

City of Cambridge
Getting to Net Zero Action Plan
Fiscal Year 2016 Progress Report

May 5th, 2017





City of Cambridge
CLIMATE PROTECTION ACTION COMMITTEE

May 4, 2017

Louis A. DePasquale, City Manager
795 Massachusetts Avenue, 1st Floor
Cambridge, MA 02139

RE: CPAC's Assessment of the Fiscal Year 2016 Progress Report for the City of Cambridge
Getting to Net Zero Action Plan (February 21, 2017)

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 reporting on its progress on an annual basis. This letter serves as the first annual progress assessment, which includes themes and recommendations for the Plan and the Cambridge Community Development Department (CDD) which is managing the Plan.

CPAC appreciates the significant achievements that have been made in the first year of the Plan's implementation, including completing a Low Carbon Energy Supply Study and progress towards a Rooftop Ready Solar Requirement (ordinance).

However, the progress of the action items outlined below risk falling behind the Plan's implementation objectives:

1. Action 2.2.1: Market Based Incentive Program: For this collaboration with Harvard and MIT to be successful, CPAC recommends that CDD staff identify and notify specific staff, professors, and/or departments at the Universities regarding the City's desire to work with them on developing this program.
2. Action 2.3: Increase Green Building Requirements in Cambridge Zoning Ordinance: This action is being largely achieved by the fact that the state increased the stretch energy code in 2016, which the city had previously adopted. Future updates would likely infringe on the state building energy codes, as the Plan requires more stringent requirements. To avoid this potential conflict, CPAC supports current efforts by CDD to develop a performance based standard.
3. Action 2.5: Removal of Barriers to Increased Insulation: CPAC recommends that CDD staff fast track engagement with the Planning Board and Inspection Services Division to

work towards achieving the goal of “exploring with advice” from those entities, as this is an internal-to-the-City action item.

In addition, it is CPAC’s understanding that the Mass Save Program anticipates challenges that may fundamentally change the structure of in-home delivery of energy efficiency programs. This may affect the multifamily energy efficiency pilot with Eversource and MIT. CPAC recommends that these potential changes be tracked closely by CDD and reported regularly to CPAC for further evaluation.

Very truly yours,

A handwritten signature in blue ink that reads "Lauren Miller". The signature is fluid and cursive, with the first name "Lauren" being more prominent than the last name "Miller".

Lauren Miller
Chair

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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. Recently 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

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




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>

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 first 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 first citywide GHG Community Inventory is due to be completed in early 2017 and should serve as a baseline indicator for the Net Zero Action Plan. Because GHG emissions are measured at the community scale in Cambridge, however, attributing changes in GHG emissions to individual Net Zero actions will likely be challenging. Therefore, annual building performance measured by the Building Energy Use Disclosure ordinance and individual action outputs and their alignment with the assumptions of the Net Zero GHG Model⁴ will serve as an indicator of the direction and magnitude of potential GHG reductions that can be attributed to the Plan. Because this year's report is being completed concurrently with the first Community Inventory and many of the actions are planning and enabling steps, the focus of the report is on the qualitative progress towards annual goals.

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. Note that the progress status is based on what was accomplished towards the FY16 action items up to the writing of this report in December 2016. 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.

	Action status (on track, in progress, or behind)
	Action barriers (regulatory, institutional, resources)
	Next steps

Following discussion of qualitative progress towards each of the actions is a section summarizing initial quantitative indicators which can serve as baselines for future progress towards achieving GHG emissions reductions through the Net Zero Action Plan.

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

⁴ http://www.cambridgema.gov/CDD/Projects/Climate/~/_media/89814C94911A49388ECDBAAEAE7366A6.ashx

FISCAL YEAR 2016 ACTION PROGRESS UPDATES

Fiscal Year 2016 is the first year of Net Zero Action Plan implementation. Most of the actions therefore focus on studying the feasibility and design of action categories. FY16 included actions in four of the 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.

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 FY16, the emphasis was placed on designing a custom retrofit program for residential buildings.

Action 1.1.1: Custom Retrofit Program

Introduction

Because Cambridge’s housing stock is dominated by multi-family buildings, which make up over 90% of residential units, the City has focused on strengthening utility retrofit programs for multi-family buildings. Beginning in 2013, the Cambridge Energy Alliance partnered with MIT’s Department of Urban Studies and Planning and NSTAR

(now Eversource) to design a pilot program to overcome barriers to achieving energy efficiency in medium size (5-50 unit) multi-family buildings. Key conclusions of the resulting study⁵ to inform the pilot program are to (1) build trust between building occupants/owners and the utilities/energy efficiency providers by adopting a performance-based approach to building upgrades and payments; (2) ease 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) connect building owners to accessible financing options, including existing state and utility incentives; (4) integrate renewable energy solutions such as solar PV into the energy efficiency retrofit process to streamline the renovation process; and (5) conduct a targeted marketing process to efficiently identify and enroll prospective building owners, with a focus on condominiums and renter-occupied properties with master-metered heating/hot water systems as well as landlord-occupied rental properties to reduce split incentive barriers. Lessons from a multi-family program could be applied to a commercial custom retrofit program in the future.

FY16 Action Items

Examine the feasibility of a multi-family pilot program for implementation in FY17.



Pilot feasibility complete and on track for FY17 implementation



Institutional challenges to align Cambridge pilot with Mass Save program structure



Pilot implementation and tracking

⁵ See http://web.mit.edu/energy-efficiency/docs/EESP_Michaels_PathwaysInMultiFamilyHousing.pdf

Progress Towards FY16 Action Items

Cambridge is currently negotiating a blanket MOU with Eversource to help support energy activities in the City and the Multi-Family Pilot will make up one section of this agreement. The City met with Eversource regularly during FY16 to work through the details of the multi-family pilot program in context of the 3-year energy efficiency plan submitted by the utilities to the state. The majority of Pilot components have been worked out to meet the goals of the MIT study, including plans for marketing and outreach, customer enrollment, energy efficiency and renewable energy assessment and delivery, and evaluation and monitoring. Innovative elements include providing incentives to community institutions to conduct outreach to their members, leveraging the Sunny Cambridge Multi-Family Advisor⁶ to evaluate buildings' solar potential and include solar in the improvement proposal, and presenting expected cost and GHG savings and return-on-investment at the whole-building level.

Next Steps

The Multi-Family Pilot is on track to launch in FY17. As of Q2, Cambridge is finalizing remaining program details and commitments with Eversource, with Q3 targeted for launch. The Multi-Family Pilot is scheduled to last through FY18, followed by a period of review before launching a full Multi-Family Program in FY20. Analysis of BEUDO data in FY17 could help inform a pilot program for large multi-family buildings and commercial buildings. Pilot impacts can be measured by evaluating participation levels and projected and observed electricity and natural gas savings in participating buildings.

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 proposed 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.




⁶ <http://www.sunnycambridge.org>

Action 2.2.1: Market Based Incentive Program

Introduction

In order to achieve net zero buildings in less than ten years, Cambridge is exploring 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.

	University collaboration to study feasibility at early stage
	City coordination with university partners to direct study
	Proceed with student research and faculty review of market-based incentive approaches

FY16 Action Items

In collaboration with Harvard and MIT and in consultation with industry, the City will research the design and feasibility of market-based incentives to better understand their impact and potential effectiveness in the Cambridge context.

Progress Towards FY16 Action Items

Staff have reached out to Harvard and MIT about arranging a study to determine the best approach to achieving the program goals listed above. Staff are continuing to communicate with these parties to determine the appropriate groups to involve and define a study approach, scope, and timeframe to meet the goals of this action.

Next Steps

Activity for this action should be accelerated in order to determine a favorable market-based incentive structure to pilot in the residential sector and then commercial and institutional sectors in accordance with the Net Zero Action Plan. The City will engage with Harvard and MIT to identify student researchers interested in carrying out this analysis. The City will develop draft research questions/requests and Harvard and MIT will work with the City to identify and fund (up to \$2,000 from each school) student researchers who can support the City’s work that will be managed by City staff. Harvard and MIT will also facilitate a faculty review of the research and any resulting proposals completed by the City.

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. A performance deposit should be held until 24 months following occupancy. 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 2008.⁷ The CDD Community Planning Division has also observed, however, that density bonuses are limited in nature and run the risk of being over-utilized by competing program priorities.



Slated for consideration through Envision Cambridge in 2017



Timing of Envision Cambridge process and regulatory limits to use of bonuses



Coordination with Envision process and Actions 2.2.1, 2.3

FY16 Action Items

Determine the feasibility of offering height and/or FAR bonuses to new Cambridge buildings which commit to pursuing net zero emissions. This action is to occur as part of the “Envision Cambridge” citywide planning process.⁸

Progress Towards FY16 Action Items

The Envision Cambridge planning project began in fall 2015 and as of fall 2016 is about halfway through the process. Detailed policy recommendations such as height and/or FAR bonuses for high performing buildings will not be addressed until late in calendar year 2017.

Next Steps

The design and implementation of such a bonus could be pursued directly through the zoning amendment process. The advantage of using the citywide planning process is that the impact of any density bonuses can be planned for in context of medium to long-term urban development goals. This helps mitigate the risk of over-use of density bonuses. There is potential overlap in the outcomes of market-based incentives (Action 2.2.1) and zoning requirements (Action 2.3) with the goals of this Action. Therefore, it may be prudent to pursue a coordinated and staged approach to these actions based on their observed impacts.

⁷ <https://environment.arlingtonva.us/energy/green-building/green-building-bonus-density-program/>

⁸ <http://envision.cambridgema.gov/>

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.⁹

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.



In progress but delayed due to external challenges



State building code barriers and development of third-party review process



Consider performance-based standards and limited third-party review

FY16 Action Items

Amend the Cambridge Green Building Requirements to require all new construction and major renovation projects over 25,000GFA to meet LEED criteria at the ‘Gold’ level or better. Projects should also achieve a minimum of 6 points under LEED’s Optimize Energy Performance credit and the requirements of the Enhanced Commissioning credit to ensure superior energy efficient design and operation.

Progress Towards FY16 Action Items

Staff have worked to draft a revised Article 22 to be submitted to City Council as a zoning amendment. To ensure that the proposed amendments are not overly burdensome, staff collaborated with stakeholders from the development community throughout the drafting process. These exchanges led to the proposed inclusion of Enterprise Green Communities as an additional Green Building Rating System that is particularly applicable to affordable housing developments in Cambridge. Further, stakeholders have expressed concern with proposed changes to the Special Permit application review process designed to ensure that project proposals would meet the intended level of energy performance. Specifically, there was concern that the timing of the proposed review process did not align with the Special Permit application timeline, and there was a strong desire for the developer to be able to continue to engage and manage the required third-party review of the green building submissions as is currently the case.

The Cambridge Zoning Ordinance must also align with the state building energy code. The amendments to the 8th edition of the state building code adopted on August 12th, 2016¹⁰ require

⁹ See <http://www.cambridgema.gov/CDD/zoninganddevelopment/Zoning/Ordinance> for the full Zoning Ordinance,

¹⁰ <http://www.mass.gov/eopss/docs/dps/buildingcode/8th-edition-amendments/2016-08-12-chapters-13-51-and-115-aa-8th-ed-amendments.pdf>

commercial buildings to meet the energy performance standards of ASHRAE 2013, which is approximately 8% more stringent than ASHRAE 2010. The amended Stretch Energy Code, which has been adopted by Cambridge, requires an additional 10% of stringency for buildings over 100,000 square feet¹¹. Together, this equates to approximately 17% more stringency than ASHRAE 2010. This would meet the improvement targeted by the Net Zero Action Plan. However, some new buildings in Cambridge that are subject to Special Permit requirements are smaller than the thresholds that trigger the amended Stretch Code.

Since this Action was started, Cambridge has adopted the latest version of LEED (Version 4) under the current Article 22 permitting requirements, increasing the stringency of building energy performance. All new buildings subject to the updated Stretch Code must meet its energy performance standards, and projects below stretch code thresholds are being strongly encouraged to meet the same energy performance through the design review process. New buildings are also being asked to present a 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.¹²

The enactment of Article 22 amendments has been delayed while staff have worked to research options to address both of the above barriers. Staff have worked with the US Green Building Council and Green Building Certification Inc. to determine alternative review pathways, which could include more streamlined LEED review (“Pre-certification”) or third-party review only of the energy modeling portion of the LEED checklist. The amended Stretch Code and LEED V4 requirements increase the energy performance standard for large buildings, though LEED Gold performance and the Enhanced Commissioning credit are not explicitly included. Cambridge could include these standards for all Special Permit buildings in the zoning Urban Design Objectives.¹³

Next Steps

While the newly adopted Stretch Code establishes standards that meet the proposed short-term (years 1-4) in the Net Zero Action Plan, it is uncertain if the Stretch Code will be amended within the proposed timeframe for further increasing energy performance (year 5). Therefore, staff is continuing to investigate a GHG performance standard for new buildings as an alternative to basing the standard on an improvement of code (ASHRAE) to avoid potential building code conflict. The goal is to finalize the proposed Article 22 amendments and bring them before City Council in early calendar year 2017.

¹¹ The stretch code applies to supermarkets, laboratories, and conditioned warehouses over 40,000 square feet.

¹² For examples of such pathways for different building types, see the New York “One City Built to Last” technical working group report: *Transforming New York City Buildings for a Low-Carbon Future*; http://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/TWGREport_04212016.pdf




¹³ See Article 19.30 of the Cambridge Zoning Ordinance: https://www.cambridgema.gov/~media/Files/CDD/ZoningDevel/Ordinance/zo_article19_1382.ashx

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 achieve maximum energy savings (e.g. >80% more efficient than code requirement) and are designed to accommodate 100% of annual

energy consumption by on or off-site renewable sources, recognizing that constraints such as site area or location may preclude access to sufficient onsite renewable energy to meet 100% of energy demand.¹⁴ This policy would also be applicable to “gut renovations” where a building is being completely renovated with new electrical, mechanical, interior, and envelope systems.

	Internal design in progress, but behind original schedule
	Institutional coordination among Cambridge City departments
	Continue coordinated development of City policies

FY16 Action Items

Establish a definition for the policy that new construction of municipal buildings should target net zero. Buildings must be designed to optimum energy efficiency standards such that all or a high percentage of energy loads could be met by renewable sources.

Progress Towards FY16 Action Items

Staff are working to define all aspects of the net zero requirement for municipal buildings that was adopted by City Council as part of the 2015 Action Plan. Currently, new municipal buildings are being planned to meet the short-term “net zero ready” target. For example, the Martin Luther King School (MLK) opened in FY16. With an estimated energy use intensity of 33.4 kBtu/sf/year, 69% below baseline, and over 1,600 solar PV panels, MLK produces almost half of the energy it consumes, with the potential for the remaining electrical load to be provided by green energy. The King Open School is currently being designed to be a fossil fuel-free building.

Next Steps

Net zero requirements for new construction of municipal buildings should be formally defined in a way that can be documented and used as a reference point for private development in Cambridge. Specific policy parameters including offset requirements and “gut renovations” need to be defined at least two years before the standard takes effect in 2020. Recommendations will be presented in FY17 in conjunction with development of the Local Carbon Fund (Action 4).

¹⁴ 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>

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.



Initial planning complete and implementation to begin FY17



Resource limits to achieve multiple institutional goals



Continue implementation and tracking of results

FY16 Action Items

Begin design 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 FY16 Action Items

Throughout FY16, there has been a strong focus on developing a Municipal Facilities Improvement Plan (MFIP). The MFIP aims 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. A series of four workshops were held with staff from across City departments to determine priorities for the plan, including one workshop focused specifically on environmental issues; energy and GHG savings were a consistent theme throughout the plan development. Working with the consultant, Cambridge developed a target of 30% reductions in municipal GHG emissions below 2008 levels by 2020, with a stretch goal of 35% reductions, taking into account anticipated growth. As of the 2012 municipal inventory, Cambridge had decreased its municipal GHG emissions by 20% below 2008 levels.¹⁵

Next Steps

A municipal GHG reduction target for 2030 will be set by the end of calendar year 2017. Renovations to meet the MFIP goals are beginning in FY17. The nature and impact of these renovations on energy use will be tracked and reported.

¹⁵ <http://www.cambridgema.gov/CDD/climateandenergy/municipalsustainability/municipalghginventory>

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.¹⁶ 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 buildings.



Study of options in progress, but behind implementation schedule



Regulatory prioritization of potential zoning changes in context of other needs



Complete study of impacts and options for zoning amendments

FY16 Action Items

Explore with advice from the Planning Board and Inspectional Services Division the best method of allowing external insulation in built-out compact residential neighborhoods in a manner sensitive to historic preservation principles.

Progress Towards FY16 Action Items

In FY16, staff met with Homeowner's Rehab, Inc. (HRI), an affordable housing agency in Cambridge, to discuss the need for a zoning amendment to allow increased exterior insulation and the direction such an amendment might take in order to inform discussion with the Planning Board and Inspectional Services Division. HRI cited a number of recent renovation projects that were not able to include as much insulation as desired because of the current zoning limits. They suggested increasing the allowable wall thickness addition to 6 inches and decreasing the required setback to 3 feet.

Next Steps

Staff are considering amendments to Yard Exceptions for Added Exterior Insulation that could be pursued along with Green Building Requirement (Action 2.3) and Solar Ready (Action 3.2) amendments. In FY17, a study will be completed to examine barriers and solutions to adding exterior insulation, including surveying the types of wall assemblies being used and what the space requirements are to achieve various levels of insulation, as well as the frequency with which the Cambridge Zoning Ordinance impedes the addition of exterior insulation during renovations. This study will inform potential changes to the Zoning Ordinance or other policy options.

¹⁶ 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

A comprehensive low carbon energy supply strategy is needed for the City to better understand the opportunity and pathways to achieve a transformation of its energy supply system.

The Low Carbon Energy Supply Strategy will define:

- Where and how low carbon and district energy can occur in Cambridge given current and emerging technologies.
- The role the City will play in developing and enabling district energy and distributed generation.
- Where and how the City and utilities could begin to modernize the grid infrastructure.
- The full technical and economic potential for solar PV and solar thermal installations throughout the city.
- The opportunities and potential for storage that improves resiliency and the potential to utilize more renewable energy.
- The policies and investment strategies that should be employed to improve deployment of low carbon and renewable energy.

	Study initiated, to be completed fall 2017 after funding delay
	Resource (funding) initial availability
	Complete study with input from stakeholder working group

FY16 Action Items

Engage a qualified consultant to complete a Low Carbon Energy Supply Strategy study which will meet the goals listed above. The study should be completed in FY17, at which point implementation of strategies identified in the study should begin.

Progress Towards FY16 Action Items

CDD issued an RFP for the Low Carbon Energy Supply Strategy study (LCESS) in spring 2016.¹⁷ The Danish company Ramboll¹⁸ was awarded the contract based on their extensive experience in energy master planning and particular technical expertise in district energy and renewable thermal solutions. However, because all of the bids were significantly above the original project budget, commencement of the project was delayed until fall 2016 when additional funds could be appropriated.

The LCESS kicked off in October 2016 and will involve four major phases: (1) analysis of existing factors and barriers, (2) identification of opportunities and scenarios, (3) consideration of changes and benefits related to each scenario, and (4) feasibility assessment of preferred scenarios. There will also be a significant public engagement component of the project to help educate Cambridge residents about energy supply issues and how they can take part in greening Cambridge's energy supply. The project will be guided by a working group including stakeholders from local utilities, universities, sustainability groups, neighboring communities, and relevant City departments.

Next Steps

The LCESS is slated to be completed by September 2017. Involvement of the working group should help to keep the project on track and aid with data collection and decision-making, as well as lay the groundwork for implementation of findings in FY17 and beyond by engaging key implementation stakeholders from the start.

Action 3.2: Rooftop Ready Solar 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.



Study completed in FY16;
awaiting implementation



Regulatory challenges regarding
potential building code conflict



Determine implementation
pathway in coordination with
other zoning requirements

¹⁷ See RFP at <http://www2.cambridgema.gov/purchasing/documents/3205/Bid3205.pdf>

¹⁸ <http://www.ramboll.com/energy>

FY16 Action Items

Complete a study to inform the design of a rooftop solar ready requirement for new construction projects that could be implemented in FY17 through mechanisms such as Article 22 of the Cambridge Zoning Ordinance.

Progress Towards FY16 Action Items

CDD issued a Request for Quotations for a Solar Ready Requirement Evaluation study in spring 2016. The goal of the study was to assist the City of Cambridge in the development of technical requirements for a Solar Ready ordinance, including evaluation of requirements from other jurisdictions and analysis of the costs and benefits of such requirements. The report was completed by Meister Consultants Group¹⁹ in fall 2016, and concluded that if all of the Solar Ready buildings were to eventually install solar, an additional 3-5MW of solar could be installed in Cambridge each year as new buildings are constructed and existing buildings are renovated. However, until such time that solar generation becomes a requirement, the results are uncertain.

Next Steps

A solar ready requirement for new construction and significant renovations could be implemented through the Article 22 Sustainable Design and Development Requirements of the Cambridge Zoning Ordinance.²⁰ However, the decision by the state of whether to include the solar ready provision in the proposed 9th edition of the building code will affect Cambridge's options for implementing a local Solar Ready Requirement. An alternative path may be to include Solar Ready provisions as recommendations within the Urban Design Objectives, Article 19.30 of the Cambridge Zoning Ordinance.²¹ The Design Objectives provide greater flexibility to the developer to balance multiple project goals, such as maximizing the potential area for solar while also keeping rooftop equipment hidden from view by placing it in the center of the roof, without mandatory building construction measures. These options will be considered in coordination with potential zoning changes to Green Building Requirements (Action 2.3) and Yard Exceptions for Added Exterior Insulation (Action 2.5).

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,



MOUs drafted and on track for FY17 adoption



Institutional challenges to ensure effective implementation



Complete and implement MOUs

¹⁹ <http://www.mc-group.com/>

²⁰ http://www.cambridgema.gov/~media/Files/CDD/ZoningDevel/Ordinance/zo_article22_1382.ashx

²¹ https://www.cambridgema.gov/~media/Files/CDD/ZoningDevel/Ordinance/zo_article19_1382.ashx

so a formal agreement on how the City of Cambridge, Eversource and Veolia can work together on the following areas is recommended:

- 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

FY16 Action Items

Develop a memorandum of understanding (MOU) with Eversource and Veolia based on areas of mutual interest and have senior officials meet regularly to monitor and manage progress. Explore if there is benefit to including the state government and regional partners to this collaboration.

Progress Towards FY16 Action Items

In spring 2015, Eversource and Cambridge held a half-day charrette including key stakeholders from both the City and utility to brainstorm key MOU requests and areas of collaboration. Since then, Cambridge has been working with Eversource to refine the MOU language and define commitments by both parties. Separate attention has been put into development of the Multi-Family Pilot Program (see Action 1.1.1) which is set to launch in FY17.

Cambridge has also drafted an MOU between the City and Veolia, operator of the Kendall Station combined heat and power plant in East Cambridge and a district steam network that serves areas in both Kendall Square and Boston. Collaboration with Veolia around emissions from the Kendall Station is important for development of the Community GHG Inventory which will provide the baseline for measuring emission reductions achieved by the Net Zero Action Plan. The district steam network is also a potential resource for the Low Carbon Energy Supply Strategy (LCESS; Action 3.1).

Next Steps

The Eversource MOU is on track to be adopted in FY17. In order for the MOU to be successful, both Cambridge and Eversource will have to continue a conscious effort to communicate and collaborate on ongoing projects relevant to the Net Zero Action Plan and other initiatives. For example, Eversource is a member of the LCESS working group and Eversource data will be key to the LCESS development.

The Veolia MOU is currently under review by Veolia with hopeful adoption following agreement on data methodologies for the Kendall Station GHG emissions. Veolia is also a member of the LCESS working group.




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 5.1: 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

	Strategy in progress and on track for continued development through FY17
	Resource needs to create a coordinated communication approach
	Continue communication planning with CDD communication manager

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.

FY16 Action Items

Over FY16 and FY17, develop and begin 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 FY16 Action Items

A number of concrete communication measures were initiated in FY16. Following the adoption of the Net Zero Action Plan in summer 2015, the Net Zero Infographic²² was published as a two-page spread advertisement in the Scout Cambridge magazine²³ with a link to the project website to encourage residents to learn more about the project. Staff gave multiple public presentations to introduce the Net Zero Action Plan to organizations such as the United States Green Building Council and Urban Sustainability Directors Network and at the 2016 GreenBuild conference in Los Angeles. Staff also worked with a graphic designer to create the “Net Zero Board Game” to

²² http://www.cambridgema.gov/~media/Images/CDD/Climate/NetZero/netzero_20150408_infographic.jpg

²³ <http://scoutcambridge.com/#>

serve as a fun public engagement and education tool at events such as PARKing Day.²⁴ Members of the Net Zero Task Force have shared information about Cambridge’s planning process with nearby communities such as Lexington which are interested in adopting similar plans.

Staff have also been pursuing the development of an online sustainability dashboard to provide a concise and engaging source of information about sustainability metrics that relate to the Net Zero Action Plan outcomes such as community-wide GHG emissions and the number of LEED-certified buildings in Cambridge. CDD is currently working with Kim Lundgren Associates²⁵ to determine the metrics and design of the dashboard, which the City will be able to update with additional metrics and information in the future to meet the needs and data produced by the Net Zero Action Plan and other initiatives.

The Low Carbon Energy Supply Strategy study (Action 3.1) begun in October 2016 is an example of an individual action with its own public engagement strategy. In addition to the working group of local stakeholders, staff are working with the consultant to develop a public outreach strategy to use the LCESS as an opportunity to engage and educate Cambridge residents about energy use in the community and actions they can take to help reduce GHG emissions from energy use. Potential events include peer-learning sessions hosted by volunteer residents and a panel at the 2017 GreenBuild conference to be held in Boston.

Next Steps

In FY17, staff will continue to work on a comprehensive and cohesive communication strategy for the Net Zero Action Plan. The Environmental and Transportation Planning website is being updated and could host a new, dedicated site for the Plan. Engagement of a public relations firm to develop a integrative brand identify for the Net Zero Action Plan in context of broader CDD energy and climate activities could help to increase public recognition for the initiative and consistency across outreach campaigns. CDD has recently hired a communications manager who will be able to help with implementation of these efforts. Individual communication opportunities and action-oriented engagement will continue to be pursued as they arise.

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



On track with implementation of NZAP management and reporting structure



Institutional need to ensure coordination



Complete report review and ongoing program monitoring

²⁴ <http://www.cambridgema.gov/CDD/News/2015/06/parkingday>

²⁵ <http://www.kimlundgrenassociates.com/sustainabilitydashboard/>

objectives will be met over the duration of the project.

FY16 Action Items

Cambridge should assign and commit to specific roles and responsibilities for implementing the Cambridge Net Zero initiative over the long term. This includes project leads for each of the early actions, identifying research and implementation partners, developing a reporting structure and a governance structure to ensure that the project remains on track and consistent.

Progress Towards FY16 Action Items

Soon after the Net Zero Action Plan was adopted in June 2015, the Cambridge Climate Protection Action Committee (CPAC) agreed to serve as the governing body responsible for ongoing oversight of the Plan. Staff provide NZAP updates at monthly CPAC meetings. CPAC will also receive and review an annual report outlining progress towards actions for the previous year and results of these actions on clean energy measures and GHG emissions in Cambridge. This is the first such annual report. 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 along the Plan and necessary adjustments moving forward based on changes in technology, policy, and other influential factors. The first of these reviews is due to occur in FY 2020.

In February 2016, CDD hired Net Zero Energy Planner Seth Federspiel to coordinate and manage daily implementation of the Plan. Seth has worked to assign roles and responsibilities to City departments, committees, and external partners and stakeholders in implementing the Plan. Federspiel is responsible for ongoing monitoring and reporting on the Net Zero Action Plan, including writing this report, establishing a website and other public communication channels (see Action 5.1), and tracking of relevant metrics such as green building permits and annual energy use and GHG emissions reported through the Building Energy Use Disclosure Ordinance (BEUDO) and Community GHG Inventory.




Next Steps

This report should be reviewed and received by CPAC, including any feedback on program management and communications. This report will provide the template for future annual reports. In FY 2020, a comprehensive Program Wide Review will be organized to make necessary adjustments to the Plan trajectory. Individual actions will be monitored and managed on an ongoing basis to provide opportunities for CPAC and outside stakeholder feedback and guidance, including periodic engagement of the Net Zero Task Force. Steps described above in Action 5.1 will enhance the communication channels available to the Net Zero initiative.

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.

	Initiated through Compact for a Sustainable Future workplan but behind implementation schedule
	Institutional coordination needed
	Convene working group to begin process of evaluating standards

FY16 Action Items

Develop a working group 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. Examine the feasibility of developing such standards.

Progress Towards FY16 Action Items

The development of net zero lab standards is to be led externally by the Cambridge Compact for a Sustainable Future.²⁶ The Compact is a coalition among the City of Cambridge, Harvard University, Massachusetts Institute of Technology (MIT), and 17 businesses and non-profit organizations in Cambridge created to leverage members' combined capacity to create a more healthy, livable, and sustainable Cambridge. Many of the labs in Cambridge are owned or operated by Compact members. In summer 2016, the Compact adopted a three-year work plan that includes assessing the feasibility of a net zero labs by 2030 goal. A working group will explore a local laboratory energy benchmark based on data from the Building Energy Use Disclosure Ordinance reporting and other sources and identify strategies to improve lab energy performance through voluntary programs and possibly new City policies. The Compact year 1 goal is to assess the feasibility of establishing such a benchmark. This working group is supported by CDD staff and is chaired by staff from Harvard and Novarits.

Next Steps

In FY17 the Compact Net Zero Labs working group should compile best practices for energy efficient lab design and operations and assess the feasibility of adopting standards for Cambridge labs. Interested labs should begin to trial energy improvement strategies, and a stretch action involves the exploration of funding opportunities to develop or implement a pilot program. An additional stretch action involves gathering and analysis of additional lab data, which could potentially occur in coordination with the Low Carbon Energy Supply study (Action 3.1).

²⁶ <https://cambridgecompact.org/>

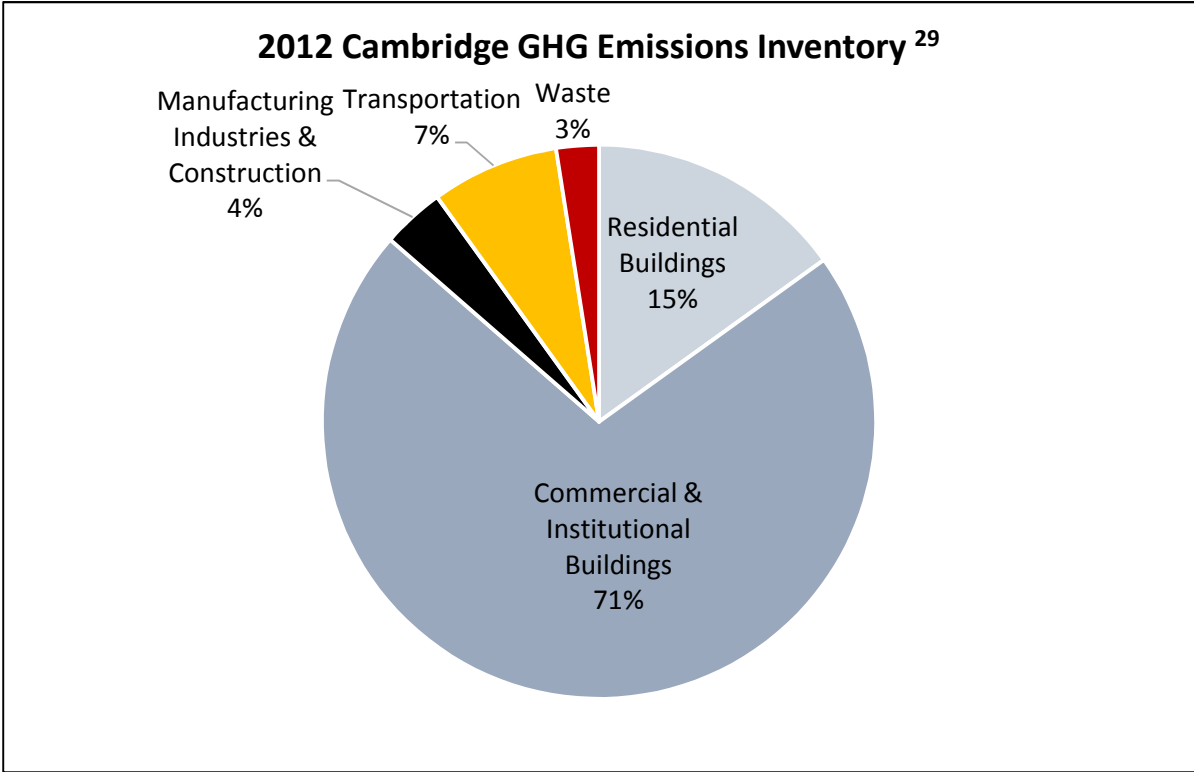
FISCAL YEAR 2016 QUANTITATIVE INDICATORS

While the bulk of this first-year report has focused on the progress toward each of the Net Zero Plan Actions, data from the 2012 Community GHG Inventory and the 2015 Building Energy Use Disclosure Ordinance report²⁷ serve as initial quantitative indicators of building energy use and emissions in Cambridge. These indicators serve as a helpful baseline for measuring progress towards Cambridge becoming a net zero community and evaluating the effect of the Net Zero Action Plan in future years.

Community Greenhouse Gas Inventory

The City of Cambridge is currently conducting a community-wide GHG inventory to meet its commitment as a participant in the Compact of Mayors²⁸ to mitigate climate change. A comprehensive GHG inventory will help the City better understand where GHG emissions are generated and then develop strategies for reducing these GHG emissions. The inventory is being completed for 2012 because of data availability and alignment with the municipal inventory, but will include estimates for 2015 as part of the GHG projections for Cambridge.

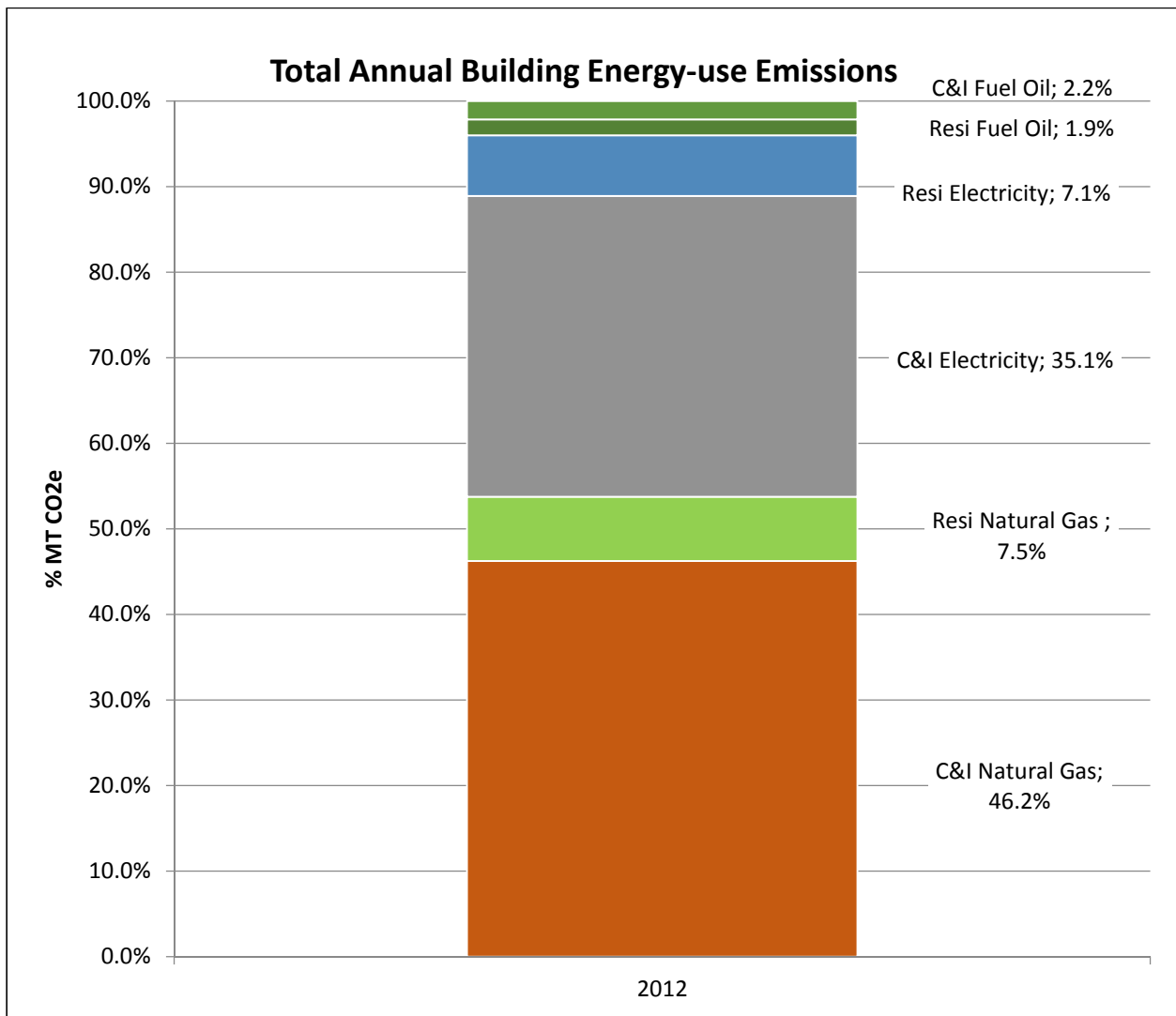
²⁹As seen in the summary graph below, the majority of GHG emissions generated in Cambridge are related to building energy use, emphasizing the importance of the Net Zero Action Plan’s goal of eliminating GHG emissions from building operations in Cambridge.



²⁷ Future annual reports will include more recent data
²⁸ <https://www.compactofmayors.org/>
²⁹ Preliminary data. Total GHG emissions: 1,733,937 MT CO₂e

A deeper dive into the preliminary emissions data³⁰ related to building operations shows that natural gas is responsible for a little more than half of building energy emissions, electricity for just over 40%, and fuel oil for about 4%. Natural gas consumed on-site currently has a lower emissions factor than electricity generated off-site,³¹ but does not have the long-term potential to eliminate these GHG emissions. Therefore, transitioning to cleaner electricity sources, as is being explored in the Low Carbon Energy Supply Study (Action 3.1), is crucial both to reducing GHG emissions from the current electricity demand and providing a carbon-neutral energy supply option to replace natural gas in the long term.

2012 Building Energy Emissions, by Sector and Fuel

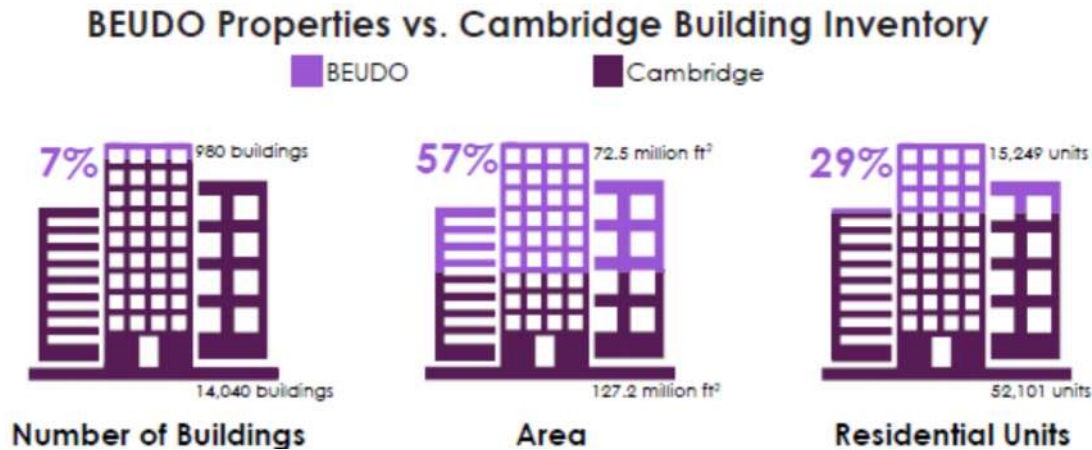


³⁰ Preliminary data

³¹ There are concerns about GHG emissions from fugitive methane emissions due to leaks in the natural gas production process and transmission infrastructure, for example: <http://www.nrel.gov/docs/fy16osti/62820.pdf>

Building Energy Use Disclosure Ordinance

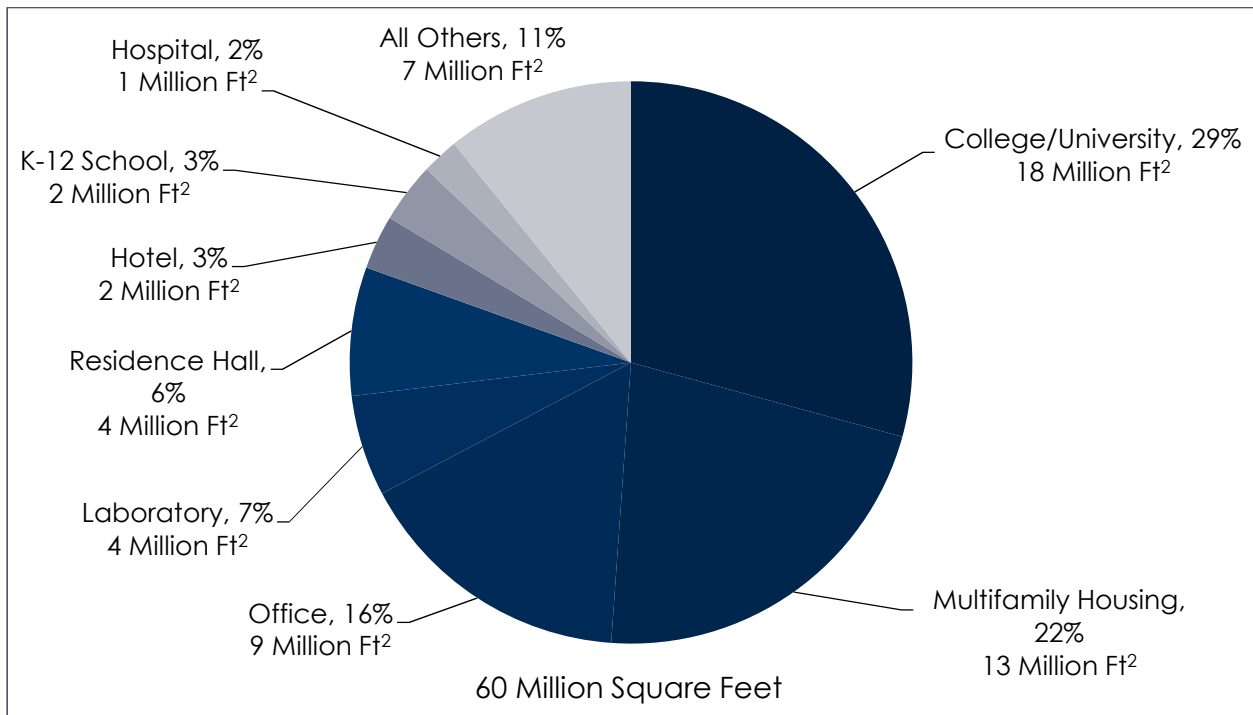
The Cambridge Building Energy Use Disclosure Ordinance (BEUDO) requires parcels with non-residential buildings of a total of 25,000 square feet or greater as well as parcels with residential buildings totaling 50 or more units to annually report and disclose their energy and water use.³² By requiring the largest buildings to report their energy use, Cambridge can gain important information about the energy consumption of a majority of the total building area in the City while streamlining the data collection process to the largest energy consumers, as illustrated by the graphic below.



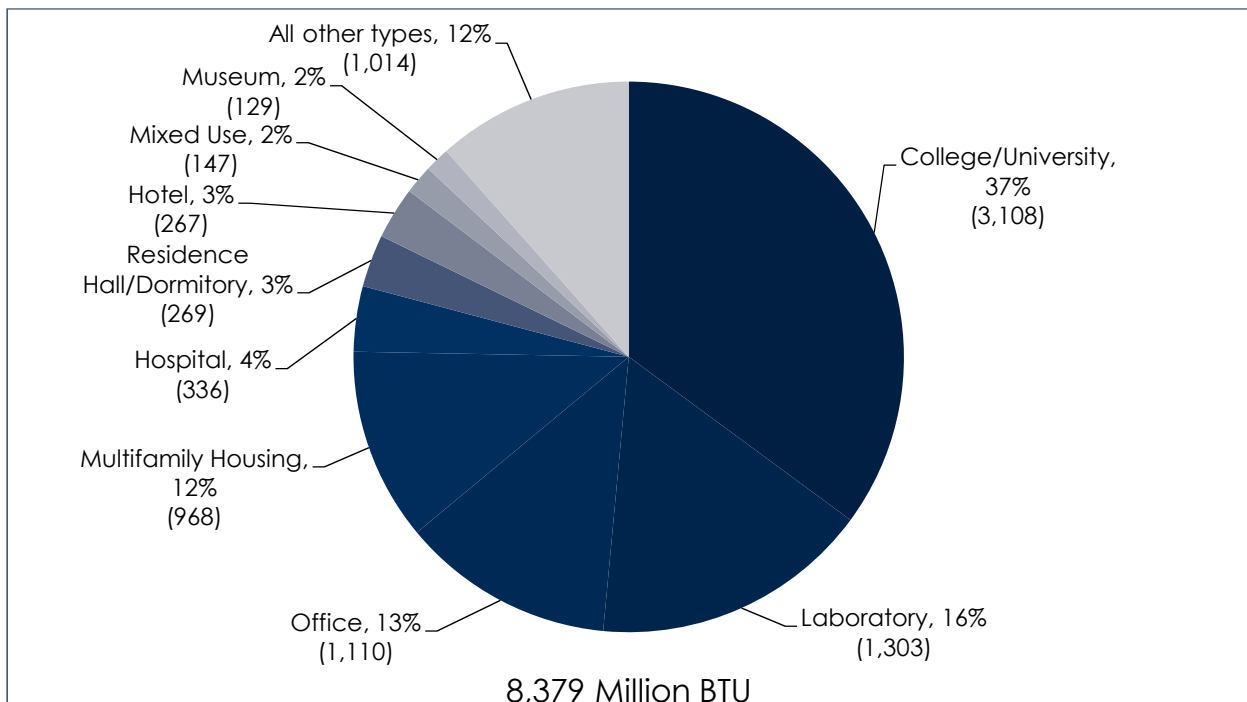
The graphs below summarize the data collected in the 2015 BEUDO reports. Academic properties make up the largest proportion of BEUDO reporters, followed by multifamily housing and office buildings. However, energy use for laboratories, even though they consist of only 7% of the reported building area, is 16% of the total energy use and greater than multifamily and offices, illustrating the much higher energy intensity of laboratories than other building types.

³² 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>

Total Area of Properties in 2015 BEUDO Analysis³³



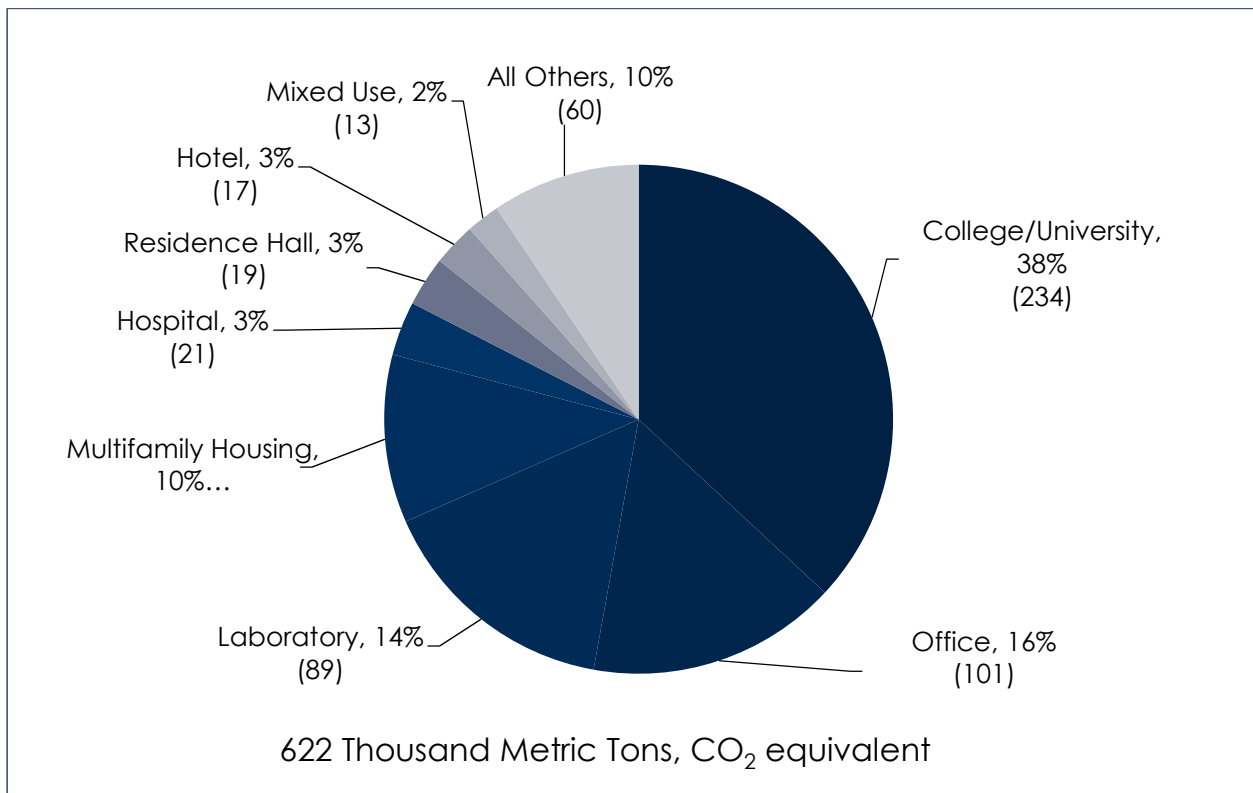
Total Energy Use of Properties in 2015 BEUDO Analysis



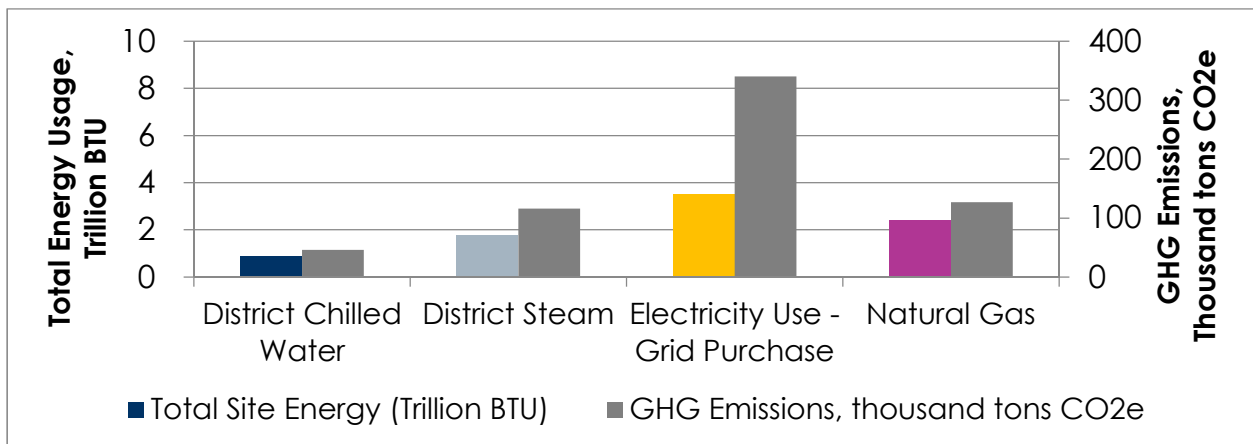
³³ "Residence Hall" or dormitories are not included in college/university to distinguish between residential building energy use profiles and those of academic, administrative, and research buildings on campuses.

Greenhouse gas emissions are tied not only to total energy usage, but also to the mix of fuel types used at each property type. The pie chart below shows the share of total emissions contributed by each property type. Notably, the ‘office’ property type contributes more greenhouse gases than the ‘laboratory’ property type, despite using less total energy. This is because the ‘office’ property type’s fuel mix has more electricity than laboratories, which tend to have proportionally higher natural gas usage. Electricity currently has a higher GHG emissions factor than natural gas, as seen in the first bar graph. A comparison of fuel mix across property types is located in the second bar graph.

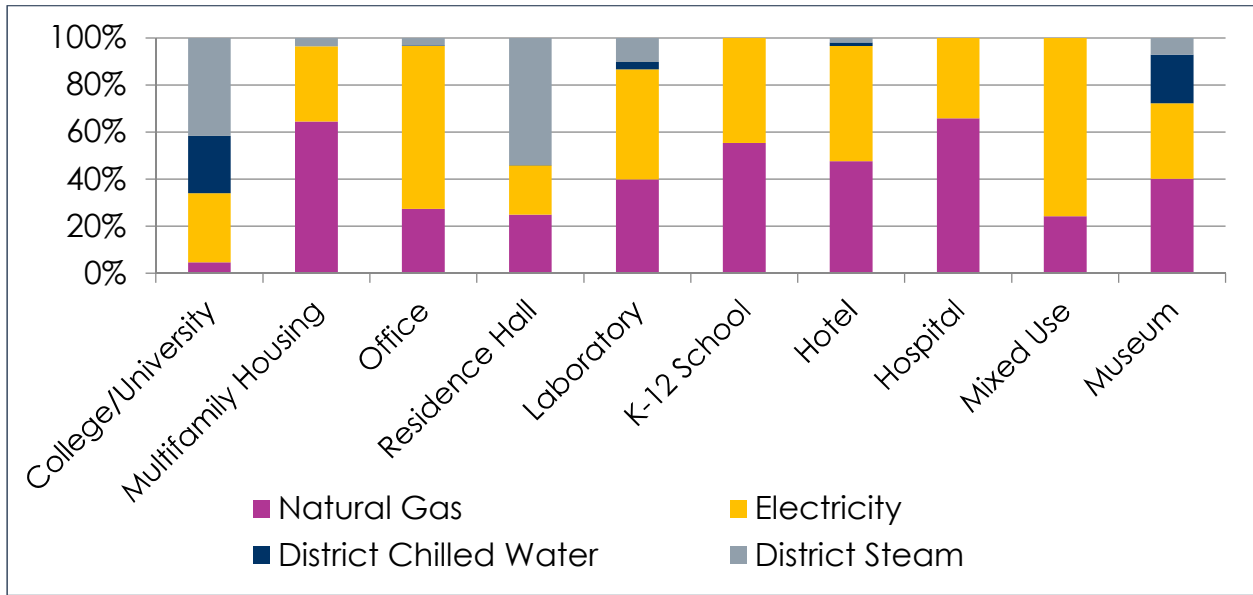
Total Greenhouse Gas Emissions of Properties in 2015 BEUDO Analysis



GHG Emissions by Energy Source

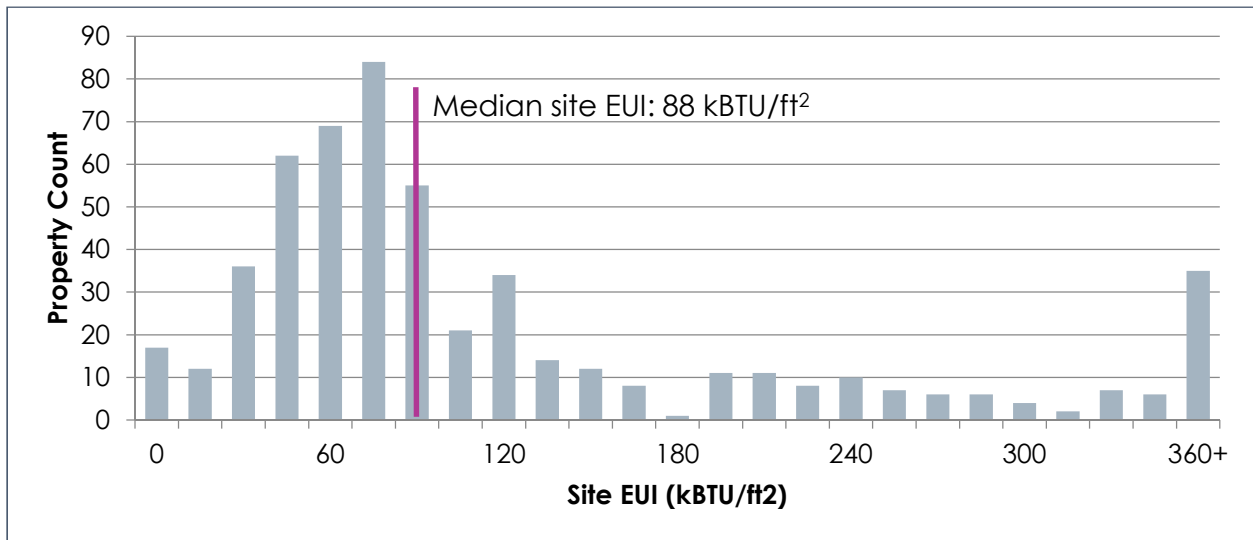


Fuel Mix by Property Type



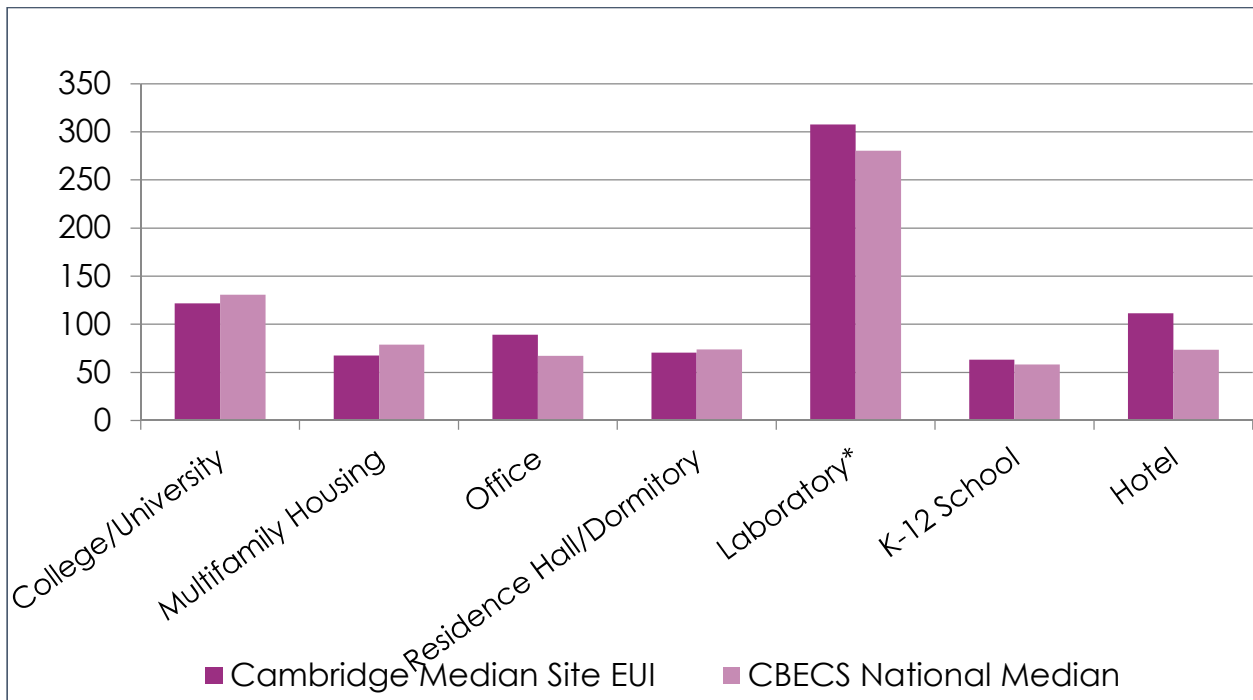
The energy use intensity, or EUI, of buildings is a helpful metric to normalize energy use across buildings of different sizes, much like an MPG sticker on a car. As illustrated in the graph below, most buildings reporting to BEUDO have an EUI below 100kbtu/ft², with a handful of buildings consuming much more energy.

Site EUI Distribution



In order to contextualize the results of the Cambridge analysis, median energy use intensities for various property types included in the Cambridge data are compared to the median energy use from the most recent Commercial Building Energy Consumption Survey (CBECS). Differences in median EUI may be due to more intensive activities, different climate and weather patterns, or differences in energy performance. Overall, BEUDO reporter site EUIs are quite close, if slightly higher than, national medians.

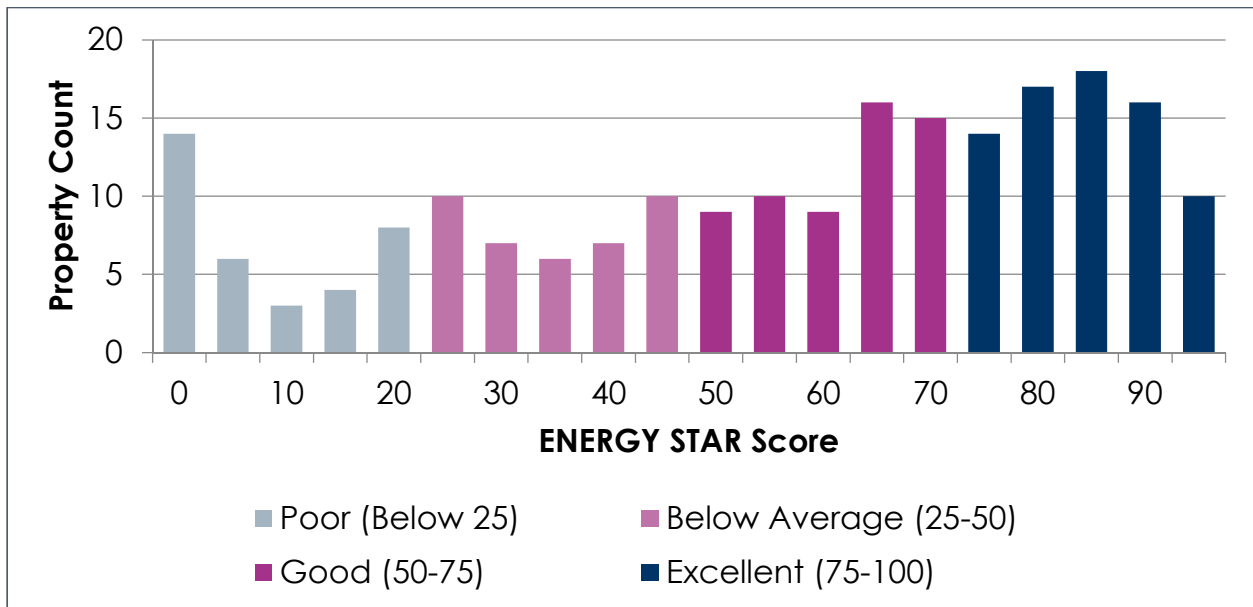
Median Site EUI versus National Median by Property Type



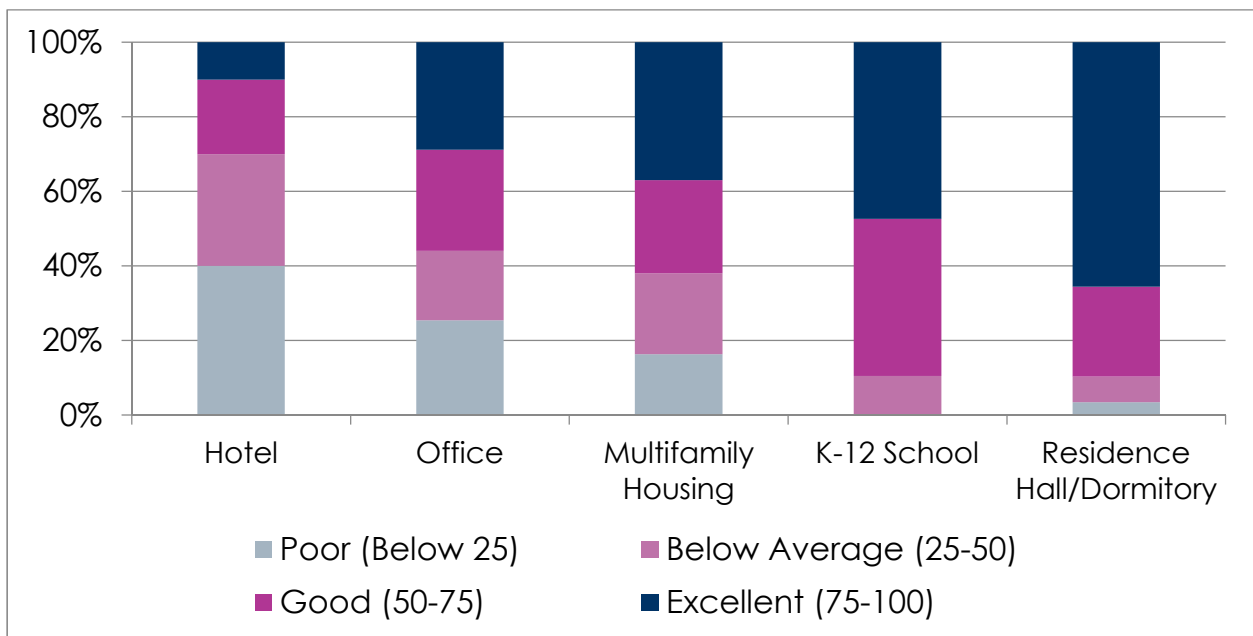
An additional comparison mechanism is the 1 – 100 ENERGY STAR score screening tool that helps property owners and managers assess how a building is performing. A score of 50 is the median; a score of 75 or higher means it’s a top performer and may be eligible for ENERGY STAR certification.

Out of the 538 reports included in the 2015 BEUDO data set, a subset of building categories which contain 225 buildings (41% of the total) are eligible for an ENERGY STAR score. The graph below shows the distribution of ENERGY STAR scores for these properties. Across all eligible properties, Cambridge buildings tend to perform better than their peers, with an average score of 61. The graph also shows a significant amount of properties with an ENERGY STAR score of zero, which may be due to incomplete information or a mixed use (such as a laboratory in an office building). Twenty eight properties are eligible for ENERGY STAR certification. The second graph shows the ENERGY STAR score by property type. Note that schools in the Cambridge data set have a higher EUI than the national median, and also have high ENERGY STAR scores. This indicates that the schools may have more energy intensive activities than the national median, but are using that energy more efficiently, thus giving them a higher energy performance score.

Distribution of Energy Star Scores



ENERGY STAR Score Distribution by Property Type

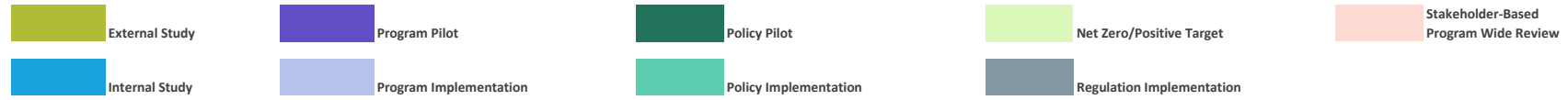


Based on the data in the BEUDO reports, many large building types in Cambridge are already on the way to efficient energy use, while others have a ways to go. Laboratories are clearly a key challenge based on their high EUI and significant proportion of total GHG emissions. It should be noted that the unique uses of laboratories along with health and safety requirements has much to do with their high emissions, and not necessarily the construction of the buildings themselves. Hotels, while having a lower ENERGY STAR score, only contribute a small proportion of Cambridge’s GHG emissions, so may be less of a priority. The higher GHG emission factor of electricity from the grid illustrates the important of decarbonizing the electricity sector in the

short term, which will enable additional emissions reductions by fuel switching from natural gas to electricity in the medium to long term. Annual BEUDO reports will serve as a key resource to tracking energy and GHG emission trends from large buildings in Cambridge and hopefully demonstrating the progress of the Net Zero Action Plan. BEUDO's direct connection to building energy performance also makes it an important tool for directly increasing this performance, as laid out in Action 1.1.2.

APPENDIX 1: NET ZERO ACTION PLAN SCHEDULE

Cambridge Net Zero Action Plan - April 29, 2015



Net Zero + Net Positive Targets						Net Zero Municipal	Net Zero Residential 1-3 Units			Net Zero Commercial Multi-Family Institutional				Net Zero Labs				Net + Municipal				
YEAR (fiscal year July - June)		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	
Action 1 - Energy Efficiency in Existing Buildings																						
1.1.1 Custom Retrofit Program	Residential	Feasibility	Multi-Family Pilot	Review	Potential Multi-Family Program				Review	Potential Multi-Family Program												
	All				Feasibility	Custom Retrofit Pilot	Review	Custom Retrofit Program				Review	Custom Retrofit Program									
1.1.2 Additional BEUDO Requirements	Comm. + MF		Design	New Building Energy Use Disclosure Ordinance Req's				Review	Version 2 Potential T.O.S/R. Requirements				Review	Version 2 Potential T.O.S/R. Requirements								
1.1.3 Upgrades at Time of Renovation or Sale	All			Feasibility	Potential T.O.S/R. Requirements				Review	Potential T.O.S/R. Requirements				Review	Potential T.O.S/R. Requirements							
1.1.4 O+M Plan Requirement	Comm. + MF (New Const.)		Design	Required O+M Plan				Review	Required O+M Plan				Review	Required O+M Plan				Review	Required O+M Plan			
Action 2 - Net Zero New Construction																						
2.2.1 Market Based Incentive Program	Residential	Feasibility	Pilot Residential	Review	Pot. Net0 Incentive Program	Review	Potential Net+ Incentive Program				Review	Potential Net+ Incentive Program				Review	Potential Net+ Incentive Program					
	Comm. + MF		Feasibility	Pilot Commercial		Review	Potential Net0 Incentive Program				Review	Potential Net+ Incentive Program				Review	Potential Net+ Incentive Program					
	Labs			Pilot Labs		Review	Potential Net0 Incentive Program				Review	Potential Net+ Incentive Program				Review	Potential Net+ Incentive Program					
2.2.2 Height + FAR Bonus		Feasibility *	Potential H+FAR Incentive Program				Review	Potential H+FAR Incentive Program				Review	Potential H+FAR Incentive Program				Review	Potential H+FAR Incentive Program				
2.3 Increase Green Building Requirements in Cambridge Zoning Ordinance		Design	Stage 1 - New LEED Requirements			Review	Stage 2 - New LEED Requirements				Review	Stage 3 - New LEED Requirements				Review	Stage 4 - Potential New Green Building Requirements					
2.4.1 Net Zero Requirement for New Construction of Municipal Buildings		Design	Net Zero Ready			Review	Net Zero Required				Review	Net Positive Required				Review	Net Positive Required					
2.4.2 Renewal of Municipal Buildings		Design Action Plan		Pilots		Stage 1 - Building Renewal Strategy					Stage 2 - Building Renewal Strategy											
2.5 Removal of Barriers to Increased Insulation		Design	New Policy			Review	New Policy															
Action 3 - Energy Supply																						
3.1 Low Carbon Energy Supply Strategy		E.S.S. Study **	Implement Energy Supply Strategy																			
3.2 Rooftop Solar Ready Requirement		Design	Solar Ready Requirement	Study	Potential Solar Requirement Version 1						Potential Solar Requirement Version 2											
3.3 Develop a Memorandum of Understanding with Local Utilities		Develop MOU	Utility Collaboration					Review	Potential 2nd Utility Collaboration													
Action 4 - Local Carbon Fund																						
4 Investigate Local Carbon Fund			Feasibility	Establish Potential Co2 Fund																		
Action 5 - Engagement and Capacity Building																						
5.1 Communication Strategy		Design	Implement Communication Strategy																			
5.3 Net Zero Lab Standards		Feasibility ***	Dev. Standard	Pilot Standard 1			Implement Potential Standard				Review	Pilot Standard 2			Implement Potential Standard							

* To occur as part of Cambridge Master Plan process
 ** To happen in conjunction with Kendall Square study
 *** Externally Led