City of Cambridge
Net Zero Action Plan – 2021 Update

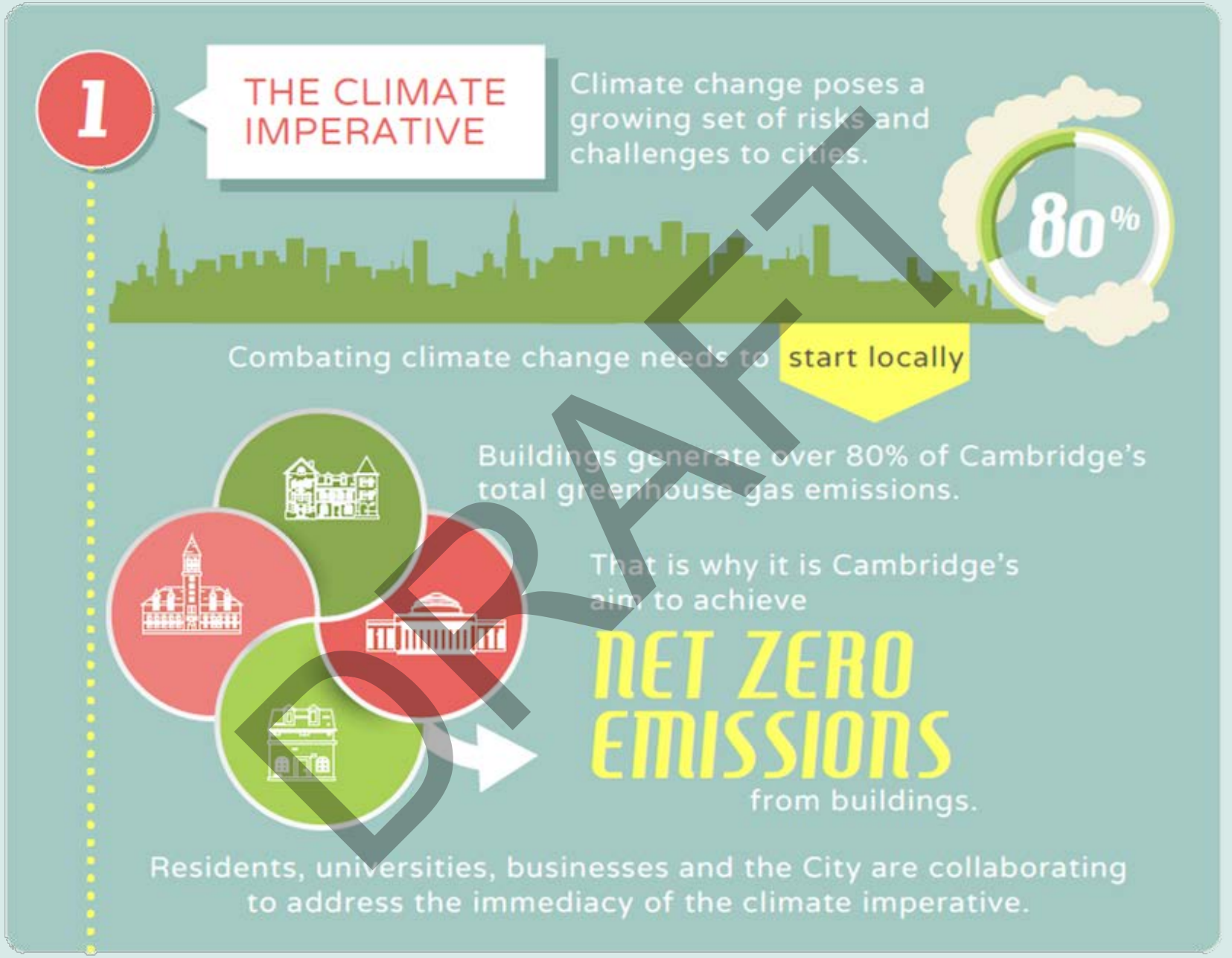
Executive Summary

June 30, 2021

Topics covered by executive summary slides

1. 5-year Review Background
2. Net Zero Task Force Process
3. NZAP Impacts To-Date
4. 2021 NZAP Actions
5. 2021 NZAP Implementation

5-Year Review Background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THE CLIMATE IMPERATIVE
Climate change poses a growing set of risks and challenges to cities.
80%
Combating climate change needs to start locally
Buildings generate over 80% of Cambridge's total greenhouse gas emissions.
That is why it is Cambridge's aim to achieve
NET ZERO EMISSIONS
from buildings.
Residents, universities, businesses and the City are collaborating to address the immediacy of the climate imperative.

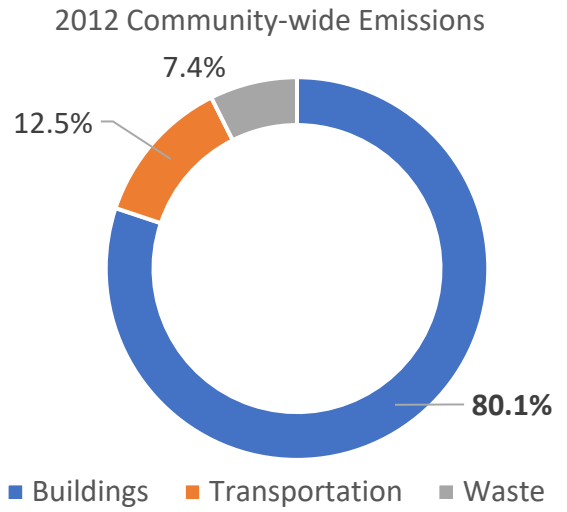
Net Zero Action Plan 5-Year Review

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

- As part of the original NZAP, the Task Force proposed that the whole suite of actions be reviewed every five years to allow for the overall strategy to adjust based on changing economics, technology, and stakeholder needs.

Why Net Zero Buildings?

- 80% of greenhouse gas emissions in Cambridge are from building construction and operations. Since the original NZAP was issued in 2015, more than 8 million square feet of buildings have been added. If the city can get to net zero in the building sector, we will have made major progress toward achieving our carbon neutral commitment.

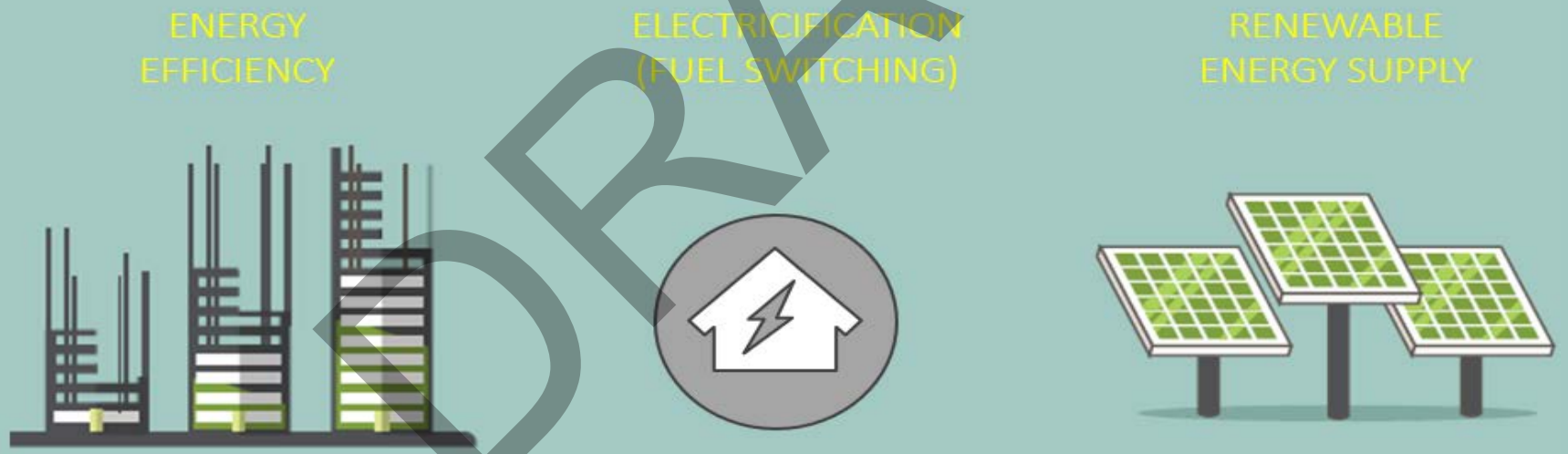


NZAP 5-Year Review Objectives

- Conduct a comprehensive review of the 2015 NZAP in its current form and all related data to assess the impacts to date
- Set the foundation for identifying adjustments to the 2015 NZAP and, with stakeholder input, develop recommendations for adjustments to the NZAP
- Update the implementation plan that serves as the guiding document for driving the activities associated with the NZAP moving forward
- Assess and incorporate equity as a key aspect of program implementation to ensure an equitable transition to net zero

Net Zero Action Plan Review Frameworks:

1. **NZAP Principles**
2. **Science, Technology, Policy, and Equity Review**
3. **Co-benefits Assessment**
4. **Reflection upon the Three Pillars of Decarbonization**



Three Pillars of Decarbonization – the three key strategies to decarbonize energy systems that align with the United Nation's Sustainable Development Goals (SDGs)

1

Net Zero Action Plan Principles:

- Supports **climate goals** and **healthy economic** strategies
- Uses **science, market, and data-driven** analysis to inform decision making
- Support an openness **to new ideas** when circumstances change
- Commitment to allowing the principle of **offsets**
- Commitment to **measuring and monitoring** impact over time
- Ensures consultation is comprehensive and **engages affected stakeholders**
- Commitment to developing informative and **replicable models**
- **NEW**: Commitment to implementing the Net Zero Action Plan through a **racial equity and social justice lens**

2 Science, Technology, Policy and Equity Lens:

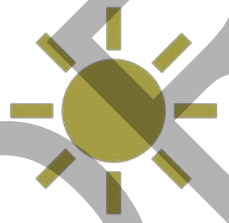
Science

What science-based GHG reductions must be achieved to mitigate the impacts of climate change and maintain a healthy environment for Cambridge residents

Policy

What Federal, State and Local Policies have changed that support our effort to reach the goals (e.g. building energy codes)

Technology



What enabling technologies have emerged since the 2015 NZAP efforts that may affect our strategy

Equity

We must recognize the social equity implications of policy choices and use an equity assessment framework to help guide our process

Science

- Since the adoption of the Net Zero Action Plan in June 2015, the International Panel on Climate Change (IPCC), the body responsible for assessing the science related to climate change, has issued special reports on the impacts of global warming.

- The latest report indicates that to keep to within 1.5 deg C above pre-industrial levels, **emissions need to be reduced 50% below 2010 levels by 2030** and 100% by 2050 maintain the ability to reach this target.

- With every passing year, there is more urgency in the scientific imperative, the years since 2015 have been the hottest on record

Policy

- **At the Federal Government Level:**
  - A slowdown in federal policy under the Trump administration for energy efficiency, especially for plug loads has created a gap in behavioral energy use reductions
  - Federal pollution regulations and tax credits will play a role in clean energy procurement for the City
  - National building codes such as the 2021 IECC set the baseline for state code updates
  - Whether policy objectives under the Biden administration are realized could have a large impact on GHG emissions, though they may have less of a direct impact on local building sector emissions

Policy (continued)

- **At the State Level:**
  - The current Three-Year Energy Efficiency Plan for gas and electric utilities expires in 2021 and may shift to focus more on GHG emissions. Although the Plan is implemented at the state level, the City can advocate for alignment with local objectives and advance programs for hard-to-reach sectors like multifamily buildings.

  - Recent State Legislation:
    - An Act Setting Next Generation Climate Policy (S.2477) sets statewide net-zero emissions limit for the year 2050: It also sets sub-limits for specific sectors
    - An Act Relative to Energy Savings Efficiency (S.2478) that enacts appliance efficiency standards

Policy (continued)

- **At the Local Level:**
  - Cambridge has now committed to achieving carbon neutrality by 2050. The faster Cambridge can reduce emissions within its borders, the more the **City can lead** by example in the global effort to combat climate change
  - Cambridge voted on the **proposed changes to the IECC** in December 2019 that would advance EE in new construction.
  - The City will **continue to advocate for a net zero stretch code** at the state level
  - A fossil fuel ban was considered, however, Brookline's effort to **ban on fossil fuel was struck down** by the State Attorney General. Still other pathways are open for consideration.

Technology

- There are many enabling technologies that have emerged since the 2015 NZAP efforts

- Energy and Efficiency Technologies
  - Cold-climate Heat Pumps
  - Electric Vehicles (connected load to buildings)
  - Battery Energy Storage
  - Microgrids
  - Lighting and Controls
  - Efficiency Gains/Cost Reduction of Renewable Technology

Technology Assessment

Tech Category	NZAP Enabling Technologies	Energy Efficiency in Existing Buildings		Net Zero New Construction		Energy Supply		Relative Impact on Overall Future Cambridge Emissions
		Economic	Technical	Economic	Technical	Economic	Technical	
Thermal Tech	**Air / Water Source Heat Pumps**	■	↑	↑	↑	n/a	n/a	**+++**
	Ground Source Heat Pumps	■	↑	■	↑	n/a	n/a	++
DER	**Rooftop PV**	↑	↑	↑	↑	n/a	n/a	**+++**
	Solar Thermal	■	■	■	■	n/a	n/a	+
	Fuel Cells	■	↑	■	↑	n/a	n/a	+
Energy Efficiency	Lighting Systems	↑	↑	↑	↑	n/a	n/a	++
	Demand Flexibility	■	↑	↑	↑	n/a	n/a	**+++**
Materials	PCM / Thermal Storage	●	■	■	↑	n/a	n/a	+
	Cement Alternatives	●	●	■	↑	n/a	n/a	++
	Glass	●	●	■	↑	n/a	n/a	++
Thermal Energy Supply	Electrolysis / Hydrogen Blending	n/a	n/a	n/a	n/a	■	■	++
	Geothermal Districts	n/a	n/a	n/a	n/a	■	■	++
Grid-scale Renewables	**Wind**	n/a	n/a	n/a	n/a	↑	↑	**+++**
	Microgrids	n/a	n/a	n/a	n/a	■	■	++
	Off-site RE Procurement	n/a	n/a	n/a	n/a	↑	↑	**+++**

Estimated Level of Feasibility:

● Low ■ Moderate ↑ Strong

Scale of Estimated Potential Impact on Overall Future Emissions:

+ Minor ++ Moderate +++ Significant

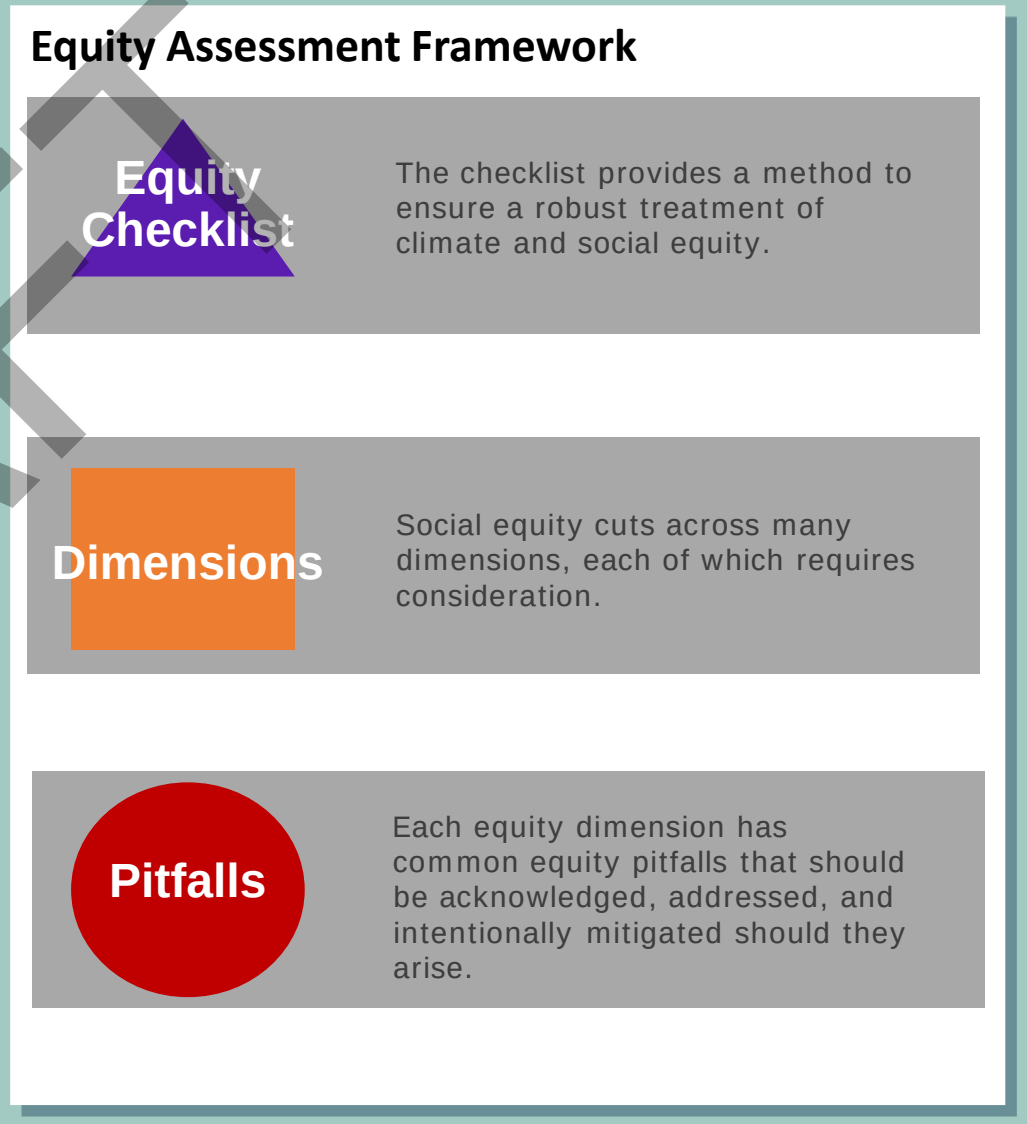
Equity

- New lens for our current work
- Cambridge recognizes the social equity implications of such consequential policy choices.

- We will be using Applied Economics Clinic's equity assessment framework helps guide our process

Equity (continued)

- The proposed Net Zero Actions entail potential equity benefits and pitfalls and, in some cases, are equity neutral.
- Potential **equity benefits** include:
  - Improved indoor comfort and air quality,
  - Lower energy bills,
  - Increased access to financing and funding,
  - Enhanced energy reliability, and
  - Increased resident engagement, awareness, and participation.
- Potential **equity pitfalls** include:
  - Housing cost and rental cost increases,
  - Energy cost increases,
  - Inequitable program participation, and
  - Inequitable distribution of benefits and burdens.
- Potential **equity pitfalls can be avoided** by incorporating specific policy language that targets equity and builds in flexibility so that policies can be adjusted if inequitable impacts arise.



3 Community Co-benefits Considered

Government and Policy Development	Economic	Environmental
• Leadership by example	• Employment Growth	• Reduction in Water Use
• Promotes Collaboration	• Enhanced Economic Competitiveness	• Less Materials Use Impacts
• Facilitates Public Participation	• Reduction in Operation Costs	• Reduction in Waste
• Enhances Policy Evaluation	• Reduction in Cost of Public Infrastructure	• Lowers air pollution from generation assets
• Enhanced data availability and access	• Decreased Energy Costs	• Life-cycle Carbon Emissions Reductions
Health and Wellbeing	**Climate Resilience**	**Access and Engagement**
• Promotes Healthy Lifestyle for Residents	• Increased Energy Security	• Improved Access to Public Space
• Lowers Combustible Gases in Buildings	• Provides opp. for hardening infrastructure	• Improved Access to Public Transit
• Improves Community Aesthetics	• Provides opp. for improved building resilience	• Improved Access to Employment /Training
• Improved Building Comfort/IAQ	• Reduces Risk for Vulnerable Populations	• Engagement of Local Women/Minority Owned Businesses

Net Zero Task Force Process

Net Zero Task Force

- A key element ensuring the continued forward-thinking of the Net Zero Action Plan (NZAP) is the plan's mandate that a detailed review of the whole suite of actions by a stakeholder Task Force. For this review, Task Force members included eight Residents/Advocates, eight Institutions/Property Owners/Developers, and nine Subject Matter Experts – a total of 25 Task Force members

Residents

David Adamian,
CEO of Greener U
Gaurab Basu,
Physician
Peter Crawley,
CPAC Representative
Margery Davies,
Mother Out Front Representative
Henrietta Davis,
Former Mayor of Cambridge
Jan Devereux,
Former Vice Mayor/Representative of Green Cambridge
Adam Gould,
Representative of Youth Climate Activists
Kolin Loveless,
Representative from Neighborhood Nine

Institutions, Property Owners and Developers

Jane Carbone,
Director of Development for Homeowners Rehab
Deborah Donovan,
VP of Env., Health and Safety at Takeda
Tom Evans,
Executive Director, Cambridge Redevelopment Authority
Heather Henriksen,
Managing Director of the Harvard Univ. Office of Sustainability
Eli Herman,
Construction Manager for Akelius Real Estate
Rick Malmstrom,
Executive Director of Sustainable Operations for Alexandria Real Estate
Ben Myers,
VP of Sustainability for Boston Properties
Julie Newman,
Director of the MIT Office for Sustainability

Subject Matter Experts

Lauren Baumann,
VP of New Ecology
David Bisson,
Business Development Manager for Resonant Energy
Andrea Love,
Resident and Green Building Design Expert with Payette Architects
Chris Leary,
VP at Jacobs Architects
Paul Lyons,
Resident and CEO of Zapotec Energy
Steve Miller,
Energy Efficiency Consultant for Eversource
Gabe Shapiro,
Co-founder All-in-Energy
Tom Sieniewicz,
Resident and member of Planning Board
Jen Stevenson Zepeda,
Director of Research and Operations for Climable

Net Zero Task Force Meetings

The Task Force was convened via Zoom webinar for a total of five full-group Task Force Meetings and six Working-group Meetings. The Taskforce Meetings were designed to cover:

a) NZAP review context and goal-setting
b) Existing data sources and program evaluation approaches
c) NZAP strategy and action update recommendations
d) Equity assessment and updated implementation plan

TASK FORCE OBJECTIVES

- Explore and update strategy as appropriate including actions, targets, and timeline for achieving net zero emissions.
- Provide recommendations outlining short-term (1-2 years), medium-term (3-5 years) and longer-term actions (6-10 years).
- Provide input on design and implementation for each action including regulations to consider, planning measures, incentives, and initiatives.
- Provide feedback on the projected impacts of each action.
- Agree on an ongoing communication, reporting and accountability strategy.

TASK FORCE MEETING STRUCTURE

- 5 Full Task Force Meetings held
- 2 sessions for each working group

1. Introductions & Context
2. Goal Setting
3. Strategies
4. Impact Analysis
5. Implementation

Working Group Meetings

Energy Efficiency

New Construction

Energy Supply

Recommendations

- ***GHG Emissions Overview***
- ***Equity Review***
- ***Historical Recap***

- ***Review data, impacts, and frameworks***

- ***Level-setting, brainstorming potential adjustments***

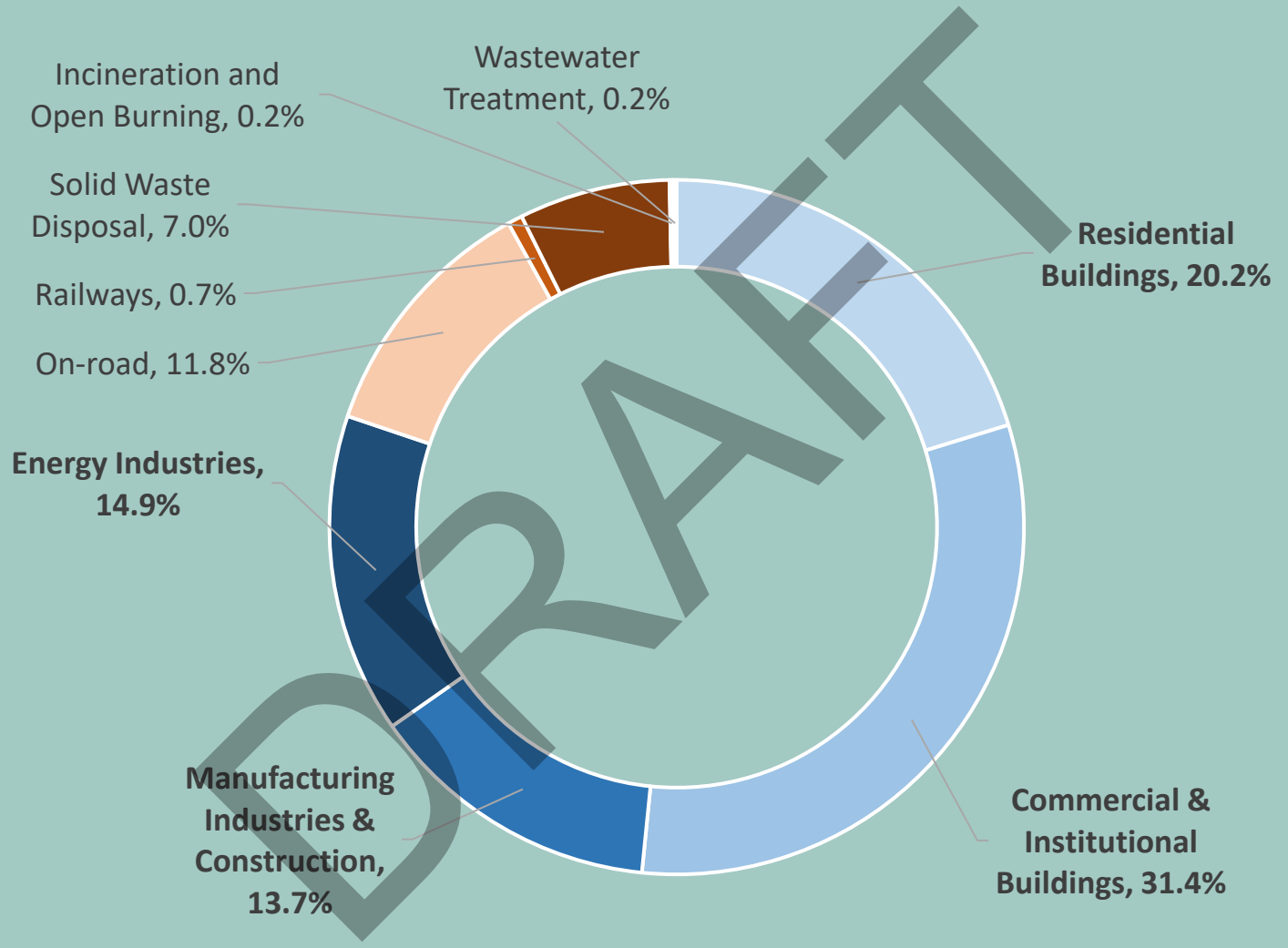
- ***Generate and confirm proposed adjustments***

- ***Review the analysis results and timelines***

- ***Prioritization of actions and activities***

NZAP Impacts to Date

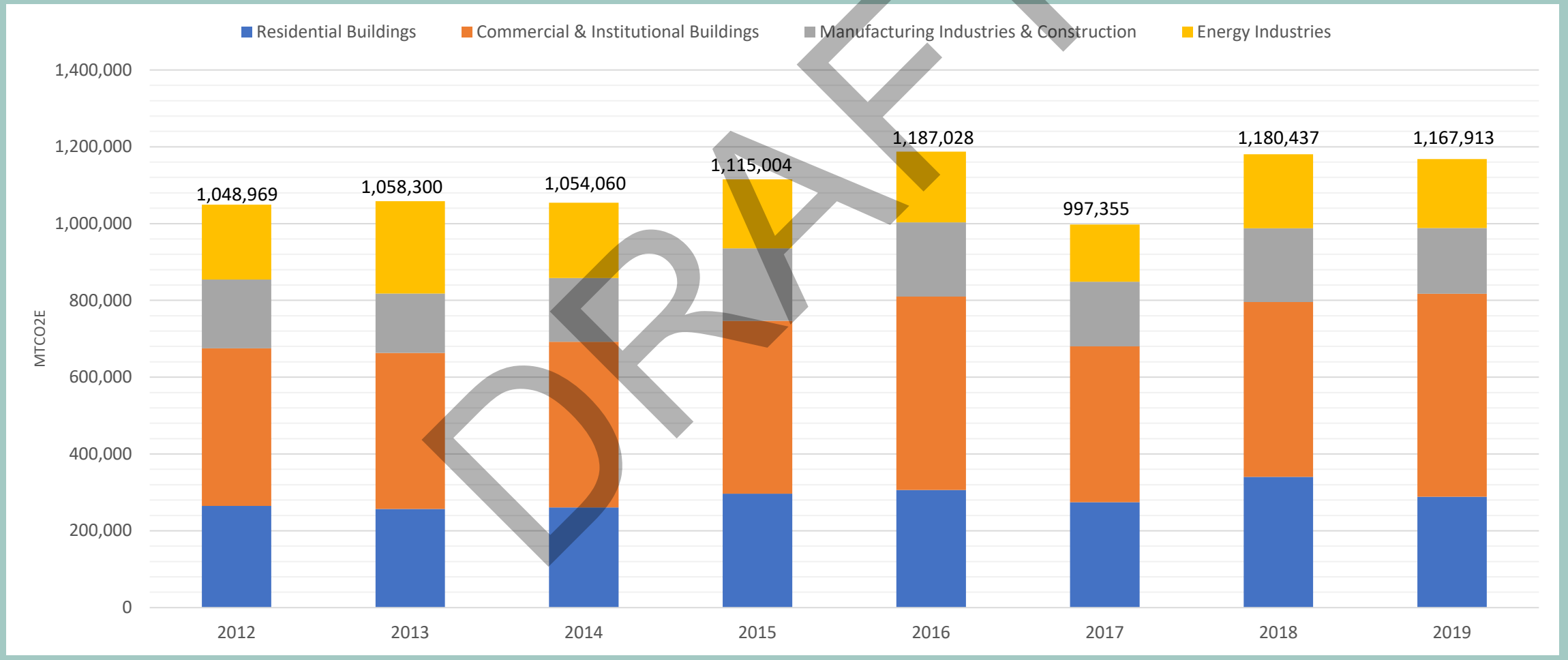
Cambridge Community GHG Inventory



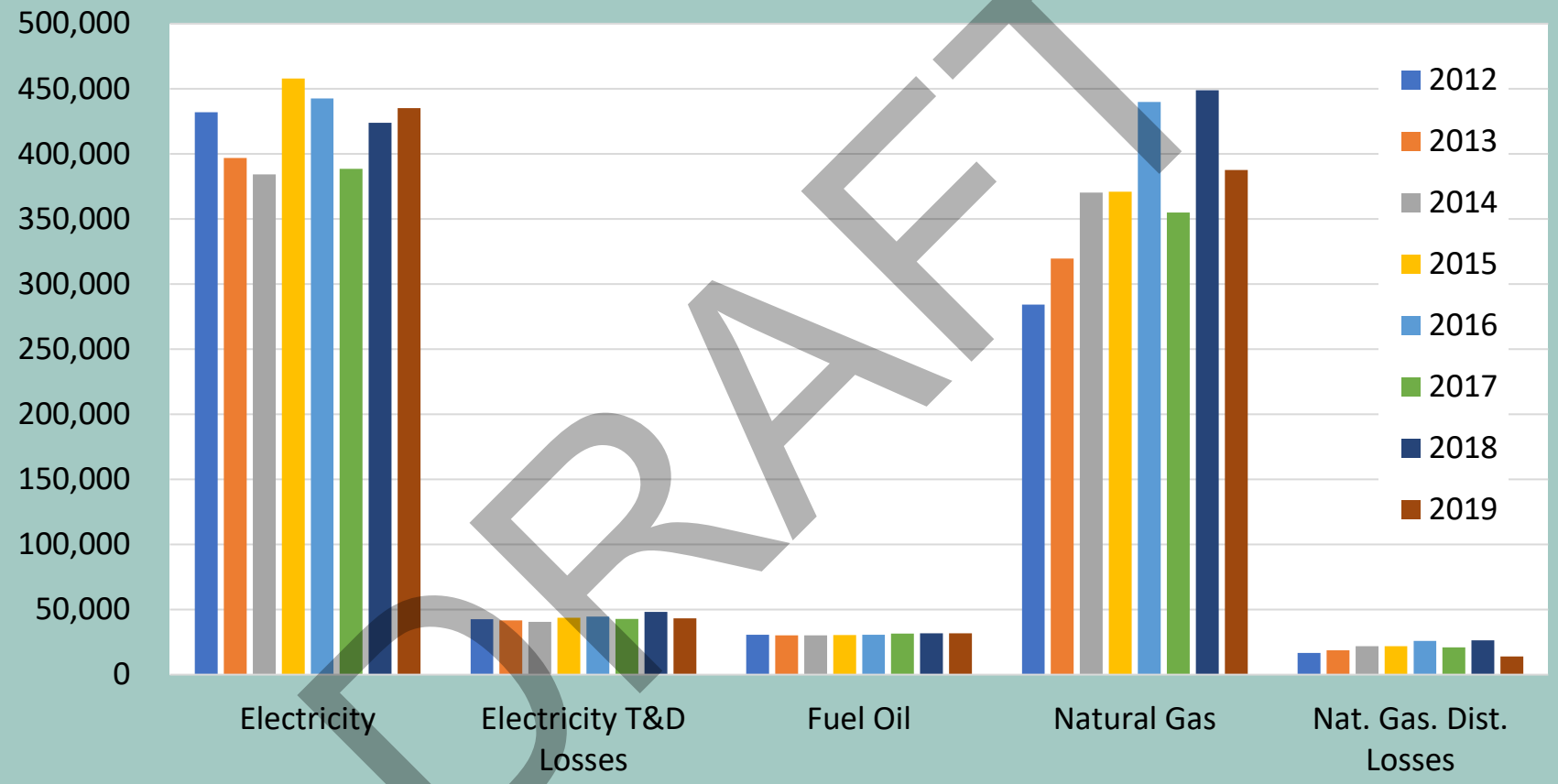
Cambridge Community-wide Emissions by sub-sector (2012)

Net Zero Action Impacts To-date

Building Sector Emissions Trends 2012 - 2019

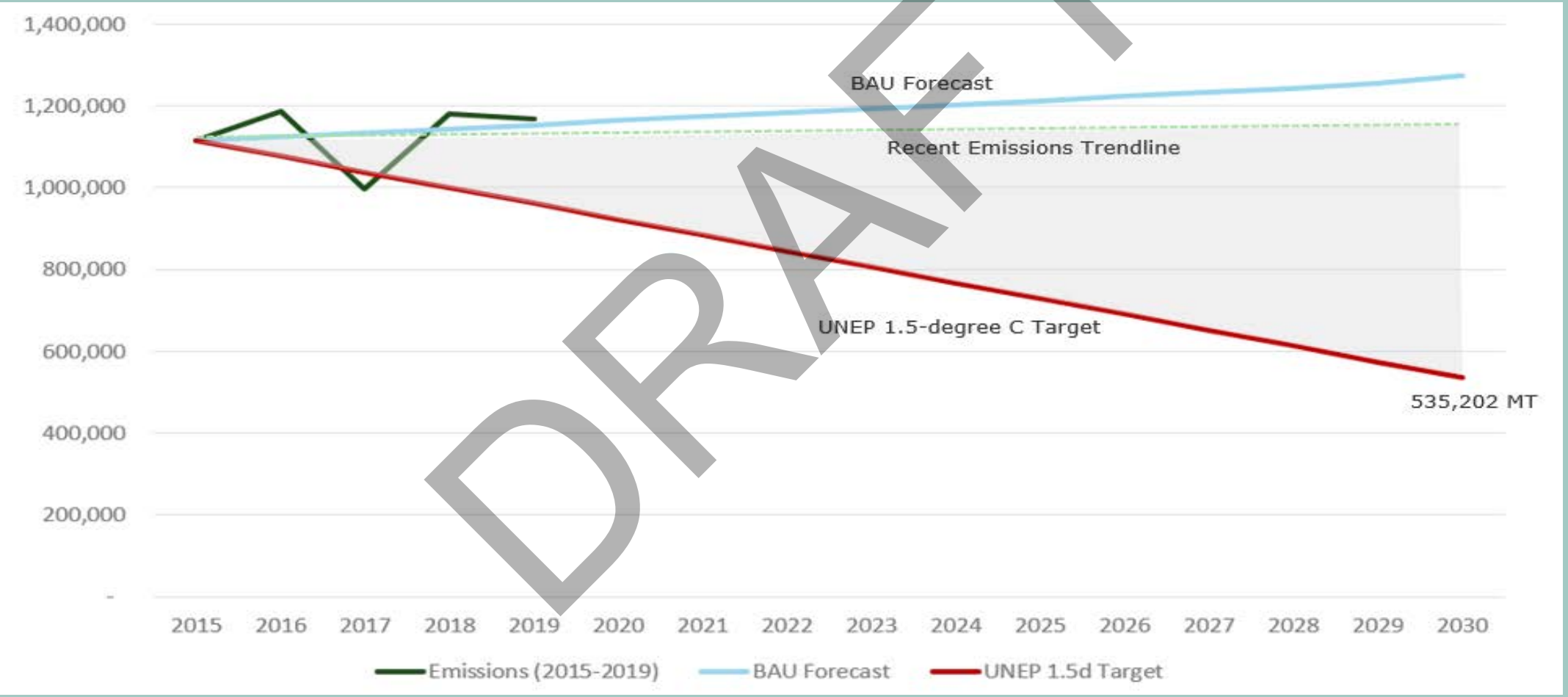


GHG Emissions Y-o-Y Trends by Fuel



Net Zero Action Impacts To-date

Comparison of Recent Trends to the 2030 UNEP Aligned Emissions Target



Net Zero Action Impacts To-date

The impact assessment involved a review of community-wide emissions trends in recent years in relation to future goals as well as a bottom-up assessment of the NZAP actions adopted in 2015. The combination of these two approaches helped determine the overall impacts of the NZAP since 2015. The review of the original NZAP actions found that:

- The **2015 NZAP has laid the groundwork to reduce emissions** from the City of Cambridge building stock with quantifiable performance from five strategies.
- **Nearly 1,100 buildings in the city now report their energy and water usage** to the city annually through the Building Energy Use Disclosure Ordinance (BEUDO) providing valuable information to the city about energy use in these buildings.
- The **long lead time in obtaining project performance data** for some of the NZAP actions makes it difficult to determine the real impacts of the program over the initial five-year period.
- While it is expected the emissions trajectory will turn downward in the coming years the **city needs to remain aggressive** in its approach and find additional ways to cut emissions.

Measurable Results To-date

- **1,450 units** in the Custom Retrofit Program (Action 1.1.1)
- **54 projects** completed under Article 22, Green Building Requirements representing over **8 million SF** (Action 2.3)
- **78 projects** completed as part of the Renewal of Municipal Buildings Action **saving 4 million kWh** of electricity (Action 2.4.2)
- **445 Rooftop PV systems** installed under the Cambridge Solar programs, **~5 MW of capacity**
- **12,592 MTCO2e** estimated emissions reduced from these actions or **~1% of all building sector emissions**

Measurable Results To-date

Other notable items:

Action 2.4.1, Net Zero Requirement for New Construction of Municipal Buildings: Has influenced the standards for design for new municipal buildings. Projects that align with these standards include:

- The King Open School (2019) – Fossil fuel free
- 859 Mass Ave (2017) – Deep energy retrofit with GSHPs
- Martin Luther King School (2016) – 69% energy performance improvement

Building Energy Use Disclosure Ordinance (BEUDO)

- Enacted in 2016 has led to nearly 1,100 buildings in the city that now report their energy and water usage to the city annually

- While no emissions savings are currently attributed at this time, we anticipate that the addition of the performance improvement requirement will result in significant impacts in the coming years

Status of NZAP Actions

Legend:
- In progress
- Behind Schedule
P - Parked

Action 1 – Energy Efficiency in Buildings

Action No.	Action	Description	Stage	Impact	Status as of 2020
1.1.1	Custom Retrofit Program	Multi-Family Energy Pilot in implementation. Custom Retrofit Program for BEUDO* buildings in implementation	Implementation	Medium	
1.1.2	Additional BEUDO Requirements	Amendment proposal is ready to move forward but behind original schedule	Regulatory	High	
1.1.3	Upgrades at Time of Renovation or Sale	Time of Renovation or Sale requirement feasibility assessment completed through Zero Cities project	Feasibility	High	
1.1.4	O&M Plan Requirement	BEUDO process included the creation of O&M plan template	N/A	Low	P

Status of NZAP Actions

Action 2 – Net Zero New Construction

Action No.	Action	Description	Stage	Impact	Status as of 2020
2.1	Net Zero New Construction	Technical and economic feasibility study for net zero small residential buildings (1-3 units) completed	Feasibility	Low	
2.2.1	Market Based Incentive Program	Completed feasibility study of market incentives for new buildings	N/A	Low	P
2.2.2	Height and FAR Bonus	Determined not to be desirable as standalone policy given upcoming requirements	N/A	Low	P
2.3	Article 22 Green Building Requirements	Previously delayed requirements have been adopted	Implementation	Medium	

Status of NZAP Actions

Action 2 – Net Zero New Construction (cont.)

Action No.	Action	Description	Stage	Impact	Status as of 2020
2.4.1	Net Zero Requirement for New Const. of Municipal Buildings	New municipal buildings being designed to achieve net zero emissions	Implementation	Low	
2.4.2	Renewal of Municipal Building	Continued implementation of Municipal Facilities Improvement Plan	Implementation	Low	
2.5	Removal of Barriers to Increased Insulation	Previously delayed requirements have been adopted	Regulatory	Low	

Status of NZAP Actions

Action 3 – Energy Supply

Action No.	Action	Description	Stage	Impact	Status as of 2020
3.1	Low Carbon Energy Supply	Implementation of multiple study recommendations in progress	Implementation	High	
3.2	Rooftop Solar Ready Requirements	Solar installation requirement technical analysis completed	Feasibility	Medium	
3.3	Develop a Memorandum of Understanding with Local Utilities	Pursue project-specific collaboration in place of overarching MOU	N/A	Supporting Action	P

Status of NZAP Actions

Action 4 – Low Carbon Fund

Action No.	Action	Description	Stage	Impact	Status as of 2020
4	Investigate Local Carbon Fund	Virtual pilot complete but behind implementation schedule	Design	High	

Status of NZAP Actions

Action 5 – Engagement and Capacity Building

Action No.	Action	Description	Stage	Impact	Status as of 2020
5.1	Communications Strategy	Implementation of multi-faceted communication strategy ongoing	Implementation	Supporting Action	
5.2	Develop Ongoing Capacity to Manage Getting to Net Zero Project	Program Wide Review delayed due to COVID-19	Implementation	Supporting Action	
5.3	Net Zero Labs Standards	In progress through Compact for a Sustainable Future workplan	Design	Medium	

2021 NZAP Actions

Recommended NZAP Adjustments to Actions

- The adjustments to the 2015 NZAP actions were a result of a lengthy stakeholder engagement process and a robust technical analysis of the possible impacts of the actions in the coming decades. These adjustments provide the city with a set of actions more focused on activities that the city has control over while also taking into consideration activities at the state level and of the local utilities

2015 NZAP	Recommended Adjustments for the 2021 NZAP Update
Action 1 Energy Efficiency	Action Area 1: Energy Efficiency in Existing Buildings
1.1.1 Custom Retrofit Program	Action 1.1 Custom Retrofit Program for Residential (up to 50 units) and Small Commercial
1.1.2 Additional BEUDO Requirements	Action 1.2 BEUDO Requirements
1.1.3 Upgrades at Time of Renovation	Action 1.2.1 BEUDO Performance Requirements
1.1.4 Operation and Maintenance Plans for New Const.	Action 1.2.2 BEUDO Resource Hub
Action 2 Net Zero New Construction	Action 1.3 Upgrades at Transaction Points
2.1 Net Zero New Construction	Action Area 2: Net Zero New Construction
2.2 Net Zero Incentives	Action 2.1 Net Zero Requirements for New Construction
2.2.1 Market-based Incentives	Action 2.2 Address Embodied Carbon through Green Building Requirements *NEW*
2.2.2 Height and FAR Bonus	Action 2.3 Net Zero Requirements for Municipal Buildings
2.3 Increase Green Building Requirements	Action Area 3: Low Carbon Energy Supply
2.4 Net Zero New Construction for Municipal Buildings	Action 3.1 Carbon Free Thermal Energy
2.5 Removal of Barriers to Increased Insulation	Action 3.2 On-site Renewable Electricity Access
Action 3 Energy Supply	3.2.1 Rooftop Solar Requirement
3.1 Low Carbon Energy Supply	3.2.2 Community Solar Access *NEW*
3.2 Rooftop Solar Ready Requirement	Action 3.3 Off-site Renewable Electricity Access *NEW*
3.3 Develop a MOU with Local Utilities	Action Area 4: Financing and Capacity Building
Action 4 Investigate Local Carbon Fund	Action 4.1 Local Carbon Fund and Community Aggregation
Action 5 Engagement and Capacity Building	
5.1 Communications Strategy	
5.2 Develop Ongoing Capacity to Manage the NZAP	
5.3 Net Zero Lab Standards	

Updated net zero action plan

Action Area 1: Energy Efficiency in Existing Buildings

- Action 1.1: Custom Retrofit Program for Residential and Small Commercial Buildings
- Action 1.2: BEUDO Performance Requirements
- Action 1.3: Upgrades at Transaction Points

Action Area 2: Net Zero New Construction

- Action 2.1: Net Zero Requirements for New Construction
- Action 2.2: Address Embodied Carbon through Green Building Requirements *NEW*
- Action 2.3: Net Zero Requirements for Municipal Buildings

Action Area 3: Low Carbon Energy Supply

- Action 3.1: Carbon Free Thermal Energy
- Action 3.2: On-Site Renewable Energy Access
- Action 3.3: Off-Site Renewable Energy Access *NEW*

Action Area 4: Financing and Capacity Building

- Action 4.1: Investigate Creation of Local Carbon Fund (Aggregation 3.0)

Action Area 1 – Energy Efficiency in Existing Buildings

2015 Structure:

- Action 1.1.1 Custom Retrofit Program
- Action 1.1.2 Additional BEUDO Requirements
- Action 1.1.3 Upgrades at Time of Renovation
- NEW Financing Access Action
- Action 1.1.4 Operations and Maintenance (being addressed under BEUDO)

2021 Updated Structure:

- Action 1.1 Custom Retrofit Program for Residential (up to 50 units) and Small Commercial
- Action 1.2 BEUDO Requirements
  - Action 1.2.1 BUEDO Performance Requirements
  - Action 1.2.2 BEUDO Resource Hub
- Action 1.3 Upgrades at Transaction Points

1.1 Custom Retrofit Program for Residential (up to 50 units) and Small Commercial

Overview

The intent of this action is to ensure that small-med residential and small commercial buildings are operating optimally and, where possible, are retrofitted to maximize efficiency and GHG reductions. In addition to these requirements, other tools and policies will be directed broadly across all building types, where appropriate, in order to achieve the necessary emissions savings.

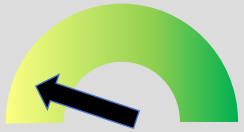
This Action will have 3 areas of focus:

- Multifamily Custom Retrofit
- LMI Multifamily Engagement
- Small Commercial Custom Retrofit

Contribution to Net Zero Objective

This set of actions is instrumental to increasing the energy efficiency of those buildings that are not covered by the BEUDO performance requirements. It will build significant capacity among building owners and industry, and it will increase equity by reducing energy costs and providing energy investment opportunities for smaller stakeholders

Anticipated Level of GHG Reductions



0 MT >5.0 Million MT

Key Activities

Short Term (1-2 Years)

1. Evaluate pilot programs to gauge impacts and identify strategies and adjustments that may be made to maximize participation
2. Determine program adjustments to:
    - Coordinate with MassSave program offerings
    - Identify a path for more adequately engaging LMI households
    - Continue to establish the CEA as a resource hub for energy management information for homes and small businesses
3. Integrate resilience and electrification with energy efficiency offerings

Medium Term (3-5 Years)

1. Identify means of access to project financing
2. Increase transparency in program implementation

Long Term (5+ Years)

1. Integrate implementation into Community Aggregation

Equity

Equitable Design: Leverage Cambridge Energy Alliance (CEA) to engage residents and small businesses in retrofit programs and facilitate their participation.

Equitable Implementation: Track retrofits and provide publicly available updates about the distribution of retrofits

Cross-cutting Issues

Renewable Thermal Systems: Retrofits present an opportunity for replacement of fuel-based systems with electric systems

Climate Change Preparedness / Resilience: consider incorporating resilience improvement assessments as part of any audit or EE improvement

Electric Transport: Consider access to charging stations and implications for buildings electrical equipment

Capacity / Local Carbon Fund: Consider designing carbon fund to supplement costs of improvements for LMI families; provide owners greater access to capital

1.2 BEUDO Requirements (Part 1)

Overview

The Building Energy Use Disclosure Ordinance covers commercial buildings >25,000sf and residential buildings >50 units. While a small proportion of the total number of buildings in Cambridge, these largest buildings account for over 50% of the square footage and approximately 70% of the GHG emissions in Cambridge. By targeting these buildings for improvement, Cambridge will see significant progress in GHG emission reductions. This Action will have two tracks:

1.2.1 Performance Requirements

1.2.2 BEUDO Resource Hub

Contribution to Net Zero Objective

This set of actions is instrumental to increasing the energy efficiency of Cambridge's existing building stock and reducing emissions. BEUDO arms building owners with the knowledge and the tools to identify areas of improvement and take action to implement improvements to their buildings.

Anticipated Level of GHG Reductions

0 MT >5.0 Million MT

Key Activities: 1.2.1 Performance Requirements

Short Term (1-2 years)

1. Finalize performance requirement proposal with stakeholder input and submit amendments to City Council for adoption
2. Integrate performance requirements into BEUDO administration and data platform
3. Establish stakeholder advisory committee to oversee implementation and inform regulations

Medium Term (3-5 years)

1. Monitor building performance and support compliance

Long Term (5+ years)

1. Following completion of first compliance cycle, review performance requirement impacts and adjust ordinance as appropriate

Equity

Equitable Design: Facilitate feedback from building owners and allow for program adjustments to provide the knowledge and tools that different kinds of building owners require.

Equitable Implementation: Track cost impacts on residents, particularly vulnerable tenants including low- and moderate-income tenants and energy-burdened tenants and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: Similar to Retrofits, building performance improvements also present an opportunity for replacement of fuel-based systems with electric systems

Climate Change Preparedness / Resilience: Consider incorporating resilience improvement assessments as part of any building improvement project

Electric Transport: Consider access to charging stations and implications for buildings electrical equipment

Capacity / Local Carbon Fund: Pursue sharing of best practices through the Cambridge Climate Leaders Initiative

1.2 BEUDO Requirements (Part 2)

Overview

The Building Energy Use Disclosure Ordinance covers commercial buildings >25,000sf and residential buildings >50 units. While a small proportion of the total number of buildings in Cambridge, these largest buildings account for over 50% of the square footage and approximately 70% of the GHG emissions in Cambridge. By targeting these buildings for improvement, Cambridge will see significant progress in GHG emission reductions. This Action will have two tracks:

1.2.1 Performance Requirements

1.2.2 BEUDO Resource Hub

Contribution to Net Zero Objective

This set actions is instrumental to increasing the energy efficiency of Cambridge's existing building stock and reducing emissions. BEUDO arms building owners with the knowledge and the tools to identify areas of improvement and take action to implement improvements to their buildings.

Projected GHG Reductions

This is an emissions reduction enabling action intended to help facilitate the requirements of 1.2.1 (BEUDO Performance)

Key Activities: 1.2.2 BEUDO Retrofit Support

Short Term

1. Continue and expand Building Energy Retrofit Program and Resource Hub to support BEUDO buildings to achieve performance requirement goals, including assistance with energy efficiency, electrification, and renewable electricity as well as project finance options
2. Consider merging current Steering Committee with BEUDO advisory committee

Medium Term

1. Monitor support program effectiveness and adjust to meet building needs

Long Term

1. Integrate support program with Community Aggregation

Equity

Equitable Design: Facilitate feedback from building owners and allow for program adjustments to provide the knowledge and tools that different kinds of building owners require.

Equitable Implementation: Track cost impacts on residents, particularly vulnerable tenants including low-and moderate-income tenants and energy-burdened tenants and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: Similar to Retrofits, building performance improvements also present an opportunity for replacement of fuel-based systems with electric systems

Climate Change Preparedness / Resilience: consider incorporating resilience improvement assessments as part of any building improvement project

Electric Transport: Consider access to charging stations and implications for buildings electrical equipment

Capacity / Local Carbon Fund: Pursue sharing of best practices through the Cambridge Climate Leaders Initiative

1.3 Transaction Points Upgrade Requirements

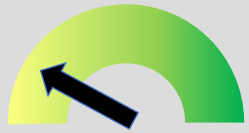
Overview

The intent of this action is to ensure that all buildings are updated and operating optimally when an owner or new tenant transaction occurs. Further, this action is intended to deliver decarbonized buildings in a way that is financially feasible. Transaction points may include time of sale, time of lease, and time of renovation/permit application. Transactions may also include time of replacement for heating and cooling systems, recognizing that there are few replacement opportunities for this equipment before 2050.

Contribution to Net Zero Objective

This action is key to both increasing the energy efficiency of Cambridge's existing building stock and replacing fossil fuel-based equipment with renewable thermal systems.

Anticipated Level of GHG Reductions



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Key Activities:

Short Term (1-2 Years)

1. Complete program design, including:
   - Determine means for tracking triggering events
   - Studying options for time-of-lease requirements
   - Studying financial options tied to transaction points
2. Develop toolkits/templates for use at transaction points
3. Implement contractor education program
4. Consider adoption of energy audit requirements at transaction points to identify retrofit opportunities

Medium Term (3-5 Years)

1. Institute initial upgrade requirements at transaction points (sale, lease, renovation, replacement) based on short term lessons learned
2. Establish a resource hub to provide technical and economic support to building owners to achieve upgrades
3. Implement transaction requirements and monitor performance and impacts

Long Term (5+ Years)

1. Assess feasibility of increasing the transaction performance improvement requirements to achieve net zero emissions.
2. Use the Community Aggregation as a means to achieve transaction-based upgrades

Equity

Equitable Design: These improvements would greatly enhance indoor environmental conditions and enhance EE (and potentially lower energy costs), which would be of the greatest benefit to the most vulnerable households that tend to have higher energy burdens and lower indoor air quality. However, these improvements could also increase property values and rents, which would be of the greatest burden to low- and moderate-income households.

Equitable Implementation: Track impacts on energy costs, property values and rents and provide publicly available updates to facilitate transparency and accountability

Cross-cutting Issues

Renewable Thermal Systems: Time of renovation also presents an opportunity for replacement of fuel-based systems with electric systems

Climate Change Preparedness / Resilience: Consider incorporating resilience improvement assessments as part of any audit or EE improvement

Electric Transport: Consider access to charging stations and implications for buildings electrical equipment

Capacity / Local Carbon Fund: Consider designing carbon fund to supplement costs of improvements or offsetting losses incurred while units are vacant

Action 2 – Net Zero New Construction

2015 Structure:

- Action 2.1 Net Zero Targets for New Construction
- Action 2.2 Net Zero Incentives
  - 2.2.1 Market-based Incentive Programs
  - 2.2.2 Height + FAR Bonus
- Action 2.3 Increase Green Building Requirements
- Action 2.4 Net Zero Requirements for Municipal Buildings
  - 2.4.1 Net Zero Requirement for New Construction
  - 2.4.4 Deep Retrofits of Municipal Buildings
- Action 2.5 Removal of Barriers to Increased Insulation

2021 Updated Structure:

- Action 2.1 Net Zero Requirements for New Construction
- Action 2.2 Address Embodied Carbon through Green Building Requirements
- Action 2.3 Net Zero Requirements for Municipal Buildings

2.1 Net Zero Requirements for New Construction

Overview

The initial net zero new construction targets developed for the NZAP are considered outdated and require alignment with current standards practices, state-level code initiatives, and the urgency of addressing climate impacts from new construction activities. These original targets can be used as a reference point, and as more information about the state net zero stretch code along with the rate of market adoption and feasibility of achieving NZE in new buildings, the target dates for adopting sector-based NZE will need to be updated.

Contribution to Net Zero Objective

The recommended targets are intended to show leadership and create an environment of innovation. The recommended net zero target years will be reassessed pending regulatory changes. Any Net Zero goal is to account for emissions related to all ongoing operations of a facility, including on-site combustion and purchased energy.

Anticipated Level of GHG Reductions

0 MT >5.0 Million MT

Key Activities

Short Term (1-2 Years)

1. Advocate for a state-level net zero stretch code approach that aligns with Cambridge's net zero emissions priorities
2. Compile net zero resources and templates for the building community to achieve net zero standards by construction type
3. Monitor and assess opportunities to avoid fossil fuel use in new construction
4. Adopt state net zero stretch code as early as possible

Medium Term (3-5 Years)

1. Revisit and assess timeline for net zero new construction by building type based on state code structure

Long Term (5+ Years)

1. Monitor performance of new construction and assess needs for additional adjustments

Equity

Equitable Design: Equitable action design: To avoid any negative effects on housing cost and production, the timeline needs to be balanced with education of market actors should be aware (or made aware) of the costs and benefits of net zero buildings.

Equitable Implementation: Track the impact of Net Zero requirements on the costs borne by vulnerable tenants, including low- and moderate-income tenants and energy-burdened tenants, and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Climate Change Preparedness / Resilience: Ensure that NZE aligns with all-electric construction with resilient design strategies. Consider requiring a resilience narrative as a part of permit process

Electric Transport: Consider requiring charging station access or charging station ready design

Capacity / Local Carbon Fund: For any building unable to achieve ZNE, contributions should be made to the carbon fund; will need to determine what those contributions are and when the fund/CCA will be able to accept payments

2.2 Address Embodied Carbon through Green Building Requirements

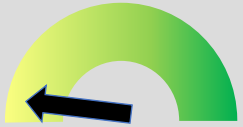
Overview

The Zoning Ordinance is a regulatory tool that Cambridge can use to incrementally require higher standards of green building and energy efficiency for large commercial projects. As we begin to transition to net zero codes, this action will also continue to evolve. While green buildings reduce energy consumption, they also provided opportunities for overlapping sustainability outcomes including social equity, human-health, and environmental stewardship. This action also provides the opportunity for the city to address another not previously considered, but highly impactful source of carbon emissions: Embodied Carbon.

Contribution to Net Zero Objective

This regulatory approach is a strong tool to demonstrate the City's commitment and leadership on sustainable new construction. Going forward, Net Zero projects should consider the impact of both embodied carbon and operational carbon. Including Embodied carbon neutrality in the NZAP is an important step in the pathway to achieve a net zero carbon future.

Anticipated Level of GHG Reductions



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Key Activities

Short Term (1-2 Years)

1. Adopt embodied carbon narrative for new construction.
2. Implement LEED alternative pathways
3. Design and develop policy to prioritize re-use
4. Design carbon intensity targets
5. Develop toolkit / templates
6. Perform technical assessment of carbon impacts
7. Participate in peer learning sessions with other cities

Medium Term (3-5 Years)

1. Adopt Life Cycle Analysis/carbon reduction requirements
2. Assess zero carbon certification
3. Implement and monitor performance

Long Term (5+ Years)

1. Adopt enhanced LCA/carbon reduction requirements

Equity

Equitable Design: The City of Cambridge can design its green building requirements to prevent inequitable housing cost increases by, for example, prohibiting cost increases that exceed the cost of green building upgrades. Specific policy language can also build in flexibility to allow for ajustments if inequitable housing cost impacts arise.

Equitable Implementation: Once green building requirements are in place, the City should:

- Provide publicly available and language-equitable updates to facilitate transparency and accountability; and
- If the policy is adjusted, the community should be engaged to provide guidance and feedback.

Cross-cutting Issues

Renewable Thermal: Consider all-electric design as part of the new construction standards

Climate Change Preparedness / Resilience: Align green buildings requirements with recommendations from Climate Resilient Zoning Task Force

Electric Transport: Consider requirements electric vehicle charging access in the design of new buildings

Capacity / Local Carbon Fund: This action presents an opportunity for sharing information and education the market on the issue of embodied carbon

2.3 Net Zero Requirement for New Construction + Deep Retrofits of Municipal Buildings

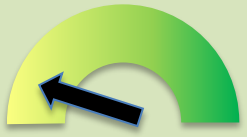
Overview

The City should maintain its commitment to all future new construction projects being net zero emissions and fossil fuel-free. This will demonstrate a commitment to the net zero and renewable thermal objectives and provide a showcase as to how to achieve energy efficient design. Existing buildings should be retrofit to maximize GHG reduction opportunities as appropriate

Contribution to Net Zero Objective

There is significant benefit to the City demonstrating leadership by committing to achieving net zero emissions in its own building stock. This shows the City's commitment, demonstrates that net zero is achievable, will generate savings and chart a path to net zero for private industry.

Anticipated Level of GHG Reductions



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Key Actions:

Short Term (1-2 Years)

2.4.1 Net Zero Requirement for New Construction of Municipal Buildings Establish a formal policy that new construction of municipal buildings will achieve net zero and be fossil fuel-free.

2.4.2. Renewal of Municipal Buildings Formalize as a policy that (1) greenhouse gas reduction is a priority when constructing facility improvement projects and (2) operational improvements will be implemented to achieve targets established and tracked by the Cambridge Department of Public Works.

- Define the aforementioned targets for operational improvements
- City of Cambridge to prioritize evaluation of Embodied Carbon

Medium Term (3-5 Years)

2.4.1. Continue Net Zero Requirement for New Construction of Municipal Buildings

2.4.2. Renewal of Municipal Buildings Continue to implement municipal building improvement strategy piloting new technologies and emerging practices, and track improvements (GHG reduction) annually.

Long Term (5+ Years)

2.4.1. Consider additional objectives for newly constructed municipal buildings

2.4.2. Renewal of Municipal Buildings Continue to implement municipal building improvement strategy

Equity

Equitable Design

By leading in designing new and retrofit net zero buildings, the City can demonstrate the health and cost benefits of these buildings for residential projects, as well as potentially driving demand for additional jobs in the clean energy sector.

Equitable Implementation

Track implementation and provide publicly available updates to facilitate transparency and accountability

Cross-cutting Issues

Renewable Thermal: All new municipal buildings should be designed to be fossil fuel-free

Climate Change Preparedness / Resilience: Municipal building should remain in operation and serve as a resource to the community during emergency events

Electric Transport: The city may demonstrate leadership by installed EV charging station at municipal buildings

Capacity / Local Carbon Fund: This action builds capacity through demonstrated leadership and piloting new technology

Actions 3 – Energy Supply

2015 Structure:

- Action 3.1 Low Carbon Energy Supply Strategy
- Action 3.2 Rooftop Solar Ready Requirement
- Action 3.3 Develop a MOU with Local Utilities

2021 Updated Structure:

- Action 3.1 Carbon-Free Thermal Energy
- Action 3.2 On-site Renewable Electricity Access
  - Action 3.2.1 Rooftop Solar Requirements
  - Action 3.2.2 Community Solar Access
- Action 3.3 Off-site Renewable Electricity Access

3.1 Carbon-free Thermal Energy

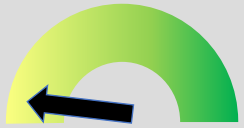
Overview

To achieve net zero and improve community resiliency will require a significant shift in the supply of energy to Cambridge buildings away from fossil fuel-based sources and toward low- or zero-carbon sources. This will include transitioning many buildings to electric-based systems, developing additional district energy capacity, and planning for an equitable phase out of fossil fuel supply infrastructure. The objective of this strategy is for the City of Cambridge to support the broad implementation and transition to low carbon thermal energy in Cambridge.

Contribution to Net Zero Objective

Roughly half of the emissions attributed to the building sector are from thermal energy use. While opportunities for emissions free district energy are limited, there may be opportunities with new developments to encourage the use of district energy as well as opportunities to support private developers with microgrid and other renewable thermal district energy concepts. Further, as more systems are electrified, additional opportunities to decarbonize will be realized if those systems are supplied with electricity produced from renewable resources.

Anticipated Level of GHG Reductions



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Key Activities

Short Term (1-2 Years)

- Continue to advance the Cambridge Clean Heat program to provide technical support and resources for individual building decarbonization
- Engage with development teams to explore options for clean district or renewable thermal energy systems for new buildings
- Identify one virtual microgrid demonstration project
- Begin the study of approaches to equitably transition away from fossil fuel infrastructure

Medium Term (3-5 Years)

- Scale electrification of existing buildings through complementary policies
- Seek to achieve no new new fossil fuel supplied buildings
- Implement virtual microgrid demonstration
- Continue to encourage the development or expansion of district energy systems and consider options for decarbonizing existing systems
- Work with utilities to plan for future energy demands

Long Term (5+ Years)

- Collaborate with regional and state entities to lay groundwork for equitable transition away from existing fossil fuel infrastructure

Equity

Equitable Design: Seek to minimize costs and maximize benefits for vulnerable populations to participate in the transition to carbon-free thermal energy supply.

Equitable Implementation: Track cost impacts stemming from this requirement and publicly report impacts on vulnerable residents including low- and moderate-income, energy-burdened households and small businesses to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: This action would be supportive of and have direct influence over the expansion of renewable thermal systems in the city

Climate Change Preparedness / Resilience: Safety and occupant health may be improved when using electric systems over systems that combust fuels on-site, while also offering an opportunity to raise equipment above projected flood elevations

Electric Transport: N/A

Capacity / Local Carbon Fund: Limited

3.2 On-site Renewable Electricity Access

Overview

On-site renewable energy access is intended to promote on-site renewable energy systems and provide support to building owners who may install these types of systems. This may include, rooftop photovoltaics (PV), solar thermal, battery storage or other system capable of providing a renewable energy to the host building. This Action will have two tracks:

3.2.1 Rooftop Solar Requirements

3.2.2 Improved Access to On-site Renewable Energy

Contribution to Net Zero Objective

The purpose of this requirement is to ensure that all new buildings, and in the future, existing buildings have access to on-site solar generation or could easily be retrofitted at a later date where feasible.

Anticipated Level of GHG Reductions

While the installation of renewable electricity systems such as rooftop photovoltaic (PV) panels produces emissions free electricity, emissions reductions from such projects are not included as contributing to the goals of the NZAP as the RECs from these systems are likely to be traded and counted as emissions reductions elsewhere

Key Activities

(See on-site renewable electricity tracks)

Equity

Equitable Design: Ensure greater access to solar is coupled with mitigation of energy and/or housing cost burdens on residents, which is of particular concern for vulnerable residents including low- and moderate-income and energy-burdened households.

Equitable Implementation: Track solar development and cost impacts and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: Improved the costs-effectiveness of renewable thermal options

Climate Change Preparedness / Resilience: Strong overlap, enables greater access to on-site power supply for when larger grid is down

Electric Transport: On-site renewables may serve as a source of energy for charging electric vehicles

Capacity / Local Carbon Fund: Carbon fund may be used to offset costs of solar installations especially for those LMI communities

3.2.1 Rooftop Solar Requirement

Overview

Cambridge will continue to pursue a requirement for onsite renewable energy generation for new buildings, with a focus on solar. By 2022, all roofs on new construction projects should include solar PV and/or thermal.

Contribution to Net Zero Objective

The purpose of this requirement is to ensure that all new buildings, and in the future, existing buildings have access to on-site solar generation or could easily be retrofitted at a later date where feasible.

Projected GHG Reductions

Key Activities

Short Term (1-2 Years)

- Study the potential to integrate a solar installation requirement with existing green roof requirements in collaboration with universities
- Adopt a solar PV or solar thermal installation requirement for new buildings based on the feasibility study

Medium Term (3-5 Years)

- Consider expanding solar ready requirement to existing buildings by applying the requirements for solar ready to major roof replacements.

Long Term (5+ Years)

- Enhanced solar requirement: Determine means to increase on-site renewable generation requirements on existing buildings.

Equity

Equitable Design: Ensure greater access to solar is coupled with mitigation of energy and/or housing cost burdens on residents, which is of particular concern for vulnerable residents including low- and moderate-income and energy-burdened households.

Equitable Implementation: Track solar development and cost impacts and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: Improved the costs-effectiveness of renewable thermal options

Climate Change Preparedness / Resilience: Strong overlap, enables greater access to on-site power supply for when larger grid is down

Electric Transport: n/a

Capacity / Local Carbon Fund : Carbon fund may be used to offset costs of solar installations especially for those LMI communities

3.2.2 On-site Renewable Electricity Access

Overview

Building off the solar initiatives undertaken to-date, Cambridge will pursue implementing a third-party administered on-site solar action initiative. The primary aim of this program will be to offer a no-cost opportunity for Cambridge building owners to participate in the development of solar projects while increasing solar access for those who can't install solar on their own homes. The program will have similar aspects to the Cambridge Energy Alliance (CEA) but is designed to overcome previous shortfalls including funding issues, developer/owner partnerships, and design.

Contribution to Net Zero Objective

This program will be designed to facilitate further development of solar and other distributed energy resources on-site. While reducing emissions, the program is also intended to promote resilience and enable access to solar for community-members where there would otherwise exist economic barriers.

Projected GHG Reductions

Key Activities

Short Term (1-2 Years)

- Further design of solar administrator program, including function, structure, and funding
- Initiate solicitation for solar administrator based on program design

Medium Term (3-5 Years)

- Continue to expand access to solar for all populations
- Integrate program with Virtual Microgrid concepts
- Review progress to-date

Long Term (5+ Years)

- Integrate with the community aggregation program

Equity

Equitable Design: May enable greater residential and commercial access to solar and spur new pathways to mitigate initial cost impacts, which would be of the greatest benefits for vulnerable residents including low- and moderate-income and energy-burdened households.

Equitable Implementation: Track solar development and cost impacts and provide publicly available updates to facilitate transparency and accountability.

Cross-cutting Issues

Renewable Thermal Systems: Improves the cost effectiveness of renewable thermal systems

Climate Change Preparedness / Resilience: Strong overlap, enables greater access to on-site power supply for when larger grid is down

Electric Transport: N/A

Capacity / Local Carbon Fund: Carbon fund may be used to offset costs of solar installations especially for those LMI communities

3.3 Off-site Renewable Electricity Access

Overview

While energy efficiency and on-site renewable generation will contribute to buildings achieving NZE, the dense urban context in Cambridge requires that off-site renewable electricity access be a part of the NZE mix as well. Not all off-site renewable contracts will have the same impact, however. When seeking to procure Off-site renewables projects must meet the following criteria: 1. A procurement supports a renewable energy project that is new; 2. RECs are assigned to the building or aggregated portfolio of buildings in Cambridge for the duration of the contract; 3. The source is an approved renewable energy generating system.

Contribution to Net Zero Objective

This action is designed to facilitate access to renewable energy resources when demand reduction, and on-site renewables are not adequate for meeting NZE performance targets.

Projected GHG Reductions

This action is considered an emissions reductions enabling action intended to support BEUDO performance requirements, and net zero new construction as well as provide an option for off-site RE purchasing through aggregation for smaller businesses.

Key Activities

Short Term (1-3 Years)

1. Formalize off-site RE criteria
2. Develop dual pathways for building owners to choose as a compliance option; City sponsored aggregation and VPPA pathway for corporate entities
3. Create a central repository of informational resources and technical support to address the questions and information needs of building owners and property managers.

Medium Term (3-5 Years)

1. Implement City-sponsored aggregation pathway for residences and small businesses
2. Integrate funding / revenue generating opportunities with financing vehicle established in Financing and Capacity Action

Long Term (5+ Years)

1. Integrate with the community aggregation program

Equity

Equitable Design

Seek to enable RE supply options which are cost-neutral or generate savings and decrease energy cost volatility, which is of particular concern for vulnerable residents including low- and moderate-income and energy-burdened households.

Equitable Implementation

Track cost impacts and provide publicly available updates to facilitate transparency and accountability

Cross-cutting Issues

Renewable Thermal Systems: Limited

Climate Change Preparedness / Resilience: Limited (greater supply of RE energy for transport)

Electric Transport: N/A

Capacity / Local Carbon Fund: CCA 3.0 to be key vehicle for delivering off-site renewable electricity

Actions 4 – Financing and Capacity Building

2015 Structure:

- Action 4 Investigate Local Carbon Fund

2021 Updated Structure:

- Action 4.1 Local Carbon Fund and Community Aggregation

4.1: Local Carbon Fund (Community Choice Aggregation 3.0)

Overview

For Cambridge to become a net zero community, it will require an annual emissions balance across the entirety of the city's building stock. This new approach to Community Choice Aggregation moves away from the boilerplate green energy business products of deregulated energy retailers and utilities towards a local ownership pathway allowing for widespread local deployment of DERs, and energy improvements including efficiency improvements and electrification. In addition, the Aggregation program will provide funding and financing access and other technical resources for helping to implement clean energy projects. This action is intended to build upon the short- and medium-term actions described in previous actions with the goal of merging into one multi-purpose aggregation program to serve the city's decarbonization strategies over the longer term.

Contribution to Net Zero Objective

This action provides a mechanism by which projects, companies and individuals can achieve net zero emissions through the direct purchase of electricity, access to energy efficiency and electrification resources, ability to participate in renewable energy purchasing programs. It will be designed to catalyze purchasing and participation for the development of local renewable energy projects or energy retrofits.

Projected GHG Reductions

This action is considered an emissions reductions enabling action intended to facilitate the emission reductions goals of other actions including 1.1 Retrofits, and 3.2 On-site Renewable Energy Access.

Key Activities

Short Term (1-2 Years)

1. Enhance CEA Support and Function
2. Generate list of financing options
3. Program design - CCA 3.0 model development: clearly define responsibilities of the CEA, CCA, Solar Advisor with respect to financing/funding access and capacity building as well as level of interaction between the administrators.
4. Identify a pathway for establishing revolving loan fund

Medium Term (3-5 Years)

1. Investigate acquiring State energy efficiency funds
2. Reassess and Develop the operational model for the CCA 3.0
3. Link relevant activities from other Actions

Long Term (5+ Years)

1. Implement the CCA3.0 and establish the program as the primary vehicle for facilitating NZE for homeowners, renters and business owners by providing them access resources for demand reduction and electrification projects and accessing renewable energy resources

Equity

Equitable Design: A core tenet of Aggregation "3.0" is to target program benefits and investment opportunities at vulnerable residents and businesses, particularly low-income residents and minority-owned small businesses.

Equity Implementation: Track purchasing and participation and provide publicly available updates to facilitate transparency and accountability

Cross-cutting Issues

Renewable Thermal Systems: encourage electrification as part of the energy efficiency programs

Climate Change Preparedness / Resilience: May be used to promote local on-site RE generation that could serve as backup power

Electric Transport: May be used to encourage the installation of charging infrastructure

Capacity / Local Carbon Fund: Could be a mechanism for providing owners greater access to capital and support

2021 NZAP Implementation

Net Zero Task Force Priorities by Action

Cambridge Net Zero Action Plan

Adjusted Actions Ratings by Various Metrics of Interest

Date: May 27, 2021

Action number	Type	Action	**GHG Impacts Rating	**Resilience Rating	**Other Co-benefits Ratin	Summed Benefits Ratings	*Avg Score (Consider.it Po	***Equity Rating	TF Adjusted Ranking
1.2		Action 1.2 BEUDO Requirements	3	2	2	7	80	Flagged	1
4	Enabling	Action 4 Local Carbon Fund (Aggregation 3.0)	3	3	3	9	64	Positive	2
3.3	New	Action 3.3 Off-site Renewable Energy Access	3	1	2	6	62	Flagged	3
1.4	New & Enabling	Action 1.4 Financing and Capacity Building	3	1	2	6	36	Positive	4
2.1		Action 2.1 Net Zero Requirements for New Constructio	2	3	2	7	71	Flagged	5
2.5	New	Action 2.5 Embodied Carbon Management	1	2	1	4	30	Neutral	6
1.3		Action 1.3 Upgrades at Transaction Points	2	3	3	8	39	Flagged	7
1.1		Action 1.1 Custom Retrofit Program	1	3	3	7	6	Positive	8
3.1		Action 3.1 Low Carbon Energy Supply	1	3	1	5	47	Positive	9
3.2		Action 3.2 On-site Renewable Energy Access	1	3	3	7	70	Neutral	10
3.2.1	Enabling	Action 3.2.1 Rooftop Solar Requirement	1	3	3	7	49	Flagged	11
2.3		Action 2.3 Increase Green Building Requirements	1	2	3	6	33	Flagged	12

Notes:

*Avg. Score (Consider.it Poll): Average priority score given in Consider.it by TF members

**GHG Impact, Resilience and Other Co-benefits rated 1-3 with 3 having the highest positive impact, and 1 having lowest impact

***Equity ratings: Positive > Action having a positive impact, Neutral > Actions that have neither positive or negative impact, Flagged > Needs work

"N/A" indicates that that Action is enabling or supporting emissions reductions in another Action

Program Governance

- The review of the NZAP Action every five years will continue as it is an important piece of the implementation of the plan. Especially as the scientific guidance behind climate change adjusts, technologies evolve, and impacts occur.

- The implementation framework will continue to adhere to the following principles:
  - Supports long-range healthy economic strategies as well as climate goals
  - Uses market-based and data-driven analysis and decision making
  - Commits to identifying and testing the best available policies, practices, and technologies, and supports an openness to new ideas when circumstances change
  - Commits to allowing the principle of offsets as long as it can be demonstrated that the offset produces actual GHG reductions, whether in the form of an energy efficiency or renewable energy activity
  - Commits to measuring and monitoring impact over time that leads to course corrections where required
  - Ensures consultation is comprehensive and engages affected stakeholders, the general public, and subject matter experts
  - Commits to developing informative and replicable models that will be shared with other
  - Commitment to implementing the Net Zero Action Plan through a racial equity and social justice lens

Program Tracking and Metrics

- In order to track progress more efficiently, a more robust system for reporting and tracking project-level performance data from all actions will be needed for residents, businesses, and program implementers to access and monitor performance

Example: BEUDO Performance Tracking Metrics

	Metric	Unit of Measurement
NZAP Action 1.2: BEUDO Performance Requirements	Buildings Disclosing Energy Use	Number
	Square Footage of Buildings Disclosing Energy Use	SF
	BEUDO Portfolio Electricity Consumption	kWh
	BEUDO Portfolio Gas Consumption	Therms
	BEUDO Portfolio Emissions	MT GHG
	Buildings Disclosing Energy Use (all years)	Number
	Square Footage of Buildings Disclosing Energy Use (all years)	SF
	BEUDO Portfolio Electricity Consumption (all years)	kWh
	BEUDO Portfolio Gas Consumption (all years)	Therms
	BEUDO Portfolio Emissions (all years)	MT GHG

*See Appendix C of the 2021 NZAP Report for Tracking Metrics for all Actions

Key Partnerships

- City staff cannot achieve the Net Zero Emissions goals alone. The City will continue to work with the Net Zero Task Force members, City Council, and other stakeholders to ensure that the residents, institutions, and development community in Cambridge are not only consulted, but central to the implementation and evolution of the project over time.

- Other Key Partnerships include:
  - **Climate Protection Action Committee (CPAC)** – CDD staff will ensure that annual progress updates proceed and are reviewed by CPAC to ensure accountability and transparency.
  - **Financing and energy program administrators** including:
    1. Cambridge Energy Alliance
    2. Eversource as the local MassSave Program Administrator
    3. The Massachusetts Clean Energy Center
  - **Regional and State entities** needed to create policy frameworks to achieve NZAP goals:
    1. Boston, Somerville, and MAPC
    2. Executive Office of Energy and Environmental Affairs agencies
    3. State legislature