owners and experts in the field, and will inform priority policies and programs to achieve a transition to renewable building thermal systems.

- *District energy*

In FY20, CDD worked with a district energy development consultant to study the building development process and identify opportunities within that process to encourage the selection of district energy supply. Using the Boston Smart Utilities²⁰ policy as a precedent, the consultant produced a sample district energy feasibility assessment template that the City could consider integrating into its development review process.

²⁰ <http://www.bostonplans.org/planning/planning-initiatives/boston-smart-utilities-project>

Next Steps

In FY21, staff will take the results of the three studies listed above and consider how to advance their goals through new policies and programs. Given the wide range of activities under the umbrella of the Low Carbon Energy Supply Strategy, the 5-Year Review process should consider whether a new set of discrete actions and timelines should be integrated into the Net Zero Action Plan to most effectively achieve the goals of the LCESS.

Action 3.2: Rooftop Solar Ready Requirement

Introduction

The Rooftop Solar Requirement is intended to help meet the Net Zero goal by encouraging additional onsite renewable energy generation, with a focus on solar. The Action should begin with the exploration of a requirement that all roofs on new construction projects must be solar ready. “Solar ready” means that buildings are designed to accommodate the future installation of roof-mounted solar panels including either photovoltaic or solar thermal. In the future, the City will consider options to require onsite solar installations for new buildings and major roof replacements.



Solar installation requirement technical analysis completed but policy adoption behind



Ensure no equity issues



Develop policy proposals for City Council consideration
Legislative Action: Pursue recommended solar installation requirements in 2020

FY20 Action Items

Implement a potential Version One of an on-site solar installation requirement

Progress Towards FY20 Action Items

In FY20, CDD worked with consultants as an extension of the Zero Cities project to complete an analysis of technical options for a solar installation requirement. The analysis included review of policy precedents in other jurisdictions and building code proposals, solar cost data review, and a comparison of the installation impact of three sample policy pathways. Based on the analysis and stakeholder feedback, the amount of solar required to be installed could be based on meeting a certain percentage of projected building energy demand or utilizing a certain percentage of the roof area, depending on building type, and should include both on-site and off-site compliance pathways. CDD also completed an internal assessment of potential equity considerations of a solar installation requirement for residential buildings.

Next Steps

Staff should complete potential policy proposals based on the technical analysis to be refined with further stakeholder and legal input and then brought to City Council for consideration in 2021. Consideration should be given to how solar requirements could interact with other potential beneficial use of roof space, such as vegetated and cool roofs.

Legislative Action

The technical study, stakeholder feedback, and legal analysis will lead to a recommended solar installation requirement policy which can be considered and advanced by City Council in early 2021.

Action 5 – Engagement and Capacity Building

The strength of the Net Zero Action Plan is built on the comprehensive stakeholder engagement which led to its formation. Therefore, continued engagement of stakeholders throughout Cambridge and related interest groups is crucial to the successful implementation of the plan. The Task Force recommended that the City continue to invest staff time and resources into identifying tools, innovative ideas, training opportunities, grants and other resources to support residents and commercial property owners in working toward the aggressive goals of the Plan.

Action 5.2: Develop Ongoing Capacity to Manage Getting to Net Zero Project

Introduction

While the Cambridge Net Zero Action Plan was completed by the Getting to Net Zero Task Force in early 2015, in the years that follow the initiative will be led by the City of Cambridge along with partners and community stakeholders. As such, it is essential that the initiative be resourced accordingly so that its objectives will continue to be met.




FY20 Action Items

Continue monitoring roles and responsibilities for implementing the Cambridge Net Zero initiative over the long term. This includes assigning project leads for each of the actions, identifying research and implementation partners, and maintaining a reporting structure and a governance structure to ensure that the project remains on track and consistent. Complete the Net Zero Action Plan 5-Year comprehensive review.

Progress Towards FY20 Action Items

In FY20, the Cambridge Climate Protection Action Committee (CPAC) continued to serve as the governing body responsible for ongoing oversight of the Plan. Staff provide NZAP updates at monthly CPAC meetings. CPAC also received and reviewed the FY19 annual report outlining progress towards actions for the previous year and results of these actions on clean energy measures and GHG emissions in Cambridge.

As laid out in the Plan, Program Wide Reviews are scheduled for every five years to involve a wide range of stakeholders in a comprehensive review of progress of the Plan and necessary adjustments moving forward based on changes in science, technology, policy, and other influential factors. The first of these reviews began in FY20 with CPAC consultation. An evaluation of the Net Zero Action Plan impact from 2015-2019 was completed including an assessment of potential data sources from which to measure impacts. These data sources were limited, and high-level assessment of GHG emissions from buildings in Cambridge showed a relatively flat trend during the evaluation period. An updated Net Zero Review Task Force was selected building off of the original Net Zero Task Force with an emphasis on broader

	Program Wide Review delayed due to COVID-19
	Ensure continued coordination among partner institutions
	Complete the Program Wide Review and implement recommendations

community representation and integration of equity into the Net Zero Action Plan. However, the COVID-19 pandemic prevented the Task Force from convening in FY20.

Next Steps

The Net Zero Review Task Force was approved in September 2020 and will begin a series of six meetings to inform the Net Zero Action Plan Review beginning in November 2020 and continuing through April 2021. The Review process will result in a comprehensive set of recommended adjustments to the Net Zero Action Plan, with an emphasis on opportunities to incorporate equity into the Plan.

APPENDIX 2: ACTIONS CARRIED OVER FROM FY19 REPORT

Given the current 5-Year Review Process (see Action 5.2), this report focused specifically on actions with significant updates since the FY19 Annual Report was published in February 2020. The remaining actions are listed here and are unchanged from the FY19 Annual Report.

Action 1.1.4: Operations and Maintenance Plan Requirement

Introduction

This action recommends that the City require, as a condition of building occupancy, that applicants submit energy management plans detailing how the building will be operated to meet the intent of the energy efficient design. While the requirement would apply to new construction, its objective is to ensure future existing buildings are operated to their maximum potential.

Since operations and maintenance planning is captured through Green Building Requirements, there is no need for further action.

FY20 Action Items

No further action at present

Progress Towards FY20 Action Items

No further action at present

Next Steps

No further action at present



BEUDO process included the creation of O&M plan template
O&M plans are implemented on a case-by-case basis after occupancy



O&M planning is captured through Green Building Requirements; no need for further action

Action 2.2.1: Market Based Incentive Program

Introduction

In order to achieve net zero buildings in advance of the proposed requirements, Cambridge should explore the use of financial mechanisms to motivate the market and accelerate innovation. MIT and Harvard have agreed to collaborate with the City on this investigation in order to determine the most effective incentives for the Cambridge context. These could include tools such as green building bonds, “green banks”, and adjusting pricing of permit fees (or rebates) based on performance.



Completed feasibility study of market incentives for new buildings



Policy constraints of revenue neutrality and no additional penalties



Prioritize height and FAR bonus for new buildings and consider market mechanisms for existing buildings

FY20 Action Items

No further action at present

Progress Towards FY20 Action Items

No further action at present

Next Steps

No further action at present

Action 2.4.2: Renewal of Municipal Buildings

Introduction

Cambridge also seeks to set an example by showing leadership in the energy efficient renewal of existing municipal buildings. The Task Force recommends introducing greenhouse gas reductions as a key component throughout the municipal facilities improvement strategy and integrating it with other priorities, such as life safety, and accessibility.



Continued implementation of Municipal Facilities Improvement Plan



Resource limits to achieve multiple institutional goals



Continue implementation and tracking of results

FY19 Action Items

Continue design and begin implementation of a phased municipal building improvement strategy where (1) greenhouse gas reduction is a priority when constructing facility improvement projects and (2) operational improvements are implemented to achieve targets established and tracked by the Cambridge Department of Public Works. The strategy will involve continuous self-evaluation requiring increased performance levels as technology and local capacity is improved.

Progress Towards FY19 Action Items

In FY17, the initial Municipal Facilities Improvement Plan (MFIP) was completed to (1) assist the City in developing performance metrics and goals for its building portfolio in key facility disciplines; (2) perform and document a needs and condition assessment of 41 municipal facilities; (3) develop and document a phased Capital Improvement Plan of identified facilities; and (4) develop a GHG emissions reduction plan for municipal facilities. The City has committed \$5 million per year for 5 years to implement the plan recommendations.

Implementation of improvements to municipal buildings is in progress: **12 energy efficiency were upgrades completed in FY19 and another 13 projects are underway. These include installation of HVAC upgrades, LED lighting retrofits, and buildings controls and retrocommissioning resulting in annual savings of over 1,400 MWh, 34,000 therms, and \$268,000 in energy costs to the City.**




Next Steps

Implementation of MFIP improvements will continue throughout FY20. The nature and impact of these renovations on energy use will be tracked and reported.

Action 3.3: Develop a Memorandum of Understanding with Local Utilities

Introduction

Cities can collaborate with utilities on projects of mutual interest to result in energy use and emissions reductions. City-utility data sharing is particularly essential to understanding where and how energy is used in the city and what opportunities exist to decrease and green this energy use. The declaration and definition of this collaboration can impact its effectiveness, so a formal agreement on how the City of Cambridge, Eversource and Veolia can work together on the following areas is recommended:

	Pursue project-specific collaboration in place of overarching MOU
	Privacy concerns around data sharing
	Leverage Energy Allies collaboration with utilities

- Investigating and piloting smart grid projects
- Investing in incentive programs
- Data sharing
- Investigation, development and expansion of district energy systems
- Interconnection issues that limit deployment of solar PV and co-generation
- Using solar PV to strategically address distribution congestion
- Work to increase resiliency of the electric, gas, and steam systems

FY20 Action Items

No further action at present.

Progress Towards FY20 Action Items

No further action at present.

Next Steps

No further action at present.

Action 4: Investigate Local Carbon Fund

Introduction

A Local Carbon Fund would serve as a vehicle that is easy to use as an alternative method to achieve net zero emissions over the short and medium term. The preliminary analysis should explore issues such as the development of a methodology for determining validity of offset projects. The offsets need not be “gold level” certified, but the accreditation methodology should be robust. In contrast to traditional offset frameworks, which typically are limited to supporting large-scale projects, a local carbon fund should be structured such that it can support a range of Cambridge-based emission reduction projects regardless of the scale of the project.



Virtual pilot complete but behind implementation schedule



Resource needs and institutional structure to establish Local Carbon Fund; utilization uncertainty



Use virtual pilot results to inform Local Carbon Fund design and begin establishment

FY19 Action Items

Build off of the Local Carbon Fund feasibility assessment with a virtual pilot to test out policy components and demand for carbon offsets. Prepare for potential FY20 implementation.

Progress Towards FY19 Action Items

Building off of the Local Carbon Fund feasibility assessment completed in FY18, in FY19 staff worked with consultants from the Cadmus Group to run a “virtual pilot” of the Local Carbon Fund concept with Cambridge building stakeholders. The virtual pilot entailed constructing a basic building energy/cost model in Excel to model potential pathways to achieve net zero emissions in Cambridge buildings. The model selected the combined use of energy efficiency, renewable energy, and carbon offsets that would minimize upfront and operational costs for building owners. Stakeholders provided feedback on the model construction and data from actual building projects to help test out the model and its conclusions in a hypothetical setting.

The goal of the model was to further investigate the utility of a Local Carbon Fund while gathering data to answer key questions about offset cost, purchase timing, and differentiation of separate offset types. While modeling and data limitations precluded detailed conclusions for all of these questions, it remains clear based on the results and stakeholder feedback that a local carbon offset option can be an important pathway for net zero emissions standard compliance.

Next Steps




Based on the conclusions of the virtual pilot, in FY20 the City and stakeholders should continue to determine options for Local Carbon Fund establishment and implementation. The Fund could also serve as a pathway for achieving compliance with proposed BEUDO performance requirement compliance beginning in 2021 (see Action 1.1.2) and small residential net zero emissions compliance beginning in 2022 (see Action 2.1).

Action 5.1: Communication Strategy

Introduction

To maintain a high level of stakeholder engagement around the Net Zero Action Plan, the City should develop a comprehensive long-term communications strategy around the Cambridge Net Zero objective. The strategy will ensure that key stakeholders including City officials, the building industry, and Cambridge residents remain aware of the progress

toward net zero and engaged with the initiative as needed or desired. The strategy will also enable the Net Zero Action Plan to serve as a touchpoint for broader energy and climate education in Cambridge, encouraging residents to take personal responsibility for helping Cambridge to meet its ambitious climate change mitigation and adaptation goals.

	Implementation of multi-faceted communication strategy ongoing
	Broaden community awareness of Net Zero Action Plan
	Action-specific and integrated stakeholder engagement activity

FY19 Action Items

Continue implementation of a comprehensive communications strategy around the Net Zero Action Plan objectives and components. Integrate stakeholder engagement and public communications into each Action as appropriate.

Progress Towards FY19 Action Items

Regular communication and outreach around the Net Zero Action Plan continued in FY19. Ongoing interest in net zero planning among communities across the greater Boston region led to multiple requests for presentations and consultation to support planning processes. Particular promising are collaborative efforts to enable net zero-related initiatives as the regional and state level, such as by advocating for a net zero state stretch energy code.²¹

²¹ See joint comment letter at <http://cambridgeenergyalliance.org/wp-content/uploads/Tri-city-letter-on-stretch-code-5-28-19.pdf>

The Net Zero Newsletter was sent to over 800 stakeholders and community members in July, 2019.²²

Extensive stakeholder engagement was undertaken to support the development of the BEUDO performance requirements (Action 1.1.2) and Custom Retrofit Program (Action 1.1.1). Staff have been collaborating with the CDD Communications Director and Eversource marketing team to prepare for the public launch of the Program, which will include press engagement, targeted stakeholder communications, and a launch event hosted by a stakeholder institution. The program will be supported by a new “resource hub” website to help BEUDO building owners and operators understand the resources and opportunities to help them lower energy use and GHG emissions.




Next Steps

In FY20, staff will continue to implement outreach and communication for the Net Zero Action Plan. Action-specific stakeholder engagement will continue, as well as additional efforts to help stakeholders understand and provide feedback on overlap between the multiple net zero actions moving forward in parallel.

Action 5.3: Net Zero Lab Standards

Introduction

Commercial and academic laboratories are responsible for approximately one third of the current energy demand in Cambridge. Given this large impact, the challenges for laboratories to significantly reduce their energy use while meeting operational, health, and regulatory standards, and the lack of net zero lab examples, the Net Zero Action Plan includes a stakeholder-based process to research and develop new standards for lab operations that support lower energy use.

	In progress through Compact for a Sustainable Future workplan
	Diversity of laboratory uses and energy needs
	Derive conclusions and recommendations from additional benchmarking

FY19 Action Items

Continue work by a coalition of industry stakeholders, research institutions and industrial hygienists to collaborate on new standards for reducing energy use that can be trialed without compromising safety or research integrity. Develop initial standards to be piloted in future years.

²² See

https://www.cambridgema.gov/CDD/Projects/Climate/~/_media/DD19C76DAC6A42A58DB3C692212FDDDD.ashx

Progress Towards FY19 Action Items

The Cambridge Compact for a Sustainable Future²³ continued a productive working group to consider the feasibility of potential standards for reducing energy use in Cambridge laboratories, with support from City staff. The working group met regularly to discuss a variety of related topics and began a second data-collection exercise to more fully benchmark and derive conclusions from current laboratory energy use patterns.

Following the Additional BEUDO Requirement stakeholder workshops in summer 2018 (Action 1.1.2), it was determined that separate requirements should be established for laboratories given their unique operational constraints. Over the course of fall 2018, the laboratory working group collaborated to generate feedback regarding a compliance track for labs including laboratory definitions, tenant engagement, performance requirements, and monitoring and compliance.

Next Steps

In FY20, the laboratory working group will complete a second round of energy benchmarking study that will create a richer dataset to inform future performance standards and pilot program opportunities.

²³ <https://cambridgecompact.org/>