# ECONOMIC DEVELOPMENT & UNIVERSITY RELATIONS COMMITTEE

**COMMITTEE MEETINGS**

**~ MINUTES ~**

**Tuesday, November 22, 2022** **12:30 PM** **Sullivan Chamber**
**795 Massachusetts Avenue**
**Cambridge, MA 02139**

**Call of the Meeting**

| Attendee Name | Present | Absent | Late | Arrived |
|---|---|---|---|---|
| Paul F. Toner | ☑ | ☐ | ☐ | |
| Burhan Azeem | ☐ Remote | ☐ | ☐ | |
| Alanna Mallon | ☑ | ☐ | ☐ | |
| Patricia Nolan | ☑ | ☐ | ☐ | |
| Quinton Zondervan | ☐ Remote | ☐ | ☐ | |

**The Economic Development and University Relations Committee will conduct a public meeting to receive an update on the BEUDO amendments from the Community Development Department and a discussion of the environmental and economic impact of BEUDO on residential, business and academic properties/communities**

A public meeting of the Cambridge City Council's Economic Development and University Relations Committee was held on Tuesday, November 22, 2022. The meeting was Called to Order at 12:30 p.m. by the Chair, Councillor Toner. Pursuant to Chapter 20 of the Acts of 2022 adopted by Massachusetts General Assembly and approved by the Governor, this public meeting was hybrid, allowing participation in person, in the Sullivan Chamber, 2nd Floor, City Hall, 795 Massachusetts Avenue, Cambridge, MA and by remote participation via zoom.

**Clerk of Committees Erwin called the roll.**
Councillor Azeem – Present/Remote
Vice Mayor Mallon – Present
Councillor Nolan – Present
Councillor Zondervan – Present/Remote
Councillor Toner – Present
**Present – 5 – Absent – 0. Quorum established.**

Councillor Toner gave opening remarks and noted that the focus of the meeting was to receive and update on the BEUDO amendments from the Community Development Department and a discussion on the environmental and economic impact of BEUDO on residential, business, and academic properties and communities. The Chair also noted that members from Harvard, MIT, Eversource, the business community, and large residential property owners were present at today's meeting to make presentations. He introduced Iram Farooq, Assistant City Manager of Community Development (CDD), and she and her staff began their presentation titled "City of Cambridge Getting to Net Zero Action Plan, Building Energy Use Disclosure Ordinance (BEUDO) Amendment Proposal (ATTACHMENT A).

Seth Fetherspiel, Climate Program Manager from CDD summarized information from the presentation (ATTACHMENT A). Topics included a review of key components of the amendments that were originally proposed by CDD in November of 2021, and an overview of the ideas that have been under discussion since then.
Councillor Zondervan had a clarifying comment on electricity by renewable electricity by 2030.
Maija Benjamins, Director, Strategic Project Development Transmission from Eversource introduced staff Lavelle Freeman, Mark Rooney, and Gerhard Walker, and gave an overview of topics they would be discussing from their presentation titled "Economic Development and University Relations Committee Presentation" (ATTACHMENT B).
Lavelle Freeman, Director, Distribution Planning System Planning, summarized information on comprehensive solution, transmission lines and substation. They also noted that Eversource would propose a 10-year plan and Maija Benjamins gave a quick overview of what the timeline would look like.
Mark Rooney, Salex Executive Energy Efficiency, spoke remotely to members and made comments on energy efficiency based on Cambridge's electric and gas savings. They also reviewed what energy efficiency capabilities would be available in the future in East Cambridge and Cambridge as a whole.
Dr. Gerhard Walker, Manager, Advanced Forecasting and Modeling System Planning, gave an overview of what the challenges of an electrified society would like. They also noted what Eversource has done internally to take initiative on planning efforts. They reviewed what the objectives would be for the distribution planning and long-range electric demand. Gerhard also did an overview on facts and figures for the following topics: electric vehicle arrival and charging profiles, heating electrification, solar models, and storage systems. They summarized what the projected distribution infrastructure needs would be.
Maija Benjamins gave closing remarks noting that it is Eversource's goal to be on the forefront of decarbonization and they have been looking to evolve their transmission systems to bring renewable systems into the communities that need them.
Councillor Nolan had a clarifying question for Eversource on different types of heat pumps.
Gerhard Walker responded noting that weather conditions play a role in heat pumps.
Tom Lucey Director of Government Affairs and Heather Henriksen Chief Sustainability Officer from Harvard University and Sarah Gallop and Joe Higgins from MIT Government and Community Relations respectively spoke on the use of global carbon credits.
Patrick Barrett from the Central Square Business Association questioned if Central Square would have the space for the larger infrastructures that would have to be built and made comments regarding the 2025 and 2030 BUEDO tax that would come in to play and how it could negatively impact small property owners. He noted that it would be important for property owners and the City to work together to achieve climate goals.
Erica Pereira, condominium owner in Cambridge, made comments on BUEDO and how condo owners in the City are concerned about the negative effects the BUEDO amendments could have on them.
Beth O'Neil Maloney, Kendall Square Business Association, commented that the association appreciates the seriousness of climate change and make efforts with innovation science and technologies to achieve climate change goals.

Councillor Toner opened public comment.
John Patrick, 950 Massachusetts Avenue, Cambridge, MA, spoke on BEUDO amendments

Lowry Hemphill, 9 Marie Avenue, Cambridge, MA, spoke on BEUDO Amendments
Drew Pendergras, 29 Oxford Street, Cambridge, MA, spoke on Green New Deal
Helen Walker, 43 Linnaean Street, Cambridge, MA, spoke on BEUDO
Jane Carpenter, Essex Street, Cambridge, MA, spoke on Green New Deal
Lucas Vargas Zeppetello, 39 Pearson Avenue, spoke on Green New Deal
Annie Snyder, 32 Suffolk Street, Cambridge, MA, spoke on Green New Deal
Edward Woll, 80 Winslow Avenue, Cambridge, MA, spoke on BEUDO Amendments
Micharl Grill, 1035 Cambridge Street, Cambridge, MA, spoke on Proposed BEUDO ordinance
Rey Li, 3 Ames Street, Cambridge, MA, spoke on Green New Deal
Rachel Wyon, 283 Sidney Street, Cambridge, MA, spoke on Green New Deal
Gleb Bahmutov, 19 Winslow Street, Cambridge, MA, spoke on Green New Deal
George Sommer, 29 Otis Street, Cambridge, MA, spoke BEUDO Implementation
Sunessa Schettler, 34 Harvey Street, Cambridge, MA, spoke on Green New Deal
Hilsry Fabre, 88 Hancock Street, Cambridge, MA, spoke on Policy Order #5
Stephen Cellucci, 32 Vineyard Street, Cambridge, MA, spoke on Green New Deal
Sylas Horowitz, 69 Chestnut Street, Cambridge, MA, spoke on Green New Deal
Peter Kirby, 128 Oxford Street, Cambridge, MA, spoke on Green New Deal
Owen Leddy, 260 Harvard Street, Cambridge, MA, spoke on BEUDO Amendments
Corey Donahue, 66 Line Street, Cambridge, MA, spoke on Green New Deal
Sanjana Paul, 187 Brookline Street, Cambridge, MA, spoke on Cambridge Green New Deal
Graham Turk, 23 Tufts Street, Cambridge, MA, spoke on Green New Deal
Lee Farris, 269 Norfolk Street, Cambridge, MA, spoke on BEUDO
Alessandre Santos Sagastume, 69 Chestnut Street, Cambridge, MA, spoke on Cambridge Green New Deal
Suzanne Blier, 4 Fuller Place, Cambridge, MA, spoke on BEUDO
Kit Haines, 101 Reed Street, Cambridge, MA, spoke on Green New Deal

**A motion was made by Councillor Toner to extend the meeting 10 minutes.**
**Clerk of Committees Erwin called the roll.**
Councillor Azeem – Yes
Vice Mayor Mallon – Yes
Councillor Nolan – Yes
Councillor Zondervan – Yes
Councillor Toner – Yes
**Yes -5 No – 0. Motion passes.**

Councillor Nolan made comments on greenhouse gas emissions and how they have increased. She noted she looks forward to future conversations.

Councillor Toner noted that it was his intention to make a motion that would provide CDD with a clear direction from the Committee. He then recognized Councillor Zondervan.

Councillor Zondervan thanked Eversource for their presentation. He spoke on the alternative compliance credit and the future forecasting from Eversource.

Councillor Toner introduced a motion that would request the City Manager to direct the Community Development Department to provide recommendations on the BEUDO amendments

(ATTACHMENT C). Conversation on the motion between Councillor Toner, Councillor Nolan, Councillor Zondervan and Iram Farooq took place, with Iram Farooq noting that CDD was looking to have a clear direction from the Committee, but it did not have to happen today. With that being said, the motion did not move forward.

**A motion was made by Councillor Nolan to recess.**
**Clerk of Committees Erwin called the roll.**
Councillor Azeem – Yes
Vice Mayor Mallon – Yes
Councillor Nolan – Yes
Councillor Zondervan – No
Councillor Toner – Yes
**Yes – 4 No – 1. Motion passes.**

The meeting was recessed at approximately 2:49p.m.

Attachment A: City of Cambridge Getting to Net Zero Action Plan, Building Energy Use Disclosure Ordinance (BEUDO) Amendment Proposal.

Attachment B: City of Cambridge Economic Development and University Relations Committee Presentation

Attachment C: Councillor Toner's Potential Order

The City Clerk's Office received 2 written communication, Attachments D and E.

**Clerk's Note:** The City of Cambridge/22 City View records every City Council meeting and every City Council Committee meeting. This is a permanent record.

The video for this meeting can be viewed at:
Nov 22, 2022 12:30 PM - Economic Development & University Relations Committee - Committee Meetings (granicus.com)

All meetings are "closed captioned". After each meeting the "closed captioned transcripts" are available online at: https://app.box.com/s/9qormcahynjt4pzpt1n5opixogl3q7k5
Please note that there is no editing of these "closed captioned transcripts" and they do not constitute a verbatim transcript prepared by a certified transcriber.

**A communication was received from Councillor/Committee Chair Paul Toner, transmitting detailed agenda.**

**A communication was received from Iram Farooq, Assistant City Manager for Community Development transmitting Building Energy Use Disclosure Ordinance (BEUDO) Amendment Proposal.**

**A communication was received from Jason Wright Eversource Community Relations Specialist, regarding Cambridge Transmission and Distribution System Overview.**

Attachment A

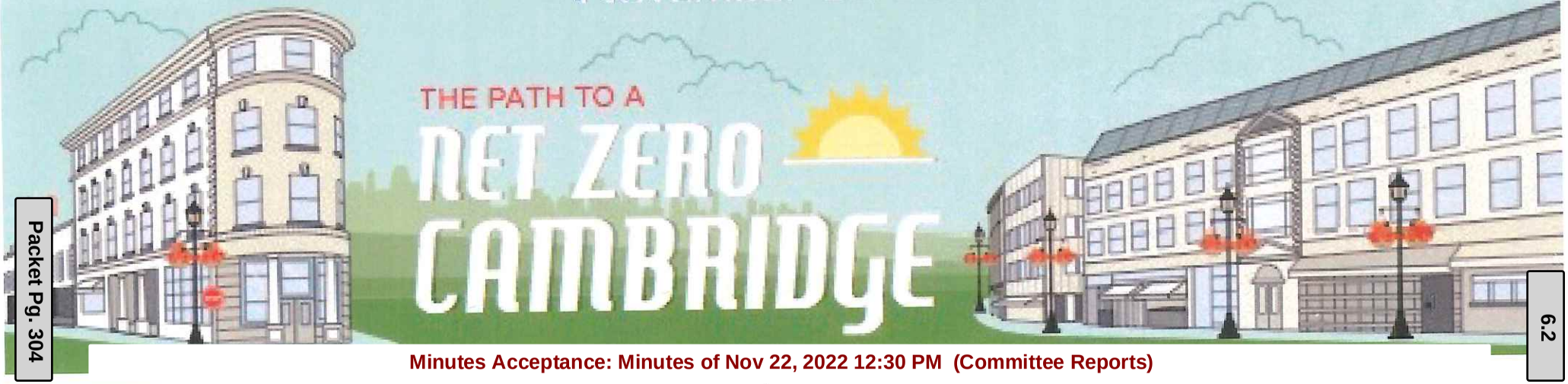
# City of Cambridge

## Getting to Net Zero Action Plan

# Building Energy Use Disclosure Ordinance (BEUDO) Amendment Proposal

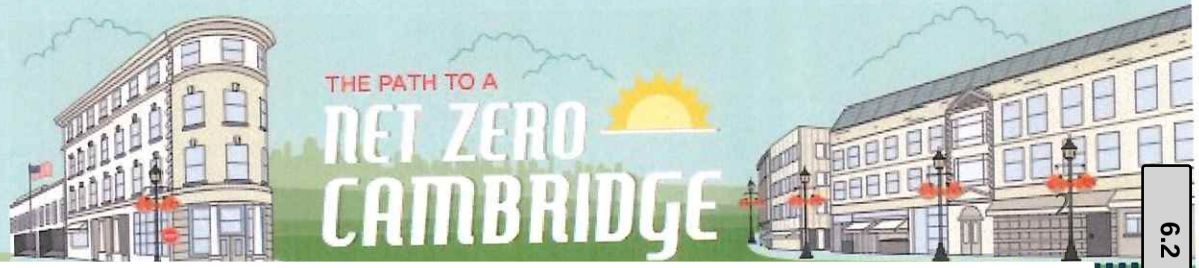
## Economic Development and University Relations Committee

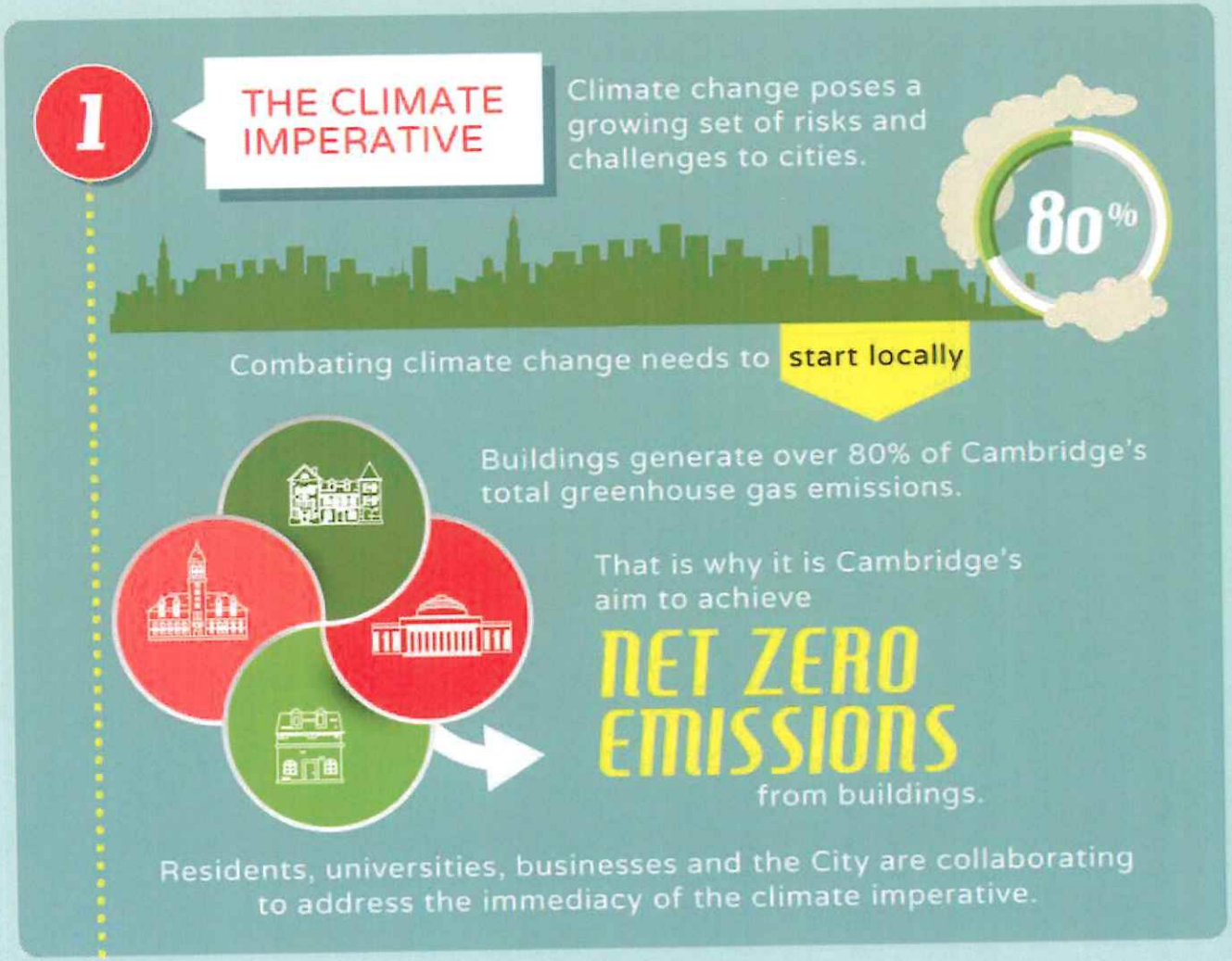
## November 22, 2022



# Agenda

- **Background**
- Overview of the amendment process
- Review of key components of the amendments
- Example compliance scenarios
- Resources to support BEUDO buildings

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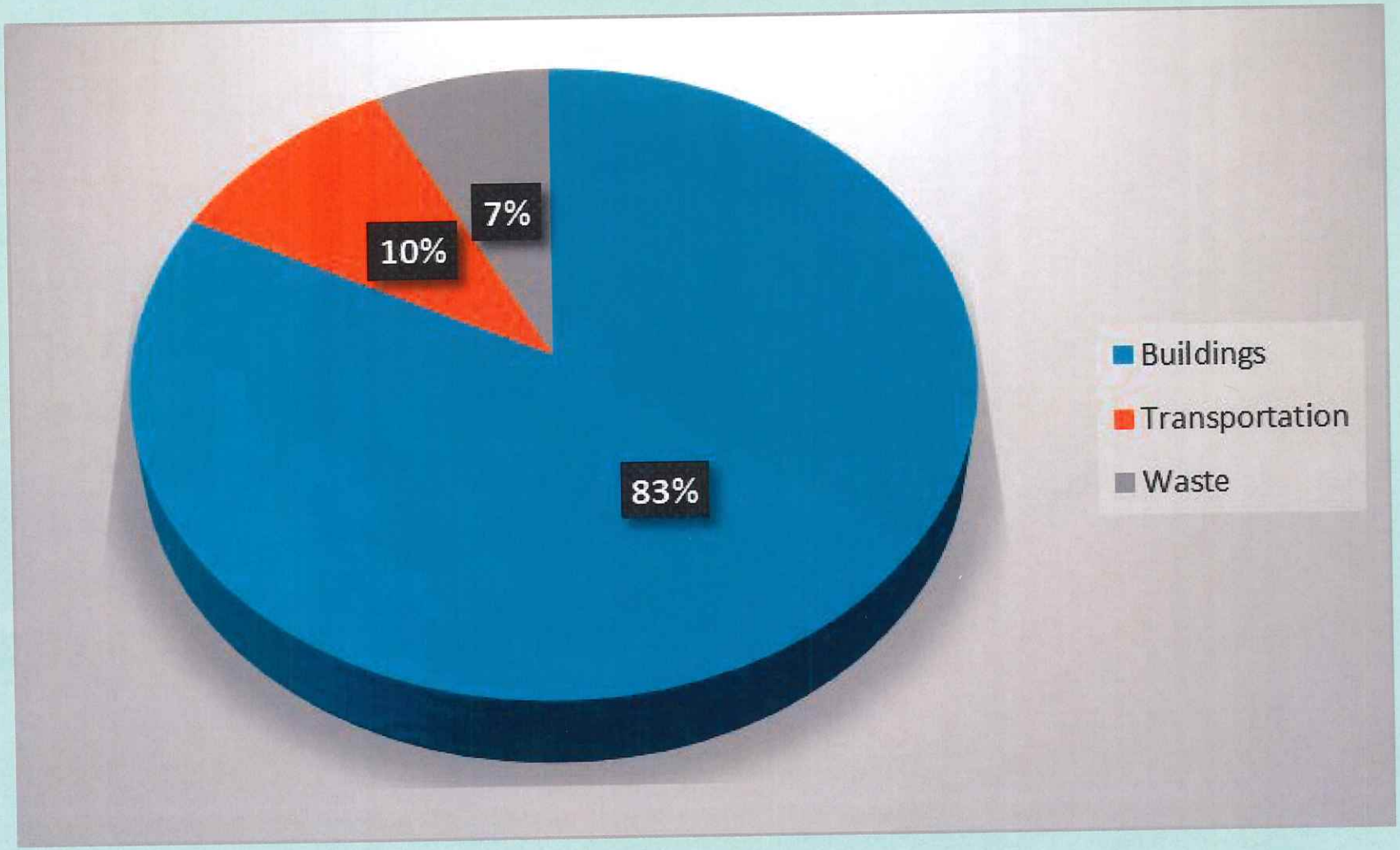
THE CLIMATE IMPERATIVE
Climate change poses a growing set of risks and challenges to cities.
80%
Combating climate change needs to start locally
Buildings generate over 80% of Cambridge's total greenhouse gas emissions.
That is why it is Cambridge's aim to achieve
NET ZERO EMISSIONS
from buildings.
Residents,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

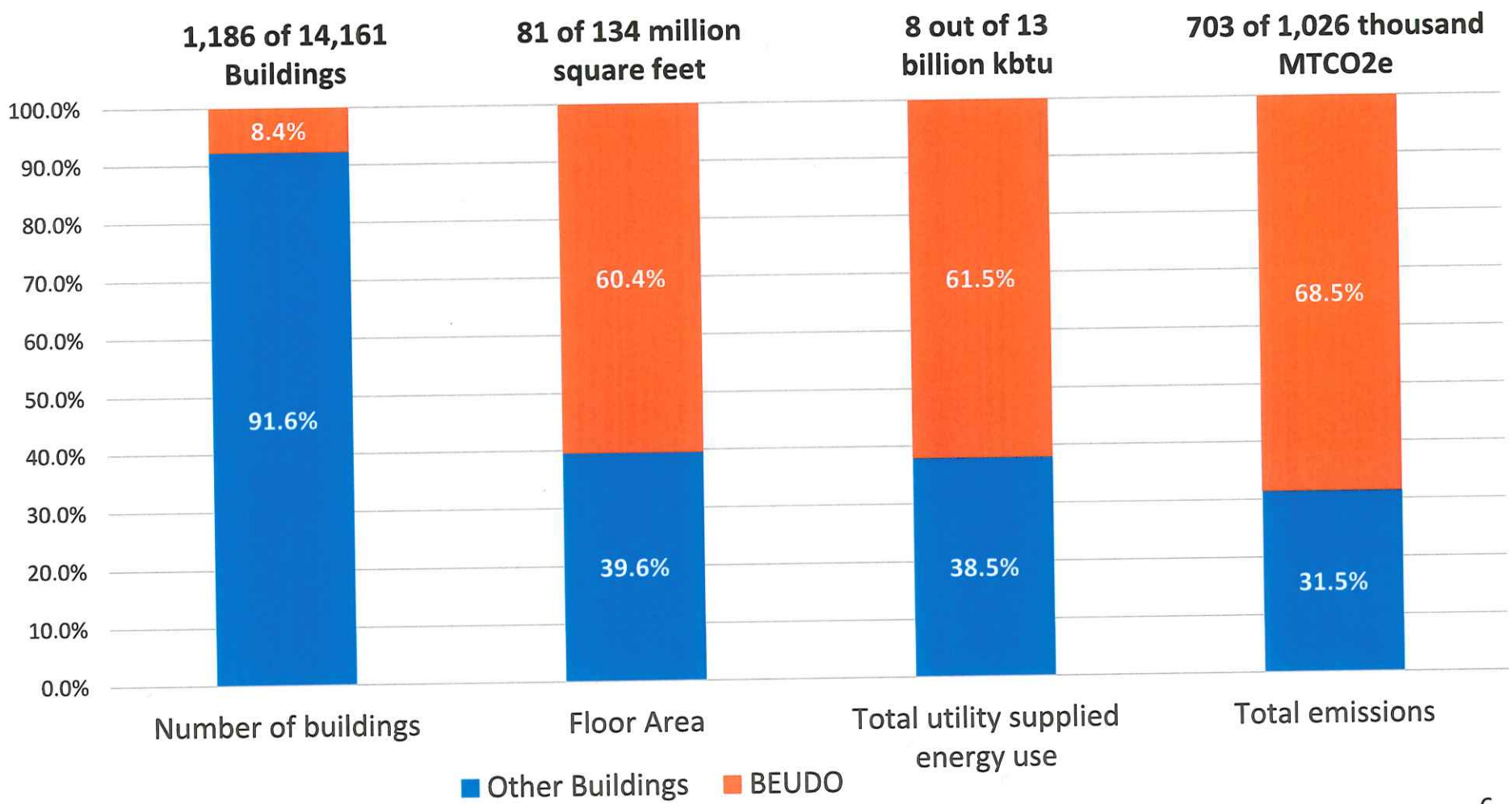

## Net Zero Action Plan - Action Map

THE PATH TO A NET ZERO CAMBRIDGE

# Cambridge Community GHG Inventory

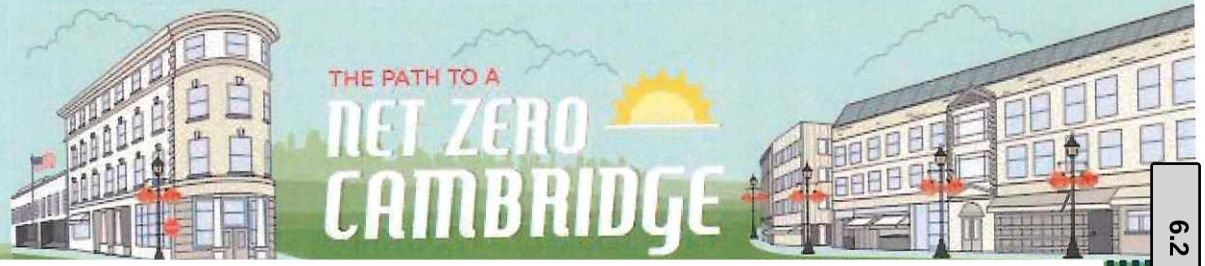


# BEUDO buildings are responsible for majority of building GHG emissions



## 2014 Building Energy Use Disclosure Ordinance

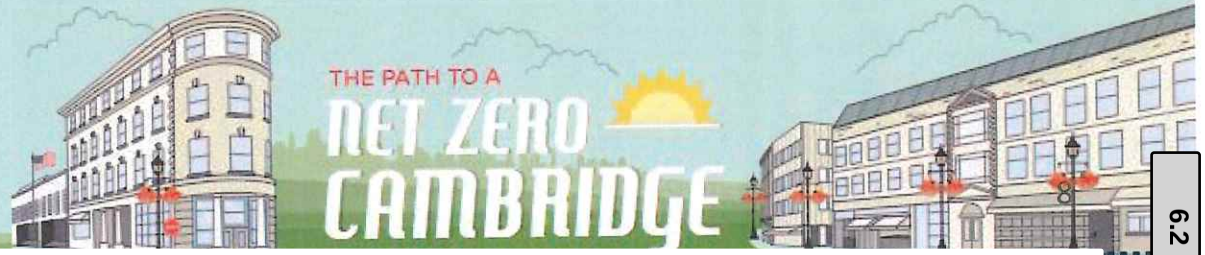
***To encourage efficient use of energy and to reduce the emission of greenhouse gases, this Ordinance requires owners to annually measure and disclose energy usage.*** *This Ordinance will authorize the City to collect energy usage data to enable more effective energy and climate protection planning by the City and others and to provide information to the real estate marketplace to enable its members to make decisions that foster better energy performance.*



# 2014 Building Energy Use Disclosure Ordinance

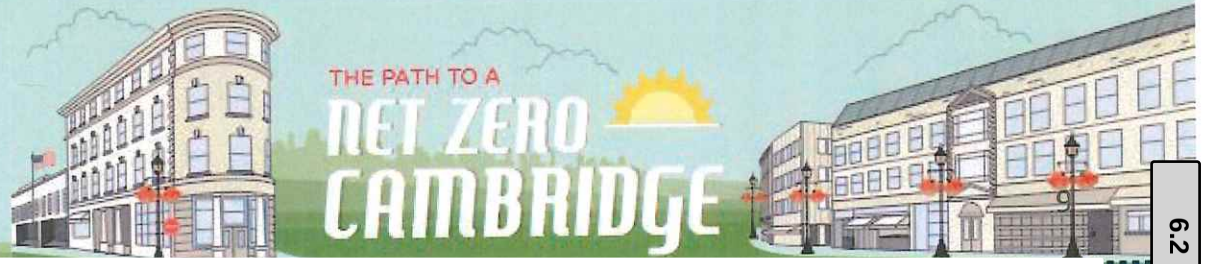
**BEUDO Applicability**

- *Municipal*: parcels with 10,000 square feet or greater (beginning 2014)
- *Residential*: parcels with 50 or more dwelling units (beginning 2015)
- *Large Non-Residential*: parcels with 50,000 square feet or greater (beginning 2015)
- *Small Non-Residential*: parcels with 25,000-49,999 square feet (beginning 2016)

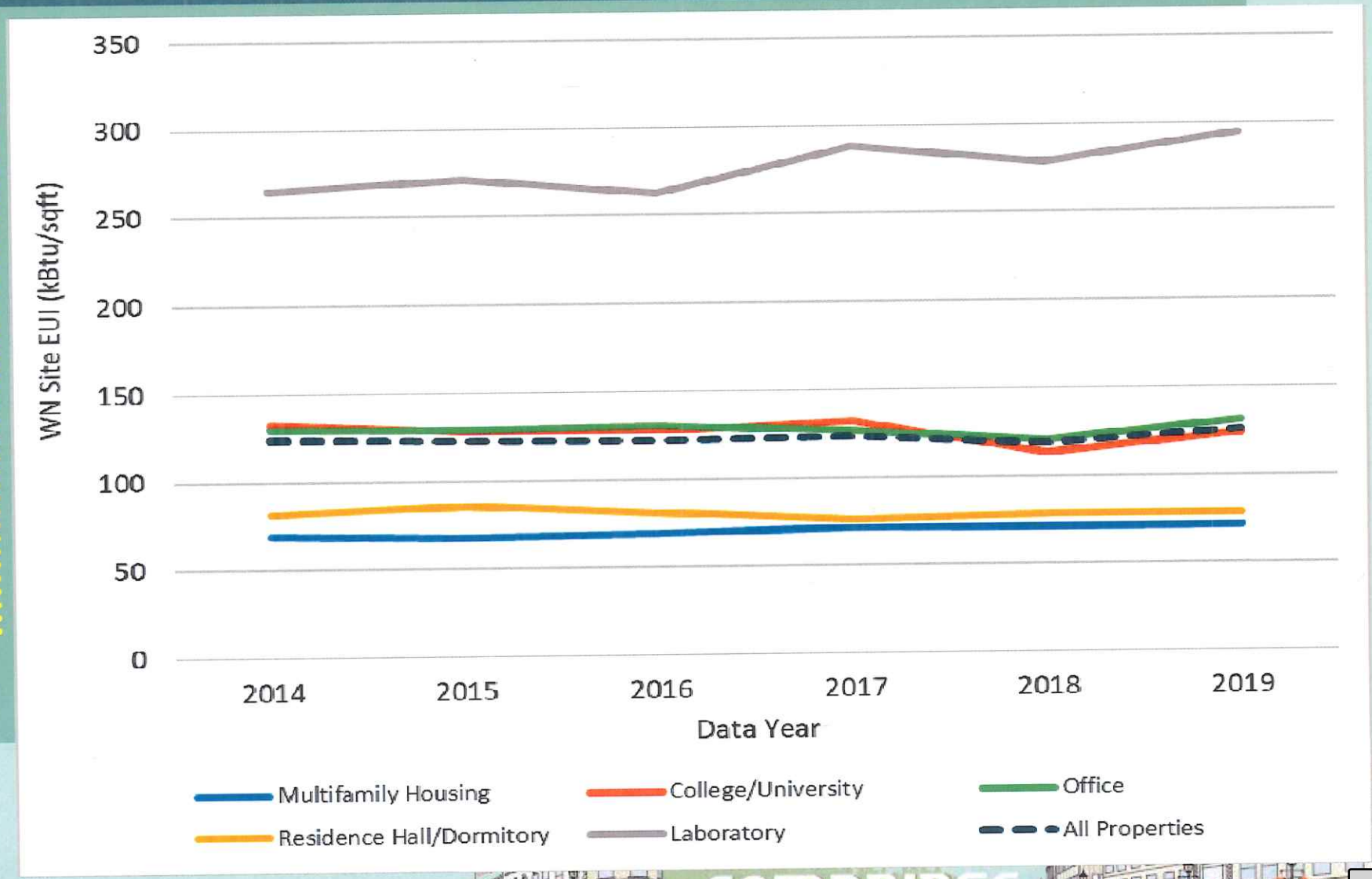


## 2014 Building Energy Use Disclosure Ordinance

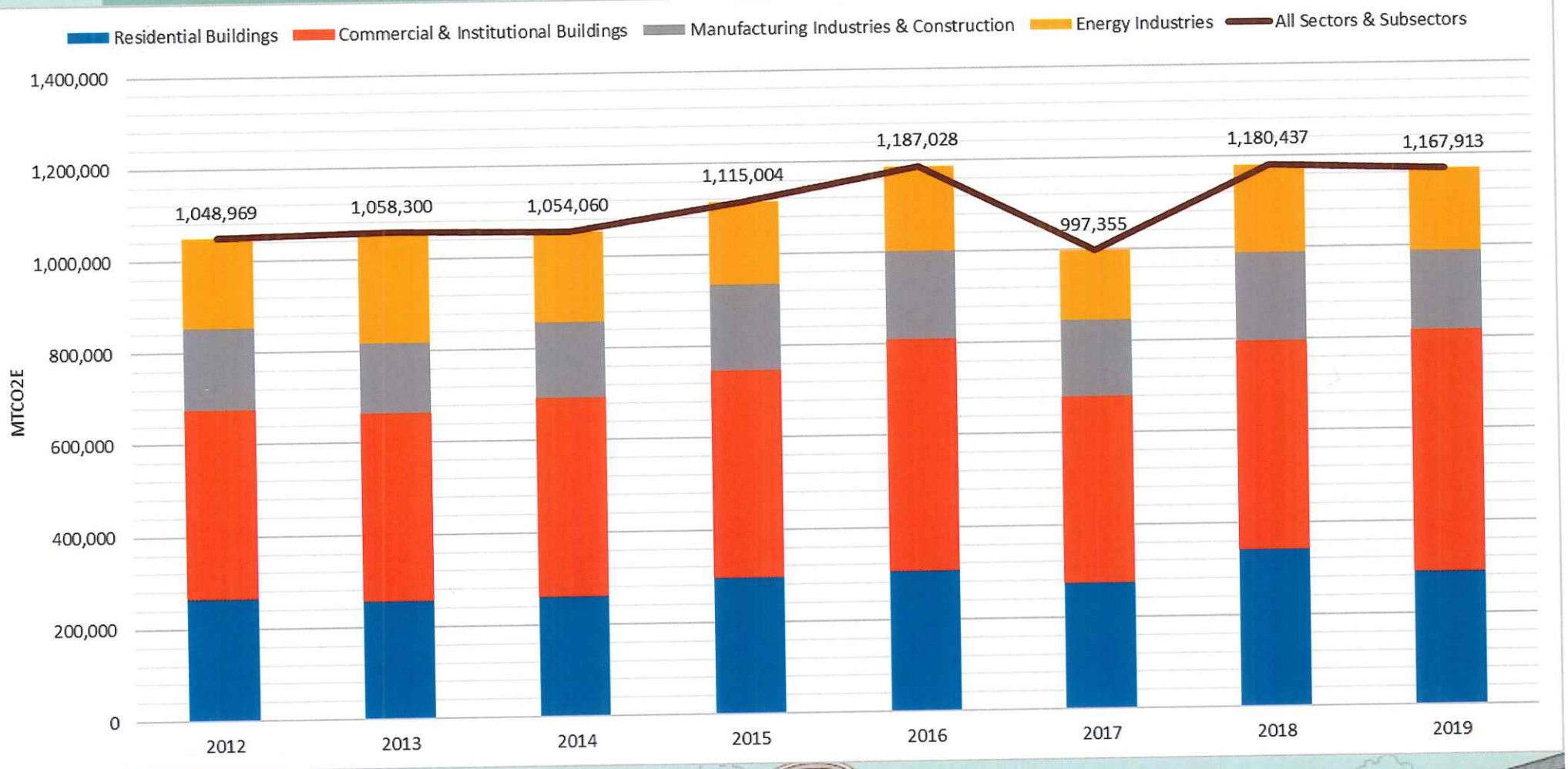
*By December 31, 2018, the Department shall review the effect of this Ordinance on improving energy performance for Covered Buildings.* ***If energy performance for Covered Buildings has not improved significantly, the Department shall make recommendations to the City Manager as to whether amendments to this Ordinance or other measures are necessary*** *to improve building energy performance for Covered Buildings.*



# Energy performance has not improved significantly over time



# GHG emissions have increased from 2012-2019




THE PATH TO A NET ZERO CAMBRIDGE

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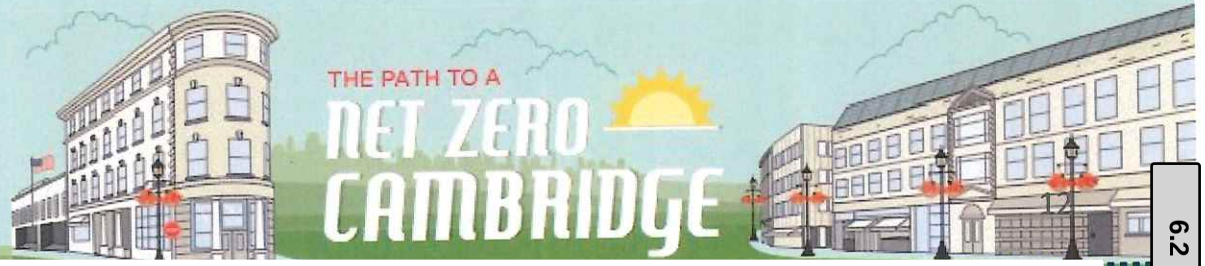
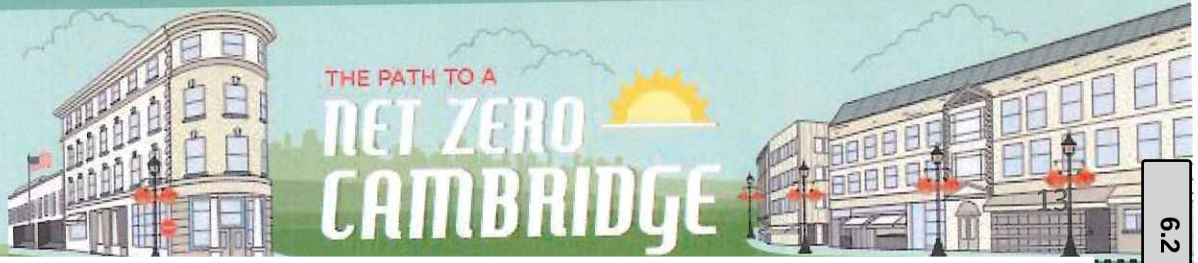


# Process Overview

- 2017: Background policy research and analysis
- 2018: Straw proposal development with BEUDO property owner consultation
- 2019-2020: Proposal refinement
- **2021: CDD submitted proposed amendments to City Council on November 8th**



# Process Overview (cont.)

- 2022: City Council process to consider BEUDO amendments
  - Multiple hearings held by Health & Environment and Ordinance Committees
  - **Committee vote to shift net zero deadline from 2050 to 2035 (based on 2017 policy order)**
    - ***Addition of flexibility mechanisms and alternative schedule for residential buildings***
  - Ongoing small group meetings with BEUDO property owners and associations

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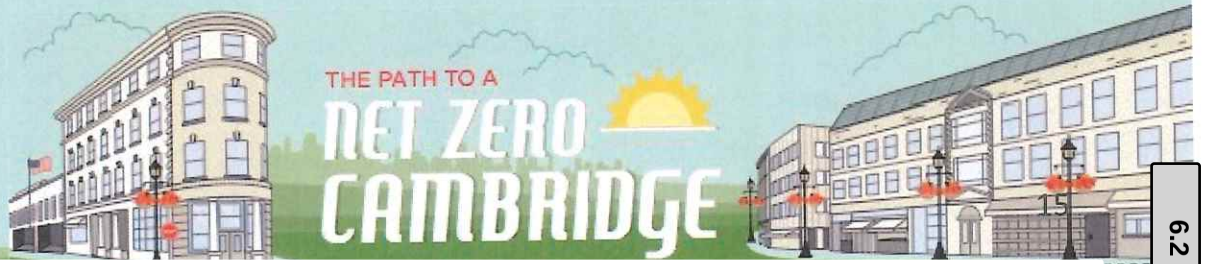
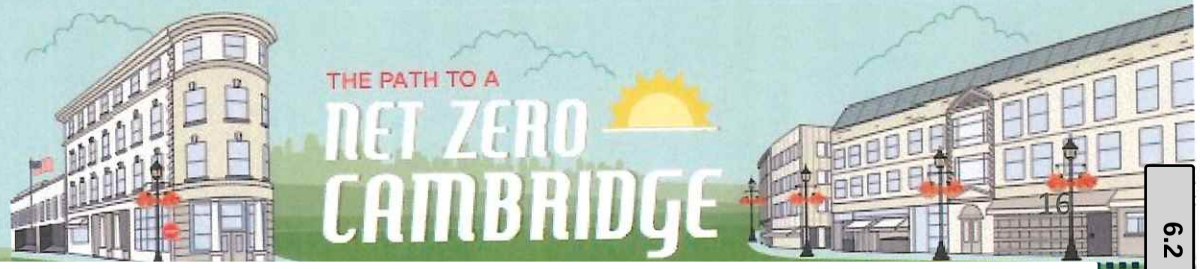


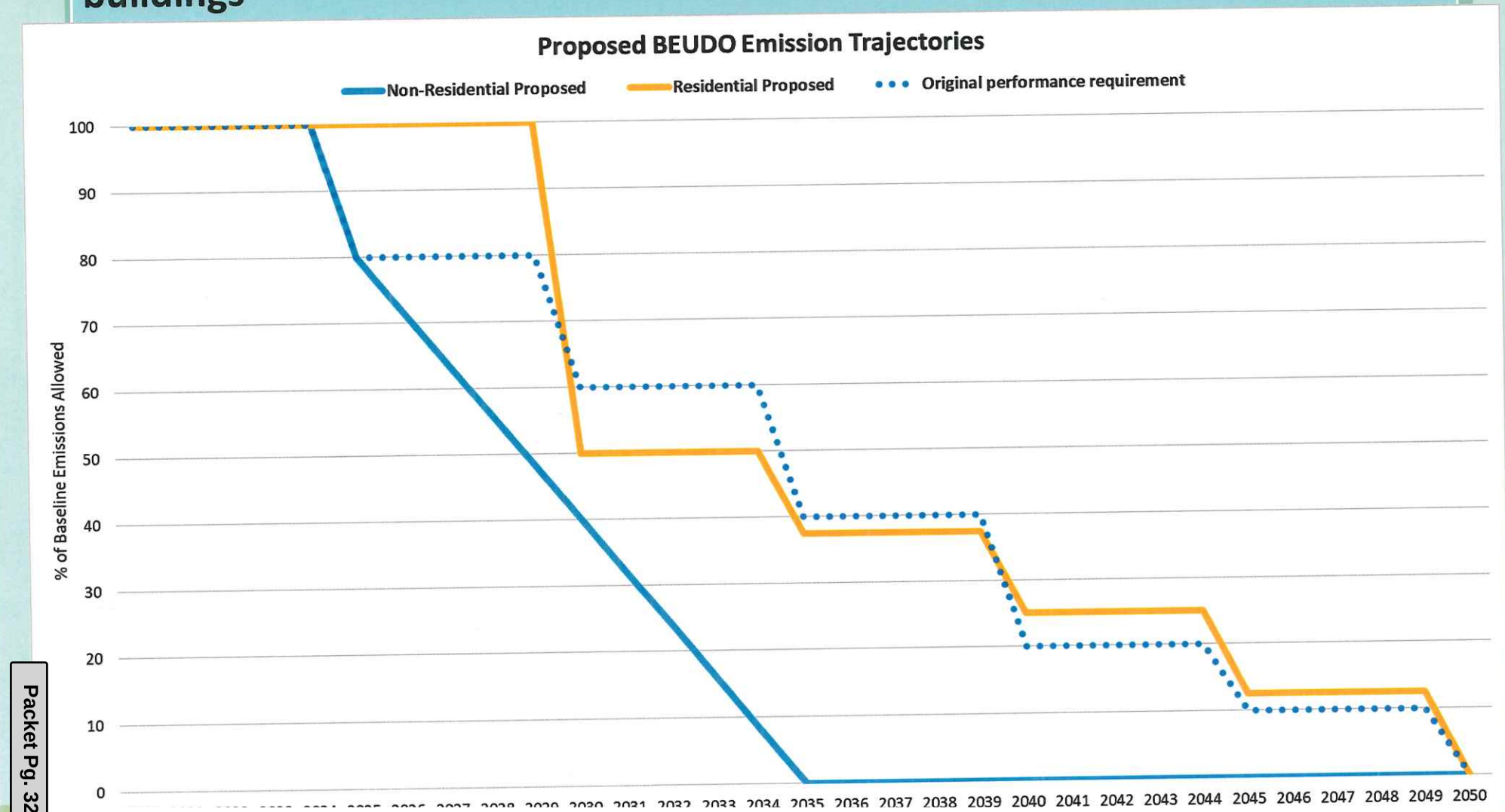
# Key Components of Nov. 2021 CDD Proposal

- Performance requirement of reducing GHGs relative to individual baseline, in 5-year increments beginning in 2025, reaching net zero by 2050
- Default baseline is 2018-2019 average, but option to pick an early baseline with adjusted reduction requirements
- Buildings can pick from onsite reductions (energy efficiency, solar, electrification); new offsite renewable energy; or Alternative Compliance Credits
- Specific pathway options for affordable housing, labs, and campuses
- Exemptions for net zero buildings and financial distress
- Periodic policy review and adjustment



# Key Flexibility Mechanisms in Council Discussion

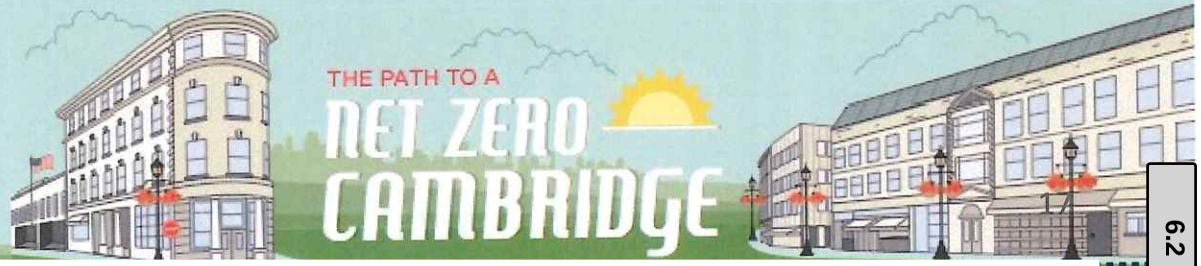
Delayed compliance for **affordable housing and market rate residential buildings**



# Key Flexibility Mechanisms in Council Discussion

**Alternative Compliance Credits** shall be equivalent to one ton of GHG emissions, and used by the City for City programs and projects to support GHG reduction

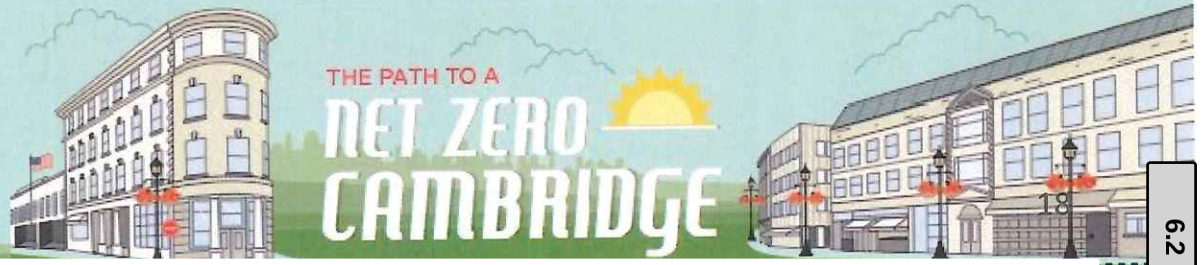
- ACCs start at $234/ton, based on analysis of average cost of reducing emissions from BEUDO buildings, and adjusted over time based on actual costs
- Potential to take credit for GHG reductions paid for in other buildings beyond requirements
- Potential deferral of ACCs up to 10 years to execute capital improvement projects, assuming that cumulative GHG reductions are equivalent



# Key Flexibility Mechanisms in Council Discussion

**Carbon Credits** are off-site measures to offset only the emissions from direct fossil fuel use of the building

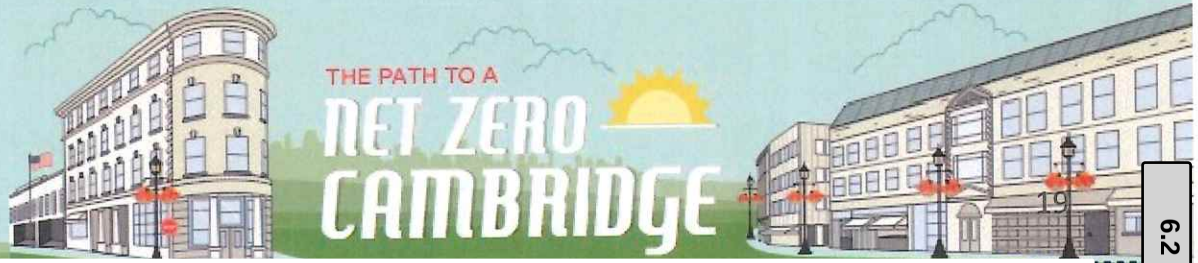
- Carbon credits would be distinguished between local and global sources
- Use of carbon credits will be phased down over time, with global credits ending in 2035 and local credits ending in 2045
- CDD would issue regulations to certify eligible carbon credits
- The cost of carbon credits would be subtracted from the cost of ACCs needed to comply in a given year



# Key Flexibility Mechanisms in Council Discussion

Off-site **Renewable Electricity** can offset only the electricity use of the building

- Renewable electricity must come from **new sources** (purchaser-caused)
- Renewable electricity may come from anywhere in the country
- As the state electricity grid gets greener, buildings automatically get credit thanks to **emission factors** which are set by regulation
- The **Cambridge Community Electricity** aggregation program will also deliver increasing amounts of BEUDO-compliant renewable electricity



# Key Flexibility Mechanisms in Council Discussion

Additional situational exemptions

- Financial Distress
- Utility Failure
- Backup Generation
- Occupant Emissions
- Community Choice Aggregation
- Department Failure
- Technical Equipment or Market Failure

THE PATH TO A NET ZERO CAMBRIDGE

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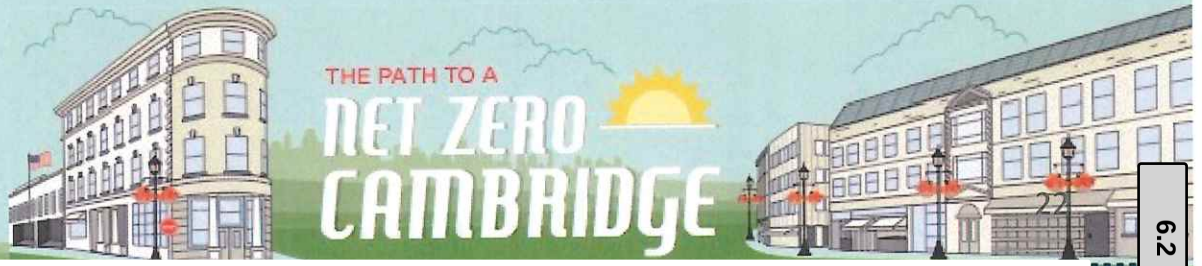


# Example: Average Lab Building

300,000 sf office-lab building

| 2019 Emissions | |
|---|---|
| Total | 3,350 MT |
| Electricity | 1,843 MT |
| Gas | 1,507 MT |

| With 100% Renewable Electricity in 2030 | |
|---|---|
| Total | 1,507 MT (55% reduction) |
| 2030 Target – 60% reduction | 1,340 MT |
| *Achieving the 2030 target would thus require efficiency or electrification measures to reduce approximately 11% of gas used for heating and hot water.* | |

# Example: Average Office Building

330,000 sf office building

| 2019 Emissions | |
|---|---|
| Total | 1,280 MT |
| Electricity | 845 MT |
| Gas | 435 MT |

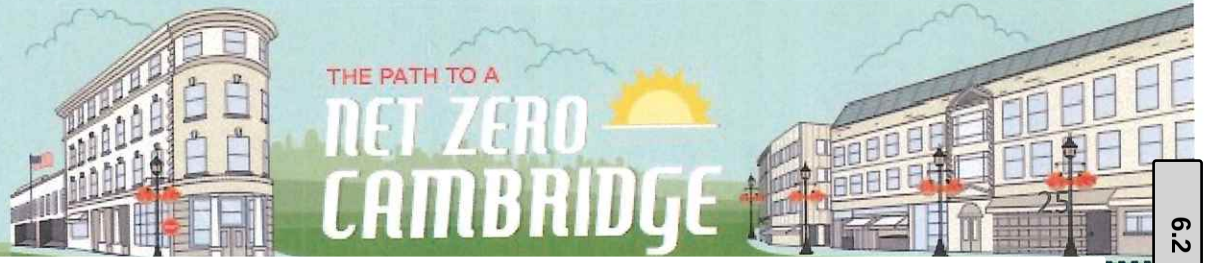
| With 100% Renewable Electricity in 2030 | |
|---|---|
| Total | 435 MT (66% reduction) |
| 2030 Target – 60% reduction | 512 MT |
| *No additional action required to meet 2030 target* | |

# Example: Average Multifamily Building

## 82 Unit Apartment Building

| 2019 Emissions | |
|---|---|
| Total | 470 MT |
| Electricity | 172 MT |
| Gas | 298 MT |

| With 100% Renewable Electricity in 2030 | |
|---|---|
| Total | 298 MT (36% reduction) |
| 2030 Target – 50% reduction | 235 MT |
| *Achieving the 2030 target would thus require an efficiency or electrification measure that reduces 22% of gas use.* | |



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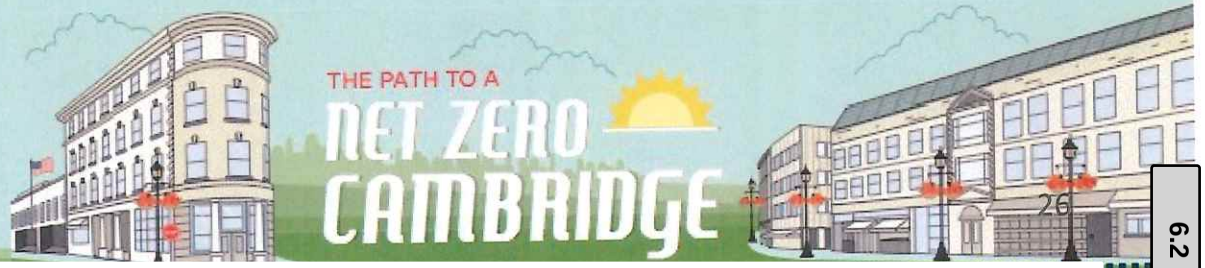
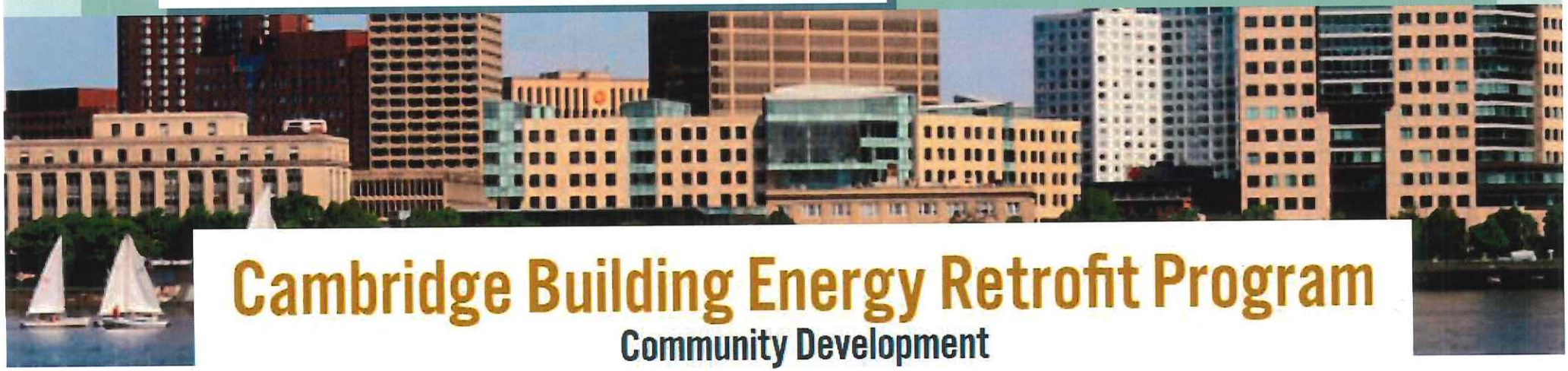


# Retrofit Resources



# Cambridge Building Energy Retrofit Program

## Community Development

**The One-Stop Shop for Cambridge Buildings Over 25,000 Square Feet or 50 Units**

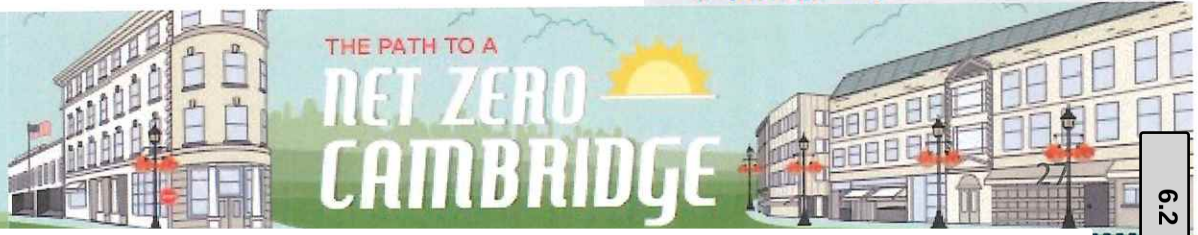
Connect with energy efficiency services and technical support including:

- Comprehensive planning services and support specific to your building
- Expert guidance, including a dedicated Eversource Energy Efficiency team, vendor referrals, and specialized building technologies
- Energy Efficiency offerings and incentives tailored to your building type and size
- Building Operator Certification training classes for facilities staff

**Contact the Cambridge Building Energy Retrofit Consultant:**
**(781) 441-3502 or CambridgeEnergyConsultant@eversource.com**

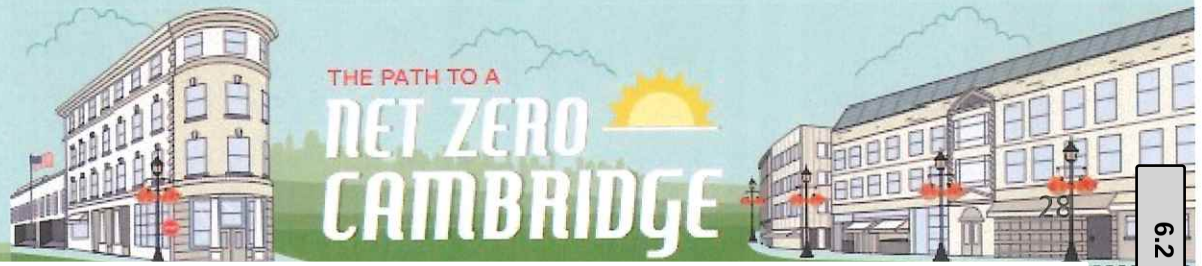
### Resource Hub

- Energy Efficiency Incentives for Commercial Buildings [PDF]
- Building Energy Use Disclosure Ordinance
- Retrofit Program Development Process - Full Report [PDF]



## Retrofit Resources

- Mass Save: www.masssave.com
- Cambridge Community Electricity: www.masspowerchoice.com/cambridge
- Cambridge Multifamily Retrofit Advisor and Cambridge Clean Heat: www.cambridgeenergyalliance.org
- Forthcoming state and federal resources

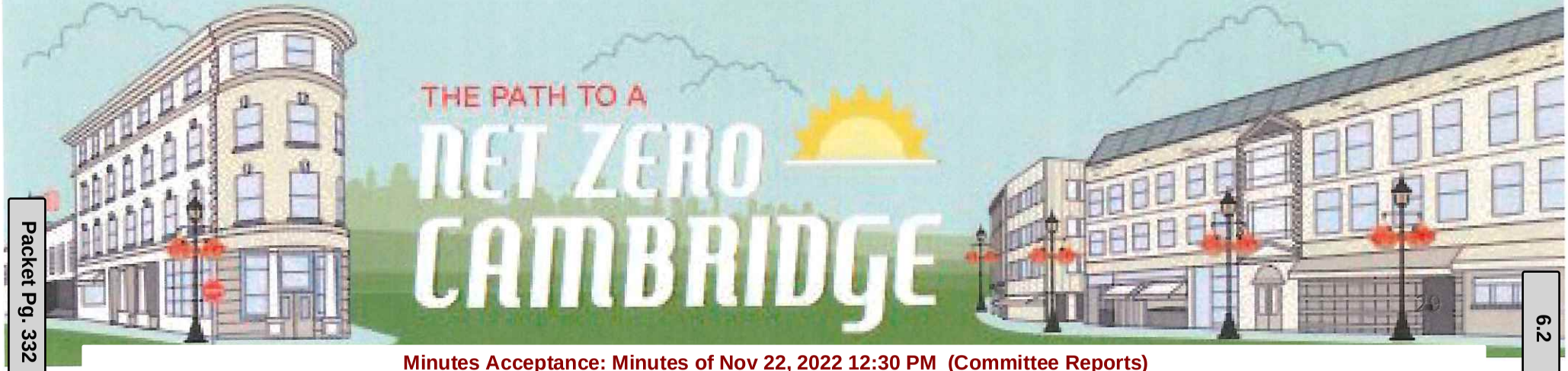


# Thank You!

www.cambridgema.gov/beudo


**Contact Information**
Seth Federspiel
*Climate Program Manager*
617-349-4674
sfederspiel@cambridgema.gov

**Contact Information**
Susanne Rasmussen
*Director of Environmental and Transportation Planning*
617-349-4607
srasmussen@cambridgema.gov

Attachment B

EVERSOURCE ENERGY

# CITY OF CAMBRIDGE

# Economic Development and University Relations Committee Presentation

## November 22, 2022

# Introductions

**Mark Rooney**
Sales Executive
Energy Efficiency

**Lavelle Freeman**
Director, Distribution Planning
System Planning

**Dr. Gerhard Walker**
Manager, Advanced Forecasting & Modeling
System Planning

**Maija Benjamins**
Director, Strategic Project Development
Transmission

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EVERSOURCE ENERGY

System Planning

# CAMBRIDGE TRANSMISSION AND DISTRIBUTION SYSTEM OVERVIEW

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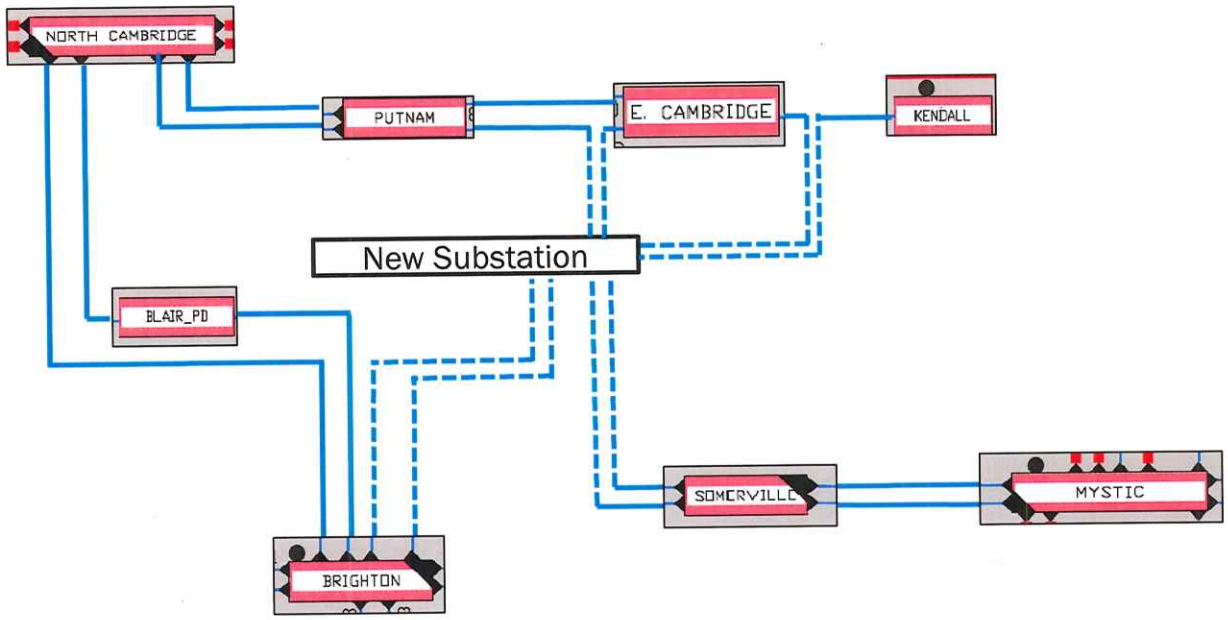
# Comprehensive Solution – Transmission Lines and Substation

- **5** existing 115kV transmission lines reconfigured in a network solution
- **8** new 115kV underground transmission lines in 5 duct banks required for robust network solution
- New lines will connect the **New 115kV substation** with the existing Brighton, Somerville, Putnam, and East Cambridge Substations



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# Cambridge Area 2030 Projection and Proposed 10-Year Plan

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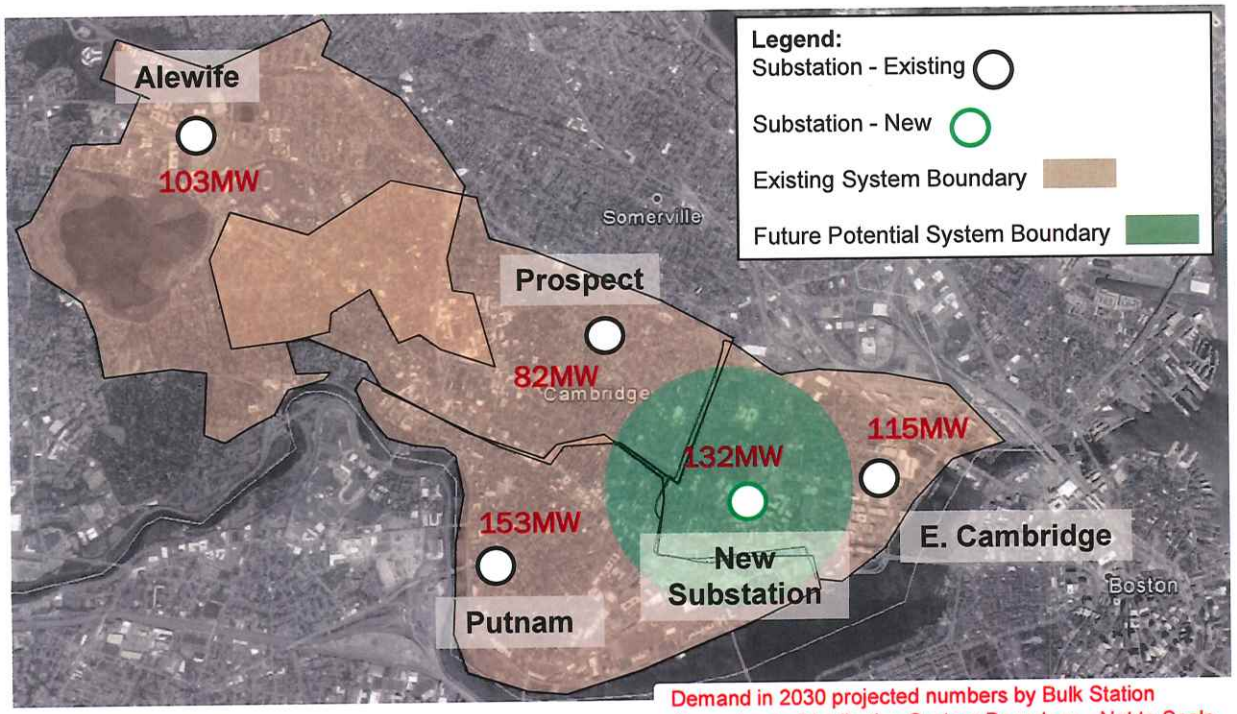
More than **585 MW** of demand projected for 2030

- **5** distribution bulk substations (16 bulk transformers)
- **17** non-bulk substations
- **~250+** distribution feeders of various voltages
- **~2000+** distribution service transformers




Demand in 2030 projected numbers by Bulk Station
Approximate Distribution System Boundary – Not to Scale



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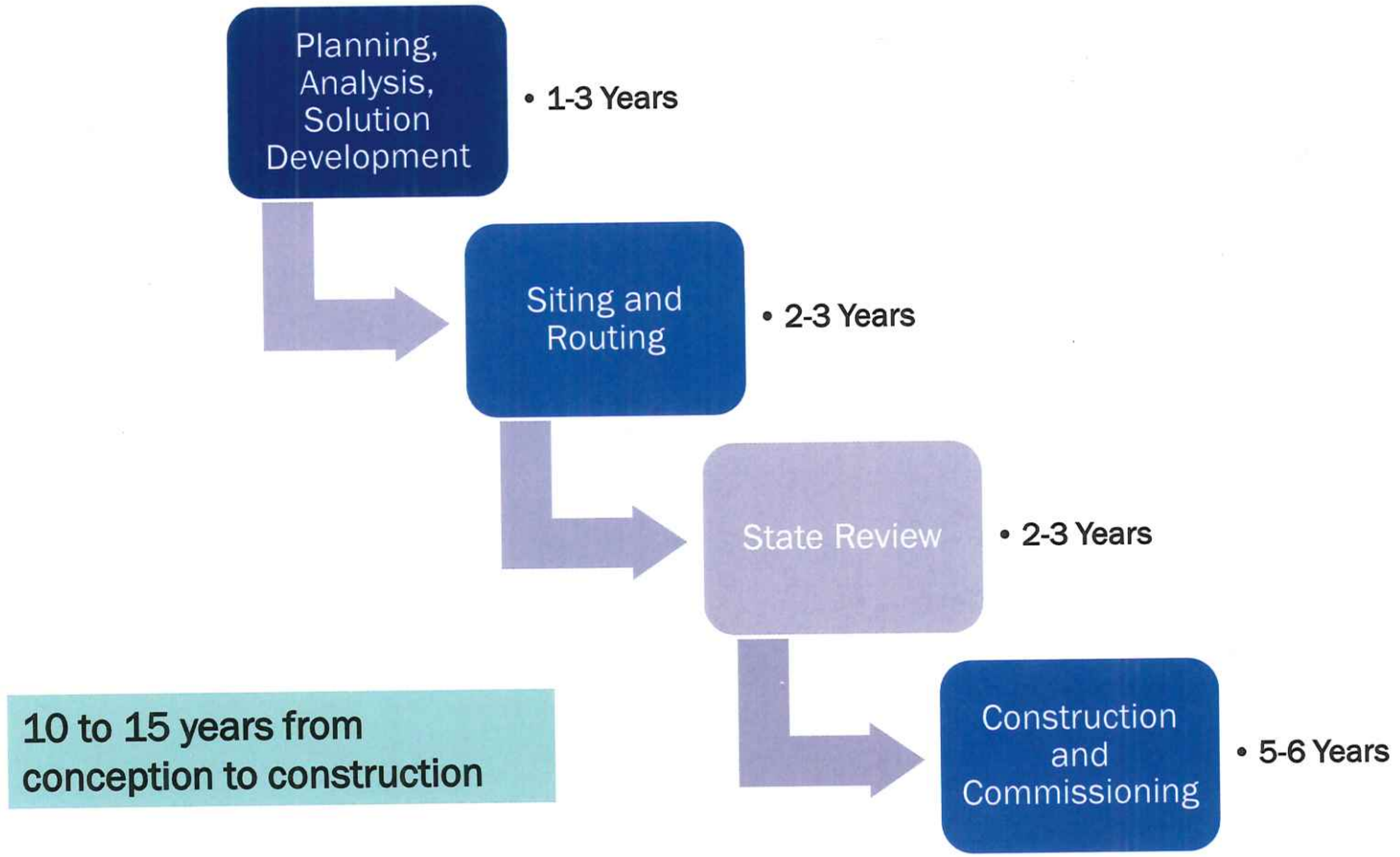
# Transmission Project Development Timeline

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# ENERGY EFFICIENCY

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# Cambridge Electric and Gas Annual Savings from Energy Efficiency Projects(2013-2021)

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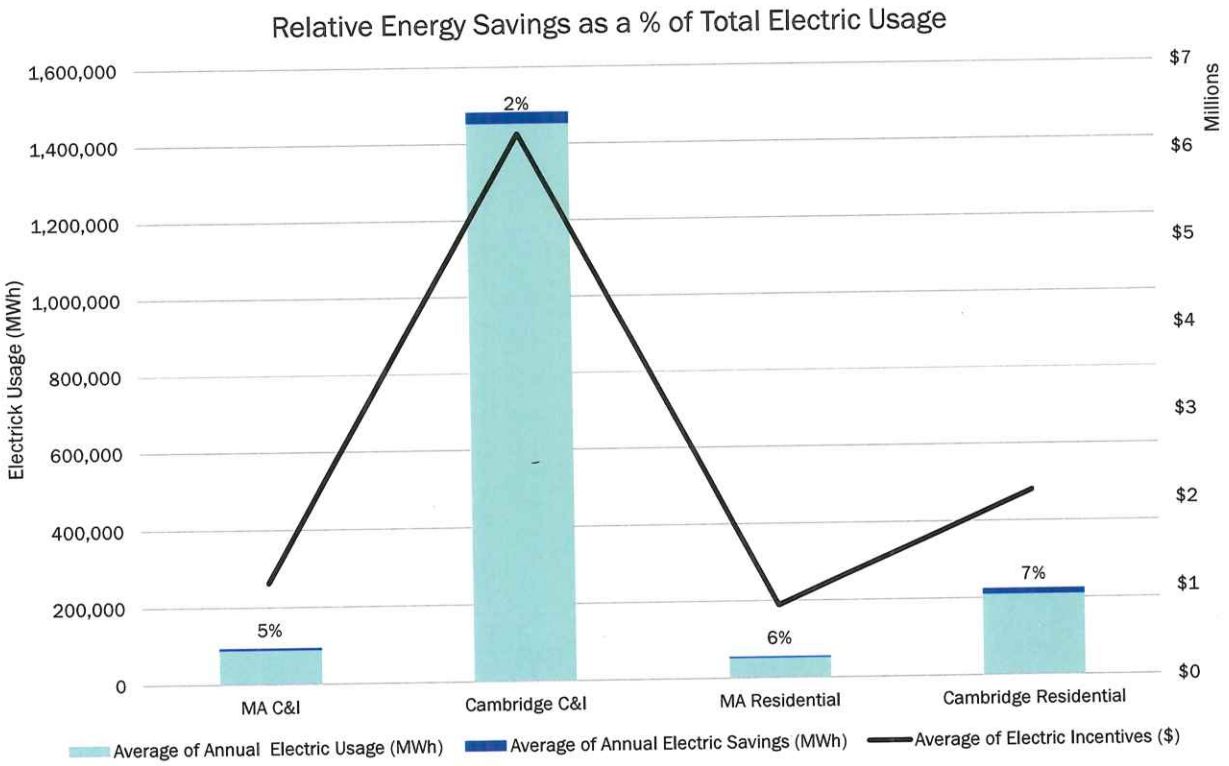
## 2013-2021 Gross Annual Electric Savings (kWh)

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Residential | 2,767,042 | 1,452,862 | 1,317,137 | 1,639,099 | 2,638,349 | 1,744,968 | 2,503,147 | 2,975,324 | 1,032,468 | **18,070,396** |
| Large C&I | 18,636,734 | 11,640,715 | 6,457,357 | 26,610,580 | 19,023,541 | 26,906,435 | 71,096,693 | 46,810,830 | 21,570,875 | **248,753,759** |
| Small Business | 3,178,071 | 2,839,964 | 1,547,564 | 1,254,471 | 1,461,450 | 1,071,474 | 1,427,722 | 1,717,808 | 904,626 | **15,403,150** |
| | | | | | | | | | | |
| ***TOTAL*** | ***24,581,847*** | ***15,933,541*** | ***9,322,058*** | ***29,504,150*** | ***23,123,340*** | ***29,722,877*** | ***75,027,562*** | ***51,503,962*** | ***23,507,969*** | ***282,227,306*** |

## 2013-2021 Gross Annual Gas Savings (Therms)

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| Residential | 332,469 | 62,204 | 20,392 | 175,667 | 214,416 | 164,623 | 359,644 | 179,120 | 136,164 | **1,644,699** |
| Large C&I | 1,283,964 | 824,812 | 79,249 | 2,346,139 | 1,261,474 | 1,850,839 | 2,360,362 | 2,063,956 | 827,766 | **12,898,562** |
| Small Business | 25,902 | 28,750 | 16,294 | 13,306 | 15,860 | 13,826 | 6,286 | 4,977 | 15,777 | **140,976** |
| | | | | | | | | | | |
| ***TOTAL*** | ***1,642,335*** | ***915,766*** | ***115,935*** | ***2,535,111*** | ***1,491,750*** | ***2,029,288*** | ***2,726,292*** | ***2,248,053*** | ***979,707*** | ***14,684,237*** |

# Energy Efficiency




Comparison of Cambridge energy usage, EE incentives, and energy savings as a % of total energy use.

Based on data from Mass Save Data 2019

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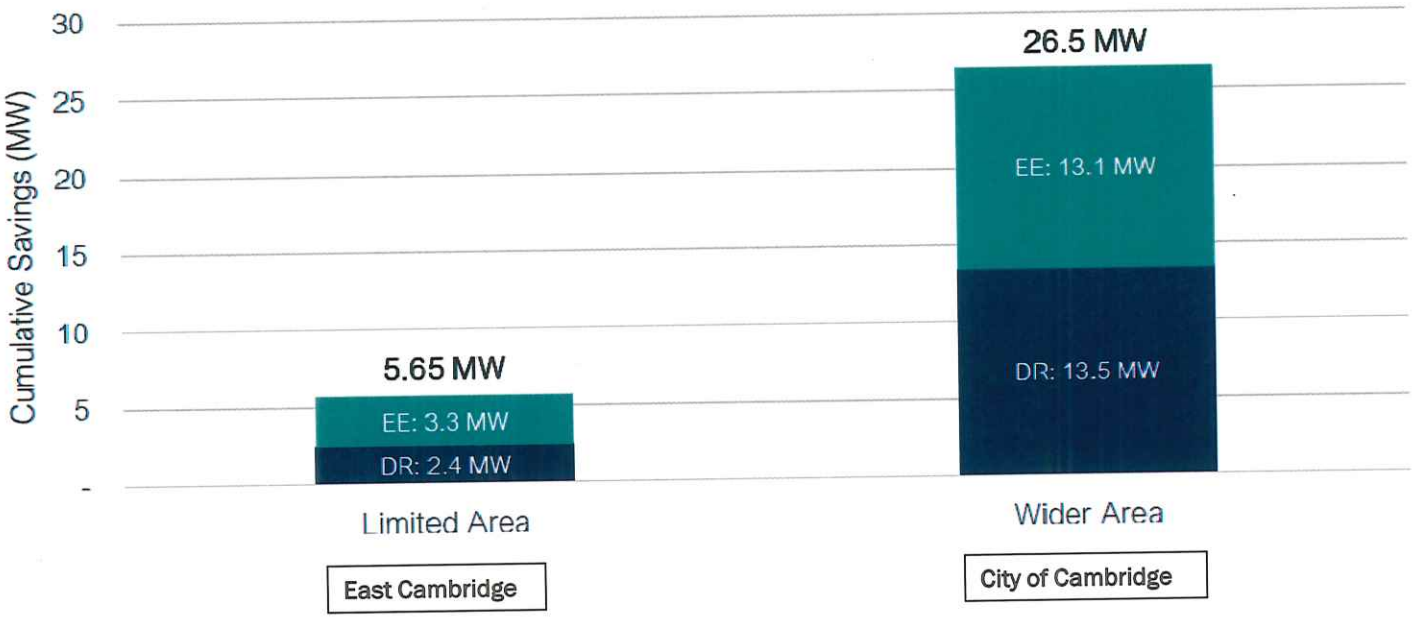
# Energy Efficiency

- Energy Efficiency capabilities available in East Cambridge and Cambridge as a whole

*Figure 10: Peak Reduction Potential from Energy Efficiency and Demand Response by 2027 under Max Achievable Scenario*

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# Energy Efficiency

*Figure 13: Total Program Costs under Max Achievable Scenarios (2022-2027)*


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Advanced Forecasting and Modeling

# ELECTRIFICATION AND LOAD FORECASTING

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# Challenges of an Electrified Society

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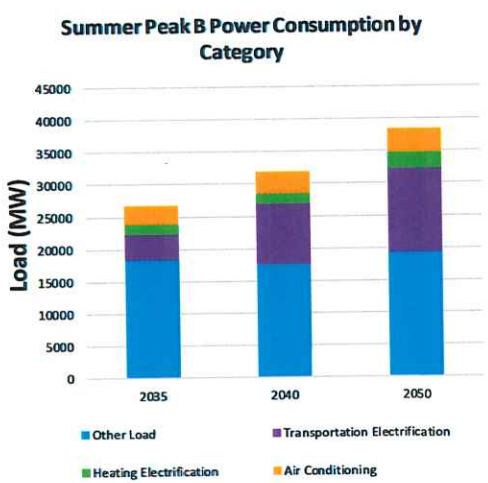
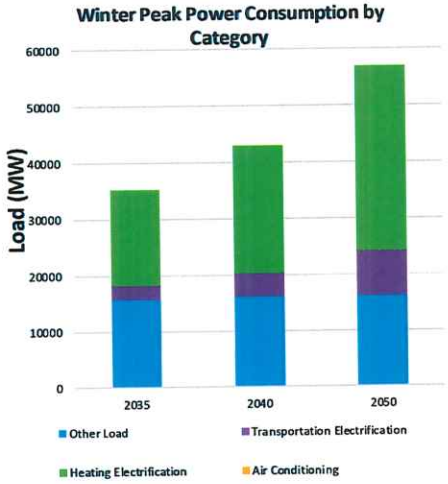
Electrification will drive an unprecedented load growth on the electric system

New England ISO finds that by 2035 the system peak will have gone up to 150% of the 2022 peak, flipping to a winter peak, while the winter peak will have increased to almost 190% from 2022's January peak. By 2050 those values will reach 232% and 290% respectively.

A recent study commissioned by the MassCEC is expected to show significant incremental distribution capital investments in the Commonwealth till 2050 to ensure sufficient distribution capacity




**Challenges**

I. Uneven adoption propensity of electrification requires detailed models to prioritize investments

II. Investment optimization on the electric system as well as across the gas and electric company to provide an integrated plan

III. Communication of the necessity and level of investments to regulators and stakeholders using data driven results

IV. Manage current inflection point of rising energy cost, significant proposed distribution investments, and challenges to the EDC business model

# Developing a Path Forward

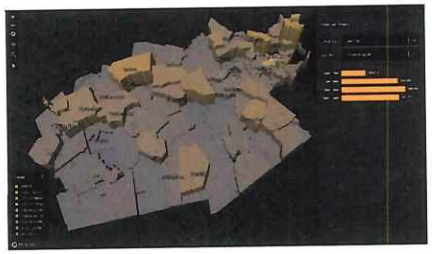
## Developing Data Driven Approaches

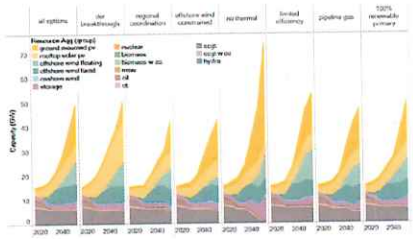
Forecasting models for key technologies provide data driven inputs to strategic decision-making processes;

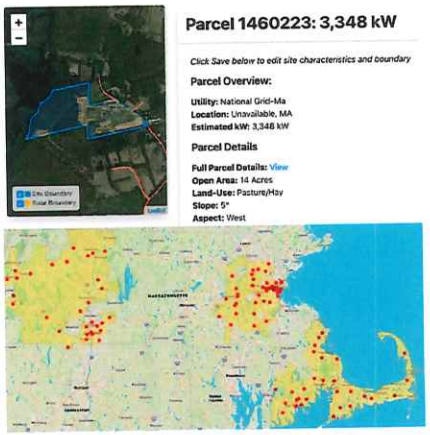
- Optimal Capital Investment based on data driven adoption rate models and state policy objectives to ensure power systems are up to the task
- Policy Coordination to inform rate and policy makers of costs associated with clean energy objectives and collaboratively develop the best course of action
- Reliability Planning to secure the Company's central role in ensuring a safe and reliable power supply while growing the asset base

And allow Eversource to take the lead when coordinating with other entities through advanced data analytics;

- State Entities such as the DOER, DOT, DPU, AGO, and MassCEC to drive infrastructure investments and design programs
- Developer Communities to drive solar development in optimal locations
- Strategic Customers to support electrification in a sustainable manner





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# Eversource is taking the initiative

EVERSOURCE ENERGY


Strategic Investment into Advanced Forecasting and Modeling

Dedicated team to transition forecasting from load centric, single value forecasts to advanced forecasting with multiple variables based on policy objectives.

- New Software Solutions such as LoadSeer, GridTwin, and Microsoft DataBricks allow for forecasting far ahead of industry standards across North America ($3+ Million in GridMod 1.5 Funding)
- Key Talent investments by introducing data scientists into System Planning with a team of three data scientists and one forecasting engineer

Dedicated Synergi Modeling Function to allow incorporation of forecasts into models and transition planning into 8760 models

- Centralized Model Management to ensure consistent model quality and to provide models as a service to all DSP, DER, and DE departments
- Development of Planning Models which represent the build out state of the system till 2050, including all forecasts

Whats Next? Expected approval of ~$5 Million GridMod funding to introduce significant automation in Synergi, as well as probabilistic power flow capabilities.

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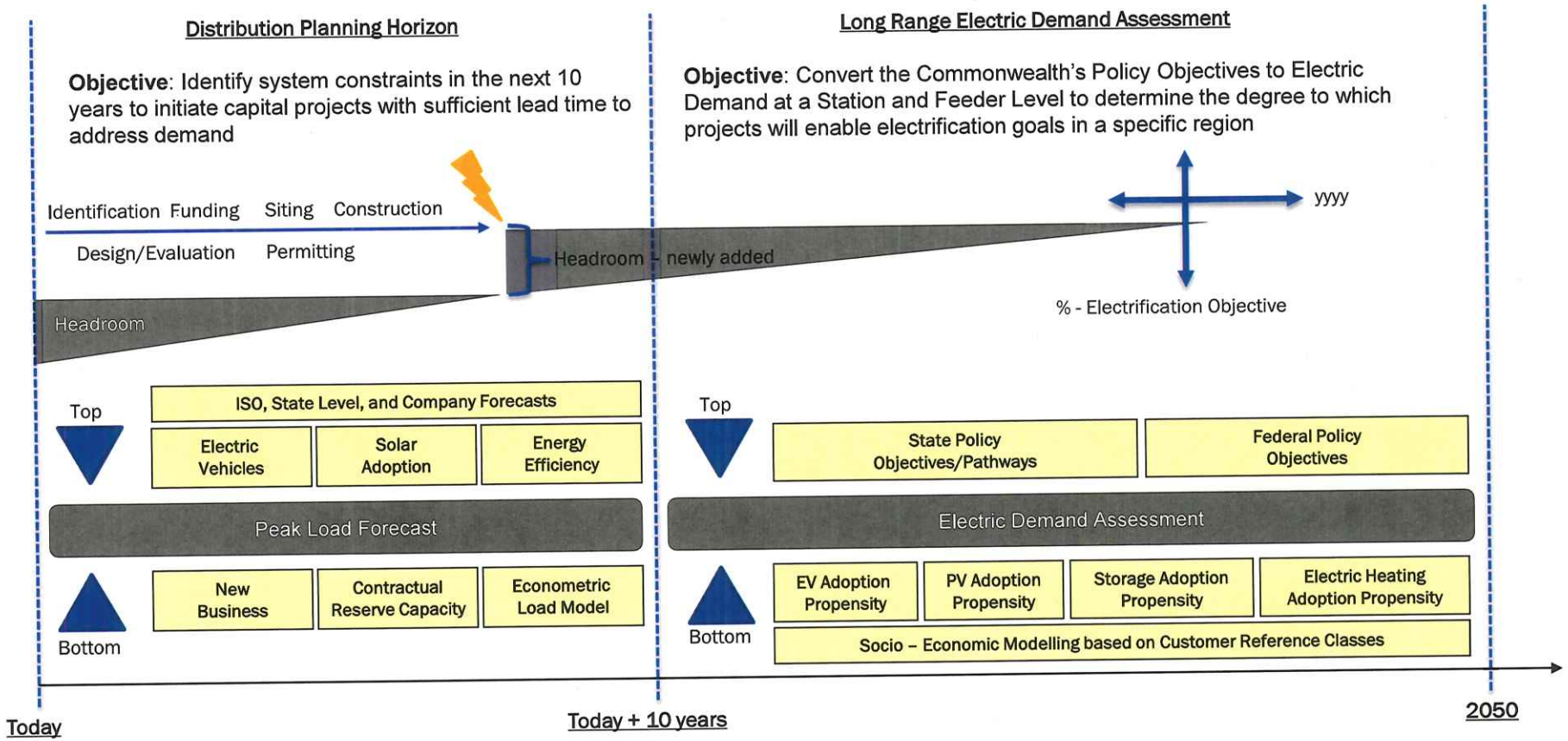
# Eversource – Advanced Forecasting

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# Long Term Electrification Impact Assessment

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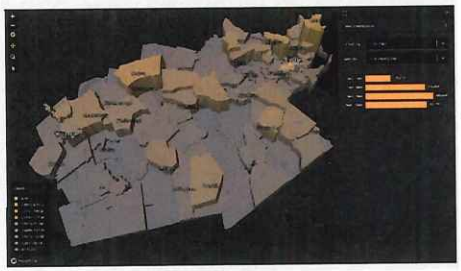
## Electric Vehicles

- Monitoring of Traffic
- Alignment with Net Zero Objectives
- Assessment of Charging Behavior

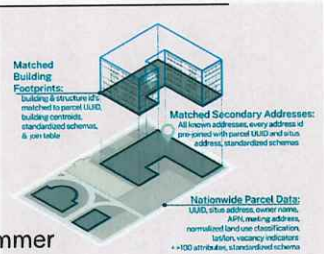
Creates
- Station Specific Load Profiles
- Long-Term understanding of load
- Feedback to charge management



## Heat Pumps

- Detailed property data based
- Close cooperation with EE Programs
- Known square footage

Creates
- Station specific heating load potential
- Understanding when winter peaks overtake summer
- Provides feedback to EE programs and gas business



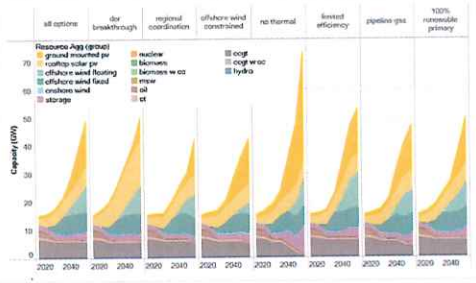

## Solar

- Territory wide parcel data base
- Econometric models for rooftop and ground mounted solar
- Hosting Capacity Maps

Creates
- Adoption propensity models for solar
- Information for developers on parcels
- Visibility for the EDC on all parcels


## 2050 Decarbonization Roadmap

- Variety of pathways to achieve 2050 decarbonization objectives
- Baseline of all long-term electrification impact assessments
- Updated as policy objectives change



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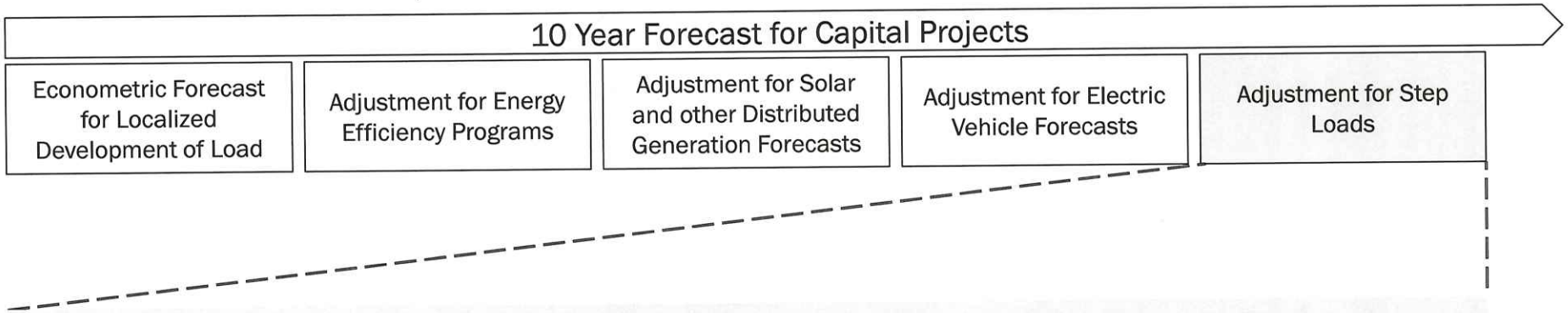
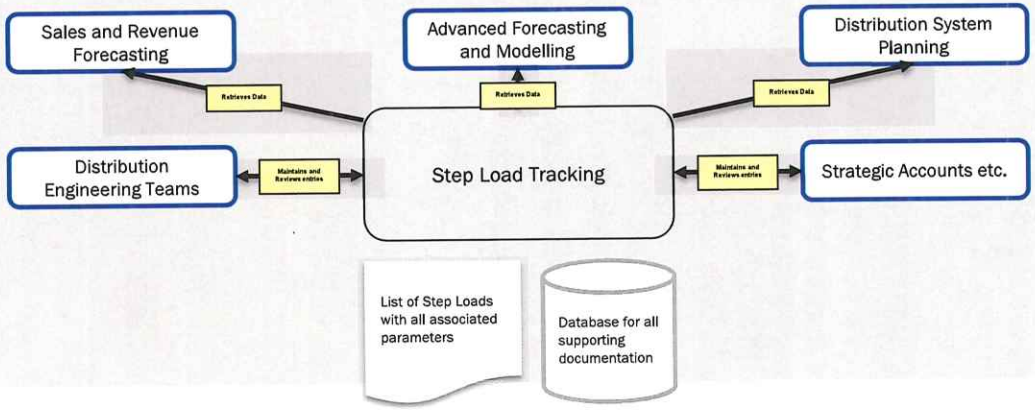
# Step Load Tracking




Step Load Tracking

Step Load Tracking is a coordinated process between Forecasting, Engineering, Planning, and Strategic Accounts

- Territory Database for all major step load increases
- Tracking of "firmness" of load
- Inclusion in 10 year forecast to inform new capital projects
- Coordinated effort between

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# FACTS AND FIGURES

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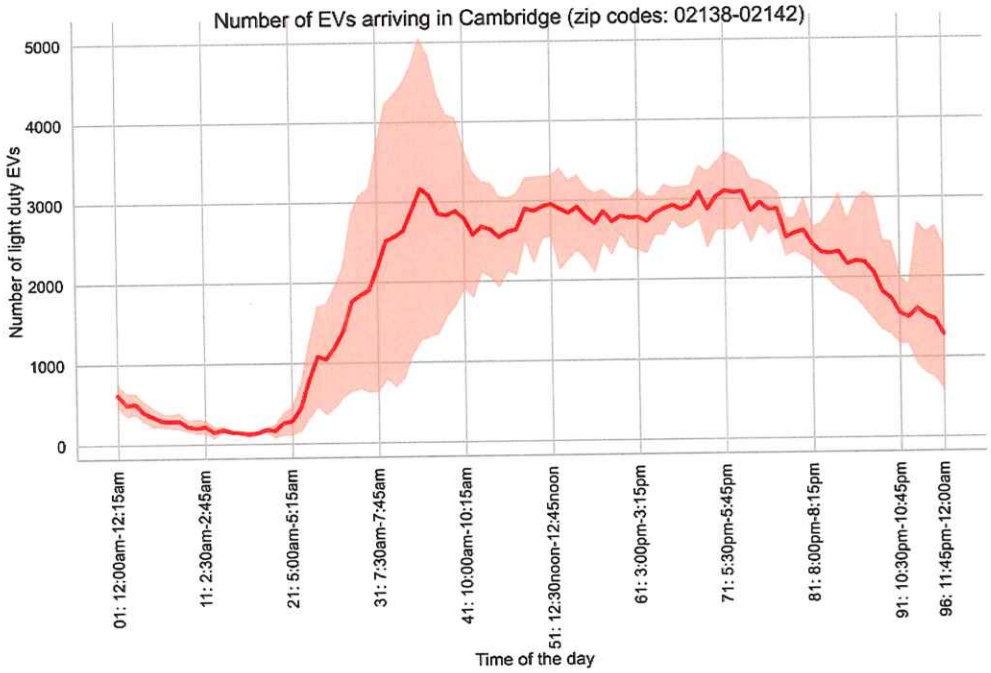
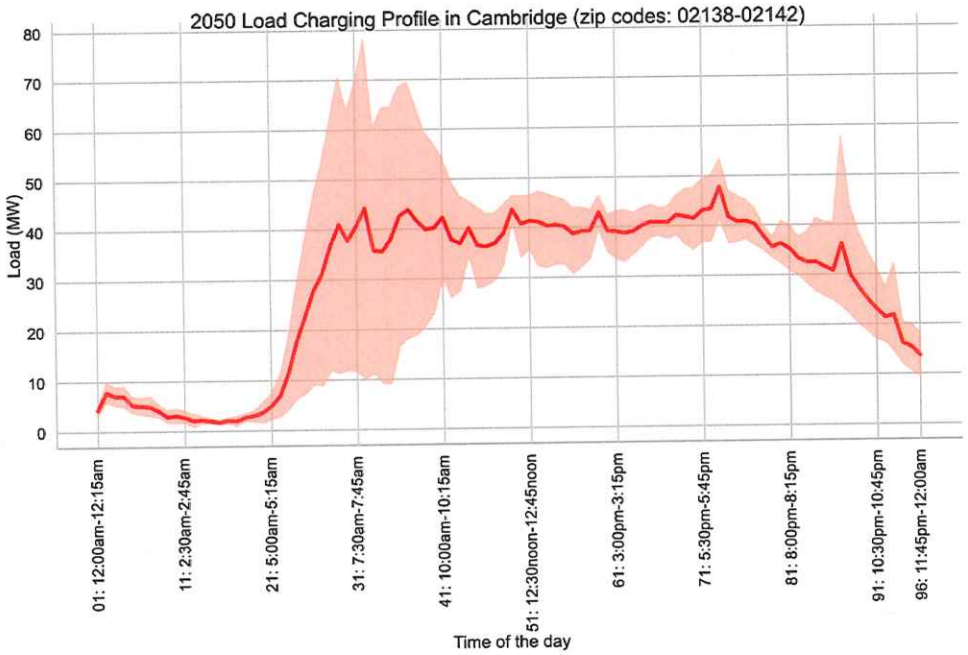
# Facts and Figures: EV Arrival and Charging Profile

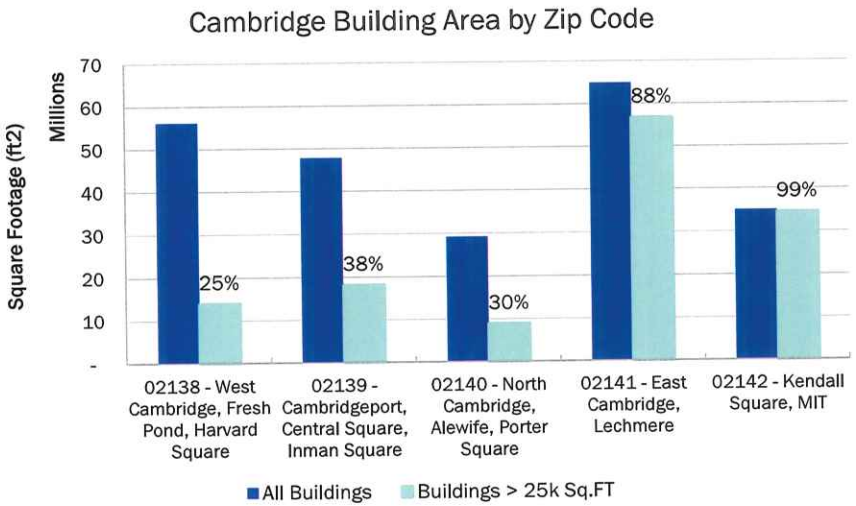


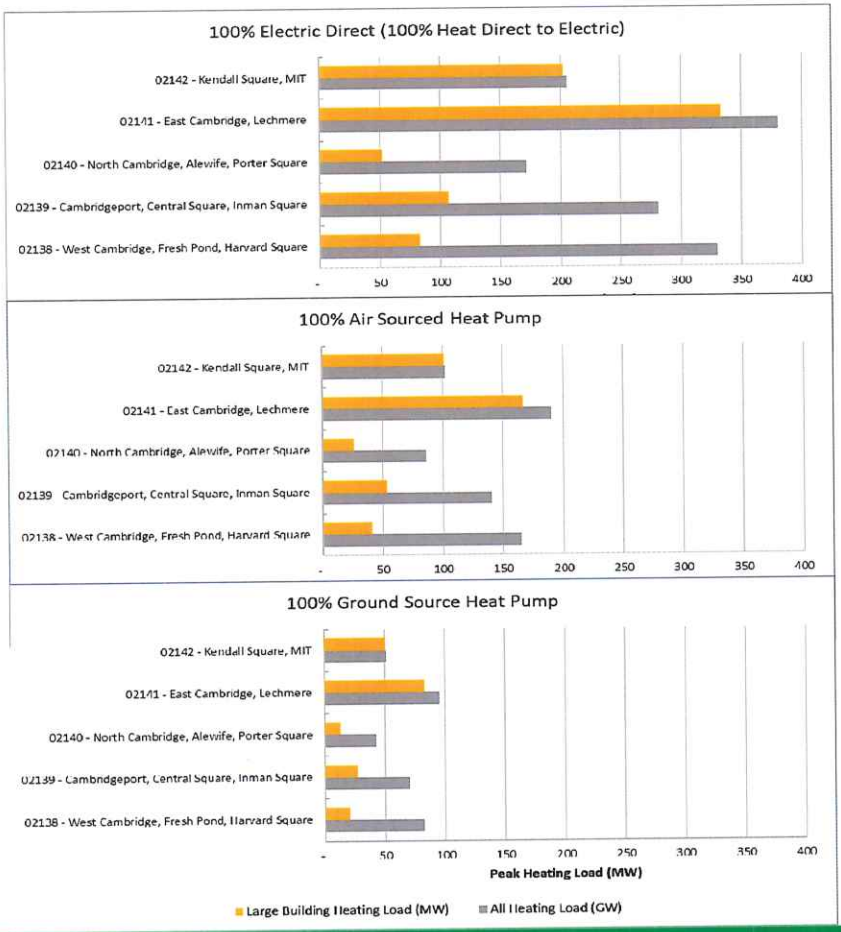




Assumptions:

- Vehicles charge upon trip termination with the charging duration based on previous trip length
- No consideration for utility or 3rd party charge management
- Assumes sufficient charging infrastructure, especially on site
- Assumes a 100% conversion of ICE vehicles to EV

# Facts and Figures: Heating Electrification




- The estimated total heating demand is 2.1 GW for direct heat to electric demand
- Using ASHP or GSHP demand is reduced to 1 GW and 540 MW respectively
- Commercial/large building heating demand has highest impact
- Cambridge consumes at peak around ~5,100 MMBTU/hr gas which represents about 1.5 GW

*Heating potential estimated based on building square footage and peak heating assumptions

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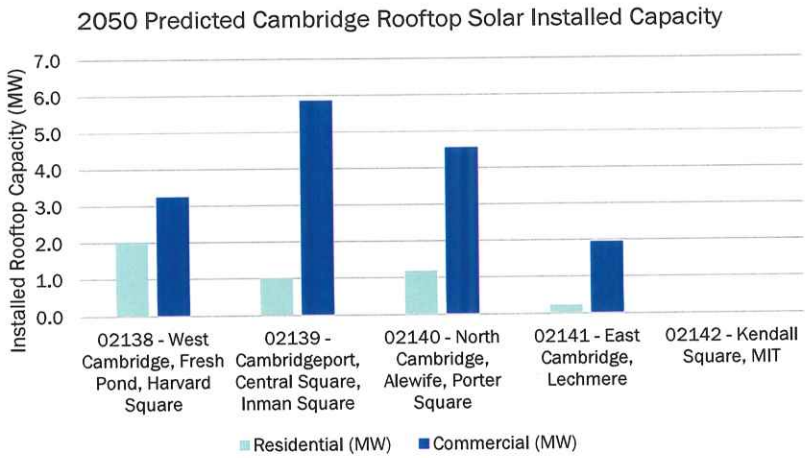
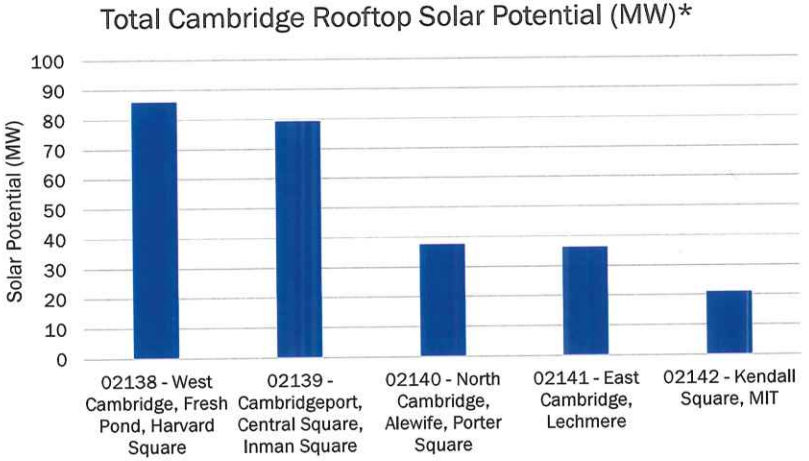
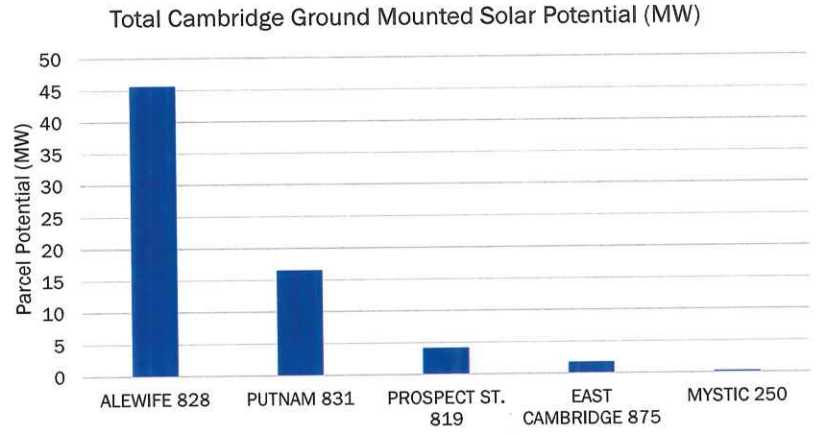
# Facts and Figures: Solar Models




- The estimated total available rooftop solar potential in Cambridge is 260 MW*.
- The predicted adoption of rooftop solar by 2050 is 20 MW**, 80% of which is Commercial
- The estimated total available ground mounted solar potential is 68 MW***

*Total available solar potential is based on parcel data and assumptions from Project Sunroof (Google)

**Based on Eversource historical, customer, PV generation data

***Based on MassGIS parcel data

# Facts and Figures: Storage Systems

- For the Greater Cambridge Project, the Company evaluated Storage + other options as a Non-Wires Alternative
- For the 2032 forecast on a 2050 timescale to decarbonization, a battery need was established
- The Battery identified would be
  - An additional load and consume 183 MWh in heat losses per cycle (more than a 5 MW Lab building in a day) adding to urban heating effects
  - Cannot be cost effectively split up and would be equal to more than 84,000 tesla power walls
  - Require significant space, compares to Moss Landing at 1600 MWh which replaced an entire power plant and sits on more than 7 acres
- Batteries will help shave peaks and offset loads, but not to the extend electrification will demand and not with the longevity required

| Scenario | Peak Power | 24-hour Energy |
|---|---|---|
| Distribution Contingency | 92 MW | 1218 MWh |
| Maximum Achievable Energy Efficiency and Demand Response | 86.3 MW | |
| 100% utilization of rooftop space PV 47.8 MW | 77 MW | 1038 MWh |
| Battery Requirement at 85% roundtrip | 77 MW | 1126 MWh |

# Projected Distribution Infrastructure Needs
## (Does not Include transmission)

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### 2030

More than **585 MW** of summer peak demand projected for 2030

Current 2030 Status Quo
- **5** Distribution bulk Substations
- **16** Bulk Transformers
- **~250+** distribution feeder of various voltages
- **~2000+** large distribution service transformers

Assumptions:
- GCEP infrastructure is in place
- Load growth is in line with forecasts
- Electrification targets aligned with 2050 Decarbonization Roadmap

### 2050 – hybrid

More than **961 MW** of winter peak demand projected with residual gas, pipeline gas, hydrogen application in non-displaceable load.

Compared to 2030
- Additional **2** bulk Substations
- Additional **8** Bulk Transformers
- Additional **~80+** distribution feeders of various voltages
- Additional **~700+** large distribution service transformers

Assumptions
- Includes 100% residential and 50% commercial gas conversion
- Does not include electrifying the steam system
- Assumes growth on 2050 timeline; Winter peak occurs between 2030 and 2040

### 2050 – full

More than **1300 MW** of winter peak demand projected for 2050 @ 100% gas displacement

Compared to 2030
- Additional **4** bulk Substations
- Additional **16** Bulk Transformers
- Additional **~150+** distribution feeders of various voltages
- Additional **~1200+** large distribution service transformers

Assumptions
- 100% conversion of gas consumption to electric at COP 2
- 100% electric vehicle conversion

### 2035 – Accelerated

Requires very aggressive timelines for additional projects to meet full need (**1300 MW** of winter peak) by 2035

Compared to 2030
- Accelerated siting and permitting for **4** additional bulk substations
- Expedited routing/permitting for new UG transmission lines
- Rapid construction of new feeders and upgrades to UG distribution
- Deployment of many additional customer service transformers

None of these projects are currently in the Company's10-year plan

*All 2035 and 2050 numbers exclude any future development and growth above and beyond the 2032 forecast in the region which would further increase need.*

EVERSOURCE ENERGY


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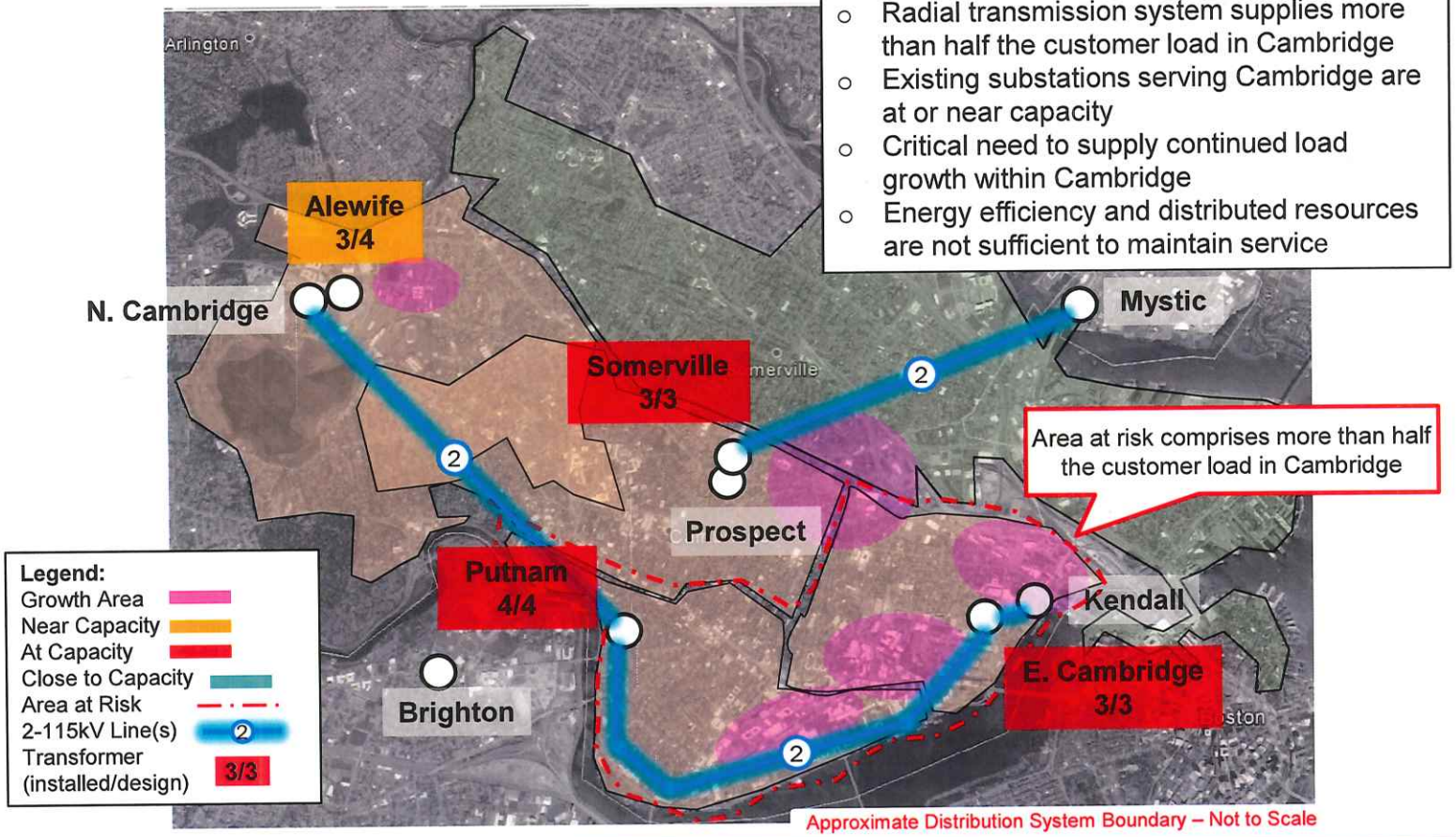
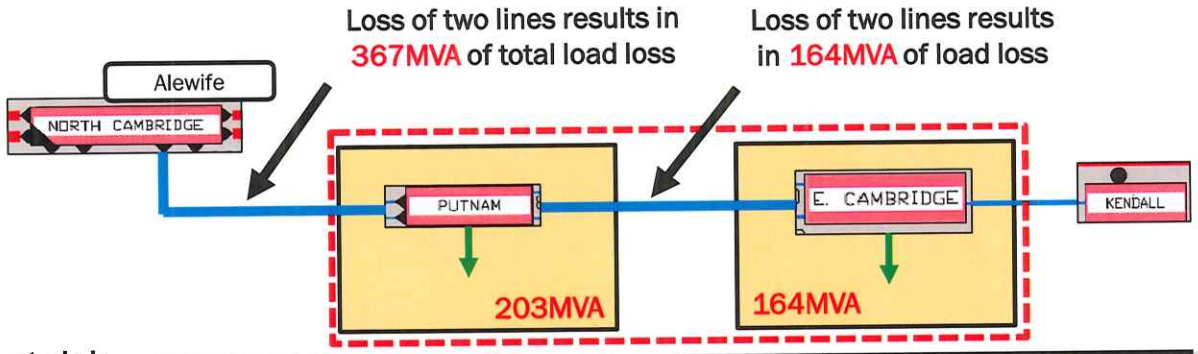
# APPENDIX

# Cambridge Area T&D Need

- Radial transmission system supplies more than half the customer load in Cambridge
- Existing substations serving Cambridge are at or near capacity
- Critical need to supply continued load growth within Cambridge
- Energy efficiency and distributed resources are not sufficient to maintain service



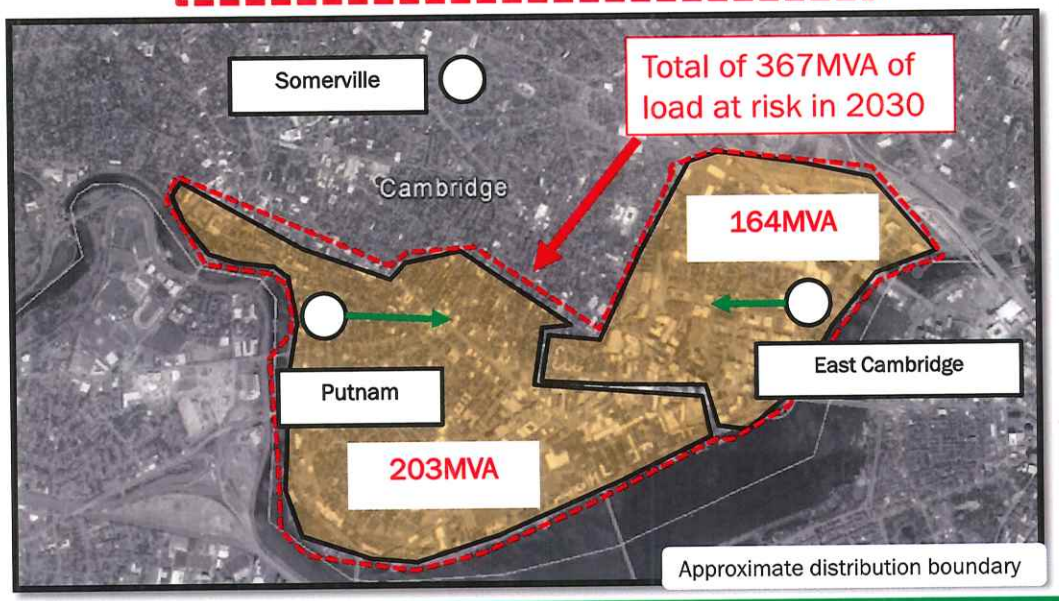
# Transmission Need




Legend:
Load Pocket
At Risk
115kV
14kV
Gen

**2021:**

- **300 MVA** load at risk in 2021
- Transmission failure can take weeks to restore
- Prolonged outage for customers in: East Cambridge, Kendall Square, and Cambridgeport




**2030:**

- Total **367MVA** of load at risk by 2030
- Load at risk would include all new business development from 2021 to 2030



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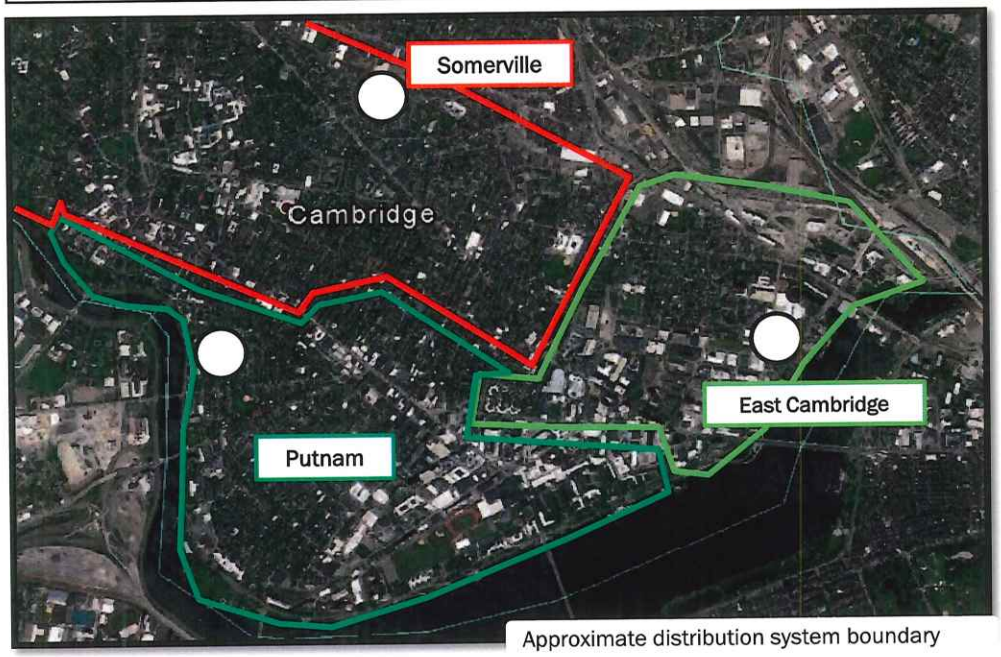
# Distribution Need

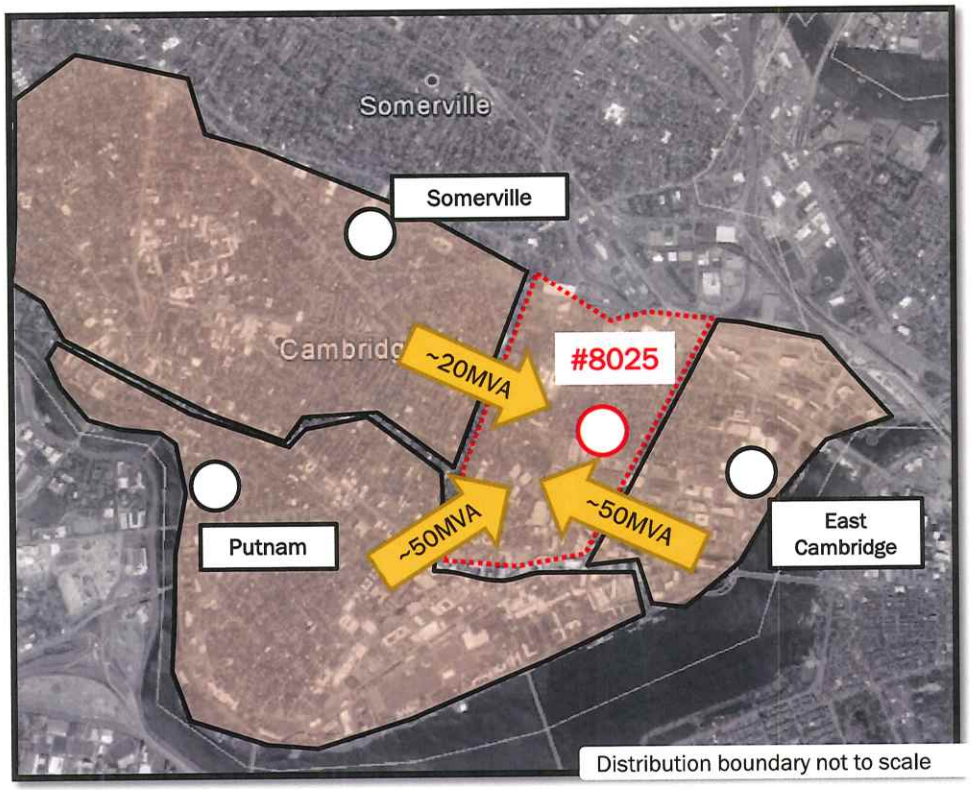
- East Cambridge Substation has reached its Operational and Emergency limit in 2021
- Each of the individual East Cambridge substation transformers has also reached its Normal thermal limit
- In the broader project area, inclusive of Somerville, load growth is projected to increase ~130MVA

| Station | Capacity | 2021 | 2022 |
|---|---|---|---|
| East Cambridge 875 | Load | 150 | 179 |
| | Firm Capacity | 150 | 150 |
| | Load/Firm Capacity | 100% | 119% |



# Comprehensive Solution – Distribution Substation and Feeders

- New Distribution Bulk Substation 8025 in service by in 2028:
  - Initial capacity: three 90 MVA transformers, expandable to four
- Project resolves **existing distribution capacity** need at East Cambridge substation and neighboring substations
- Fourth transformer expansion provides for long-term capacity needs for East Cambridge



# Cambridge EV Peak Data

EVERSOURCE ENERGY

| | Load in MW | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Zip: 02138 | | | | | | | |
| Season | Weekday (M-Th) | Peak Time | Friday | Peak Time | Weekend Day (Sa-Su) | Peak Time | Holidays | Peak Time |
| Mar-May | 28.8 | 7:45am-8:00am | 31.4 | 2:45pm-3:00pm | 29.2 | 2:45pm-3:00pm | 31.2 | 5:15pm-5:30pm |
| Jun-Aug | 25.3 | 7:45am-8:00am | 22.7 | 7:45am-8:00am | 16.3 | 12:30noon-12:45noon | 23.2 | 2:45pm-3:00pm |
| Sep-Oct | 35.3 | 5:15pm-5:30pm | 35.0 | 5:15pm-5:30pm | 33.4 | 5:15pm-5:30pm | 31.3 | 5:15pm-5:30pm |
| Nov-Dec Jan-Feb | 31.2 | 5:15pm-5:30pm | 32.0 | 5:15pm-5:30pm | 30.3 | 5:15pm-5:30pm | 25.8 | 5:15pm-5:30pm |
| | Zip: 02139 | | | | | | | |
| Mar-May | 26.4 | 9:00am-9:15am | 25.8 | 7:45am-8:00am | 19.4 | 4:00pm-4:15pm | 18.9 | 4:00pm-4:15pm |
| Jun-Aug | 25.7 | 7:45am-8:00am | 24.1 | 7:45am-8:00am | 12.7 | 3:00pm-3:15pm | 21.2 | 10:00pm-10:15pm |
| Sep-Oct | 25.5 | 9:00am-9:15am | 28.1 | 9:00am-9:15am | 19.0 | 12:45noon-1:00pm | 19.8 | 4:00pm-4:15pm |
| Nov-Dec Jan-Feb | 23.1 | 9:00am-9:15am | 23.0 | 6:45am-7:00am | 18.0 | 4:00pm-4:15pm | 14.6 | 2:45pm-3:00pm |
| | Zip: 02140 | | | | | | | |
| Mar-May | 17.0 | 6:15pm-6:30pm | 15.9 | 6:15pm-6:30pm | 13.2 | 6:15pm-6:30pm | 17.0 | 6:15pm-6:30pm |
| Jun-Aug | 12.8 | 7:45am-8:00am | 11.7 | 7:45am-8:00am | 8.7 | 3:15pm-3:30pm | 11.9 | 6:00pm-6:15pm |
| Sep-Oct | 19.9 | 6:15pm-6:30pm | 20.8 | 6:15pm-6:30pm | 17.4 | 6:15pm-6:30pm | 16.4 | 6:15pm-6:30pm |
| Nov-Dec Jan-Feb | 19.3 | 6:15pm-6:30pm | 19.9 | 6:15pm-6:30pm | 16.5 | 6:15pm-6:30pm | 14.4 | 6:15pm-6:30pm |
| | Zip: 02141 | | | | | | | |
| Mar-May | 13.2 | 10:00am-10:15am | 13.3 | 11:00am-11:15am | 10.8 | 1:30pm-1:45pm | 11.3 | 11:15am-11:30am |
| Jun-Aug | 12.5 | 10:15am-10:30am | 11.7 | 10:15am-10:30am | 11.0 | 1:30pm-1:45pm | 11.0 | 11:15pm-11:30pm |
| Sep-Oct | 12.6 | 10:00am-10:15am | 14.5 | 9:45am-10:00am | 12.5 | 11:15am-11:30am | 12.0 | 11:15am-11:30am |
| Nov-Dec Jan-Feb | 12.7 | 9:45am-10:00am | 13.2 | 9:30am-9:45am | 11.5 | 11:15am-11:30am | 10.1 | 11:15am-11:30am |
| | Zip: 02142 | | | | | | | |
| Mar-May | 13.7 | 7:45am-8:00am | 14.9 | 7:15am-7:30am | 6.9 | 7:00pm-7:15pm | 6.0 | 3:30pm-3:45pm |
| Jun-Aug | 15.4 | 8:00am-8:15am | 10.7 | 8:00am-8:15am | 4.1 | 6:30am-6:45am | 18.2 | 9:45pm-10:00pm |
| Sep-Oct | 15.8 | 8:00am-8:15am | 13.7 | 8:00am-8:15am | 7.4 | 6:45am-7:00am | 8.6 | 8:00am-8:15am |
| Nov-Dec Jan-Feb | 12.2 | 7:15am-7:30am | 12.8 | 6:45am-7:00am | 5.8 | 3:30pm-3:45pm | 6.2 | 6:45am-7:00am |
| | Zip: 02138-02142 | | | | | | | |
| Mar-May | 90.8 | 7:45am-8:00am | 89.0 | 7:45am-8:00am | 63.3 | 2:30pm-2:45pm | 59.5 | 4:45pm-5:00pm |
| Jun-Aug | 88.4 | 7:45am-8:00am | 76.4 | 7:45am-8:00am | 43.7 | 2:00pm-2:15pm | 72.8 | 9:30pm-9:45pm |
| Sep-Oct | 89.1 | 8:15am-8:30am | 89.3 | 8:15am-8:30am | 68.2 | 5:00pm-5:15pm | 61.8 | 5:00pm-5:15pm |
| Nov-Dec Jan-Feb | 75.3 | 7:30am-7:45am | 74.7 | 7:30am-7:45am | 61.0 | 5:00pm-5:15pm | 51.0 | 5:00pm-5:15pm |

**Erwin, Nicole** Attachment C

**From:** Toner, Paul
**Sent:** Tuesday, November 22, 2022 12:24 PM
**To:** Erwin, Nicole; Crane, Paula
**Subject:** FW: Potential order text

ORDERED that the City Manager be and hereby is requested to direct the Community Development Department to provide recommendations on the topic areas brought up during the Ordinance Committee discussions on amendments to the BEUDO ordinance to reconcile the 2035 target with concerns presented by property owners, including a straightforward pathway to using offsets for flexibility while giving the community predictable and real emissions reductions and report back to the Council in a timely manner.

Paul Toner, MEd, JD
City Councillor
617-216-7305
ptoner@cambridgema.gov

Attachment D



Good Afternoon – My name is Roger O'Sullivan and I am representing 1105 Mass Ave Condominium where I am a long time Trustee. Our Board of Trustees is very concerned about the impact of the proposed BEUDO Ordinance and the effect it will have on the City's hundreds of condominium buildings, especially those with more than 50 units. We strongly urge the Council to pause its implementation of BEUDO, particularly the 2035 compliance date, and align itself more with the Commonwealth goals.

- Condominiums were excluded from participating in the negotiation process for the ordinance and unable, until now, to state their case. We are playing catch up while other groups have had the advantage.

- Residential emissions are 20% of the total GHG. Covered condominiums represent a mere 1% of that, while single family homes are responsible for much more.

- Multifamily buildings are much more energy efficient unit for unit because of their density and shared infrastructure. The City should start its residential implementation of BEUDO with single family homes, not multifamily condominiums.

- The complicated ownership structure of condominiums has not been taken into account. Condo boards can make decisions on common area, but not on individually owned units. We can recommend but have no way to force compliance.

- We do not know whether there will be adequate electrical infrastructure to support the huge increase in demand for power. The last mile of connectivity is the hardest to implement. Nor do we know whether that infrastructure will be hardened and reliable to the degree required when we are all 100% reliant on it.

Thank you.

**Erwin, Nicole** Attachment E

**From:** City Clerk
**Sent:** Monday, December 5, 2022 4:27 PM
**To:** Erwin, Nicole
**Subject:** FW: Mothers Out Front response to November 22 BEUDO hearing

**From:** Lowry Hemphill <lowryhhill@gmail.com>
**Sent:** Monday, December 5, 2022 4:15 PM
**To:** City Council <CityCouncil@CambridgeMA.GOV>
**Cc:** City Clerk <cityclerk@Cambridgema.gov>
**Subject:** Mothers Out Front response to November 22 BEUDO hearing

To the Cambridge City Councillors:

Several of us from Cambridge Mothers Out Front attended the Economic Development and University Relations Committee hearing on the BEUDO amendments on November 22, 2022, and several of us also spoke during Public Comment. It was a very informative meeting, and we appreciate the work that went into the presentations and organizing the meeting. We want to address five main points about the hearing presentations: "business as usual" approaches, Eversource's continuing reliance on fossil fuels, the value of Alternative Compliance Credits (ACCs), issues with global carbon offsets, and the need to cut emissions to support Cambridge residents' health.. Links to sources for many of our points are in blue with underlining.

- **Business as usual?** Many of the speakers appeared to be presenting "business as usual (BAU)" scenarios for responding to the climate crisis. Examples include the extended Eversource timeline for expanding the grid locally and the universities' claim that they are unable to take multiple buildings offline for conversion at the same time. We recognize that conversion from fossil fuels is not always simple, but climate change is not a BAU situation. Current scientific data are clear that we need to significantly accelerate the transition from fossil fuels to avoid the most extreme consequences of the warming of our planet beyond 1.5°C. We know that New England is warming at a faster pace than many other parts of the world. This requires us to shift from a BAU to an all hands on deck approach. Current inaction is costly in terms of health impacts, especially for vulnerable members of our community, as well as impacts on our economy, infrastructure and way of life. The City of Cambridge should be applauded for its many efforts so far to respond to the climate crisis. We hope businesses and universities, and other large building owners, will join this effort as full partners in cutting fossil fuel emissions and making Cambridge a leader on climate.

- **Challenge Eversource's continuing reliance on fossil fuels.** Unfortunately, Eversource's plans continue to feature reliance on harmful gas and even gas+hydrogen

mixes. Their 2050 hybrid model, presented at the hearing, is heading in the wrong direction. We need to see a commitment from our energy supplier to get us off fossil fuels and speed up the transition to renewables, including fully utilizing abundant local wind power and solar as well as geothermal. We know that our gas pipes leak and that efforts to fix leaks are both costly for ratepayers and fruitless. Gas is harmful for our health and explosive and should be phased out quickly. We also know that the gas in our pipes is mostly methane, a potent greenhouse gas that traps heat in our atmosphere at a much higher rate than CO2. Cutting methane is thus key to reducing global warming quickly. Eversource's focus on continuing to rely on gas plus electric serves their financial interests but is not a rational response to the climate crisis. Adding hydrogen to the mix, another scenario presented by Eversource, is a very bad idea. Hydrogen is more explosive than methane, plus it embrittles pipes (and would require additional investments to replace the current pipes with pipes with appropriate lining). The significant investment that would be needed for conversion to methane+hydrogen mixes should be spent instead on accelerating the transition to offshore wind power, geothermal, and solar and to strengthening our grid.

- **Invest locally through Alternative Compliance Credits.** The large institutions and the business associations spoke in opposition to the city's proposal of Alternative Compliance Credits (ACCs). The Alternative Compliance Credit is a mechanism that enables BEUDO building owners to make a step-by-step transition to reducing GHG emissions, while contributing to the cost of local offsets that reduce emissions elsewhere in the city. Such offsets could include installing solar panels on affordable housing, municipal buildings, schools, and libraries, making energy efficiency retrofits for public housing and municipal buildings, and purchasing electric buses for our schools and electric vehicles for the City's fleet. Combined with city-supported training for workers and youth in green jobs like solar installation, retrofitting, and energy auditing, these ACC investments would reduce local emissions, improve our health, reduce energy costs for the city and lower income residents, and boost employment and our local economy.

- **Limit global offsets.** Global offsets, the alternative favored by the university spokespeople, are notoriously difficult to certify, which is to say it is very hard to be certain that a particular global offset is really reducing carbon emissions by one metric ton (mT), that it will continue to do so for the foreseeable future (CO2 stays in the atmosphere for a century or more, will offsets last that long?), and that the offset is not displacing other more appropriate land uses globally. Are our Cambridge institutions planning to re-certify each of their global offsets every year for a century? That is why it makes sense to focus on the price of the offset, and to subtract it from the ACC of $234/mT, rather than simply assuming that it will always account for one mT of emissions reduction. Deducting global offsets' cost from the price of ACCs gives our city a way to quantify and control emissions reduction in Cambridge and to invest in GHG

reductions and green jobs right here at home. It will also provide incentives for building owners to make investments that will stay in the community and benefit residents, rather than dubious and cheaper global credits that will leave local emissions unchecked.

- **Reduce local emissions to improve Cambridge residents' health.** Because they do not reduce emissions locally, global offsets do not address the health impacts of emissions from Cambridge's largest buildings. According to Mass Department of Public Health records, neighborhoods close to concentrations of large buildings and new construction, specifically East Cambridge, the Port and Wellington-Harrington, have significantly higher rates of childhood asthma than the rest of the city. These residents should not bear the burden of adverse health outcomes from living near large fossil fuel emitters. Reducing emissions locally addresses a local public health issue, as well as an environmental justice issue – and would contribute to equity in our city.

Virtually all who made presentations at the November 22 hearing reassured us that they care very much about climate change and want to address it. Let's ask all of them to set aside business as usual approaches and come up with innovative responses to the seriousness of the climate crisis. Many of the steps required are commonsensical and within building owners' current capabilities. At the hearing, the CDD presented an analysis, for example, that large office buildings can meet most of their BEUDO emissions reductions targets for 2030 by simply shifting to green-sourced electricity. In the hearing, Eversource presented results of a study that documented huge unused potential for rooftop solar in Cambridge. Furthermore, CDD is offering differentiated timelines and technical assistance to facilitate this transition while state and federal programs offer subsidies. Building owners don't have to figure it out on their own. Cambridge set aside a business as usual approach in response to the COVID-19 emergency and came up with new methods to help our schools and businesses and provide widespread vaccinations and testing. We believe the same unified approach is needed to respond to the climate emergency facing our city and our planet.

Thank you for your attention. We are looking forward to the development of the strongest possible BEUDO amendments.

Sincerely,

Elena Fagotto, Co-coordinator, Community Leadership Team, Cambridge Mothers Out Front

Kristine Jelstrup, Co-coordinator, Community Leadership Team, Cambridge Mothers Out Front

Margery Davies, Co-coordinator, Public Officials Team, Cambridge Mothers Out Front

Lowry Hemphill, Co-coordinator, Public Officials Team, Cambridge Mothers Out Front