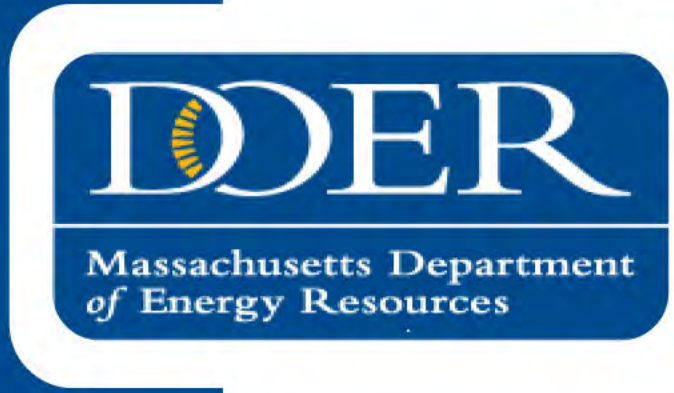
Creating A Clean, Affordable, Equitable and Resilient Energy Future For the Commonwealth



COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES
Patrick Woodcock, Commissioner

Building Energy Code Straw Proposal: Updated Stretch Code & Specialized Opt-In Code

February 2022

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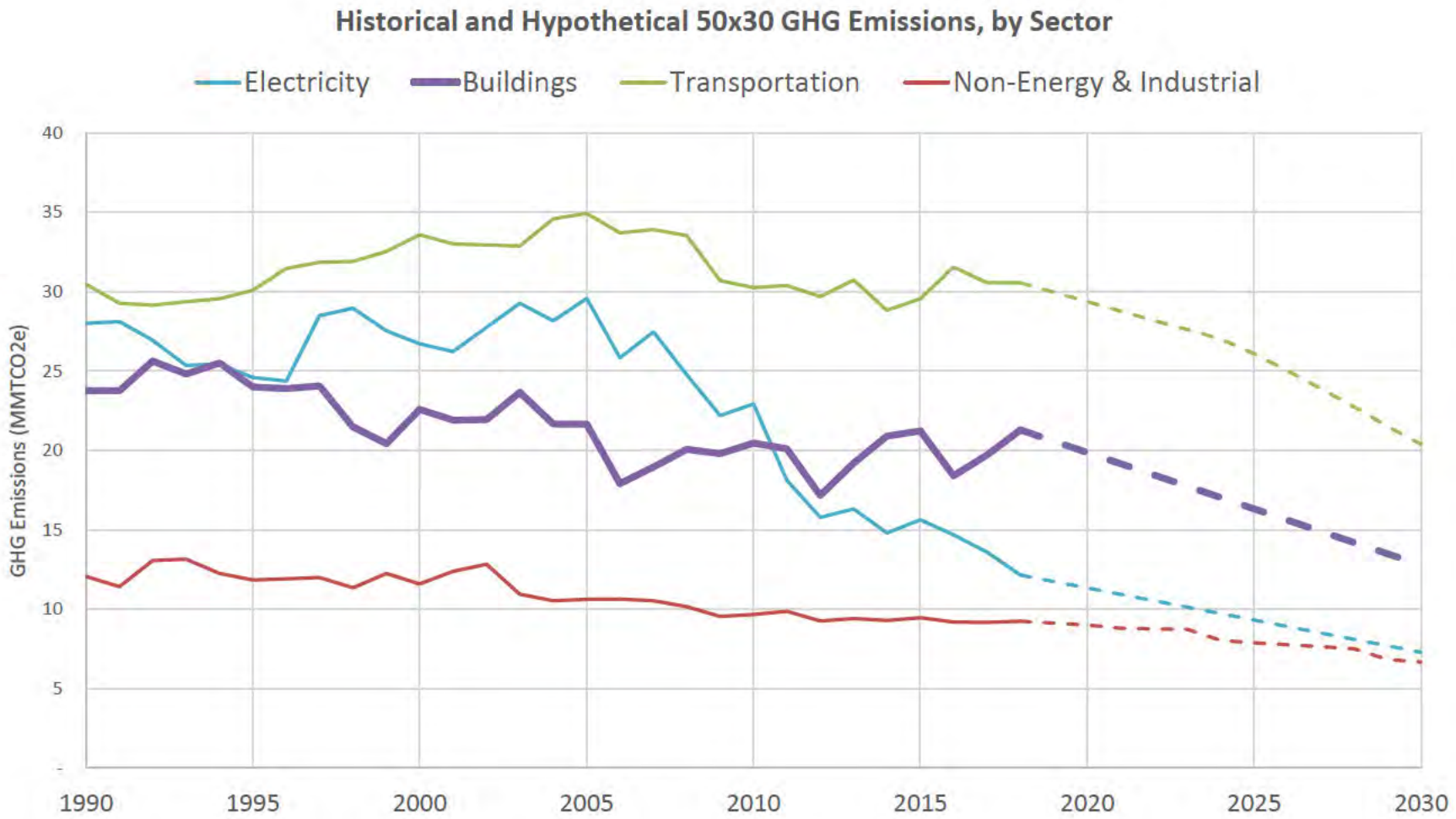
Massachusetts Department of Energy Resources

Climate context: MA Emissions by Sector

- **Historical:** Building sector emissions have made modest progress; electric sector has made most progress in decreasing emissions
- **Going forward**: Need reductions across all sectors by 2030 and beyond
- More than **50% of emissions reductions we need to cut by 2050** will come from personal vehicles and residential space heating



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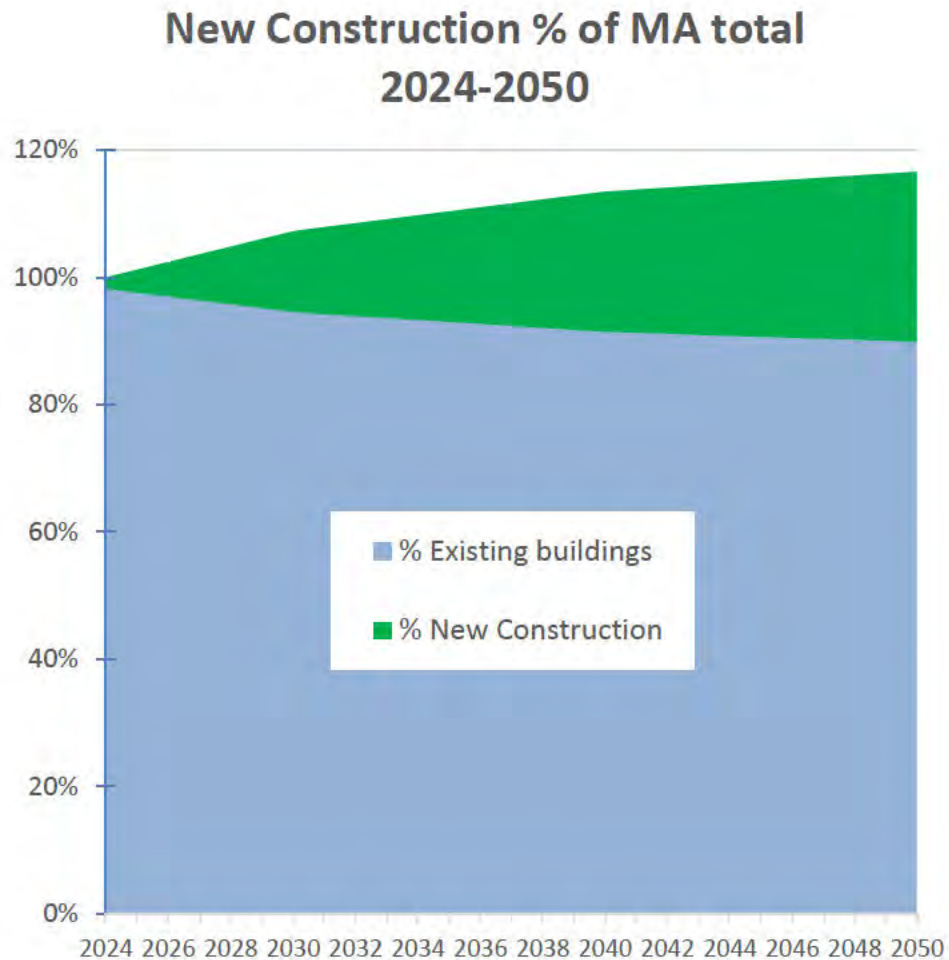
Building Energy Code role in reducing emissions

- Building code is the primary policy impacting new buildings.
- New buildings (built after 2023) ~27% of all building space by 2050
- New buildings are easiest and cheapest to make 2050-compliant
- New construction market helps drive cost reductions in building retrofits.



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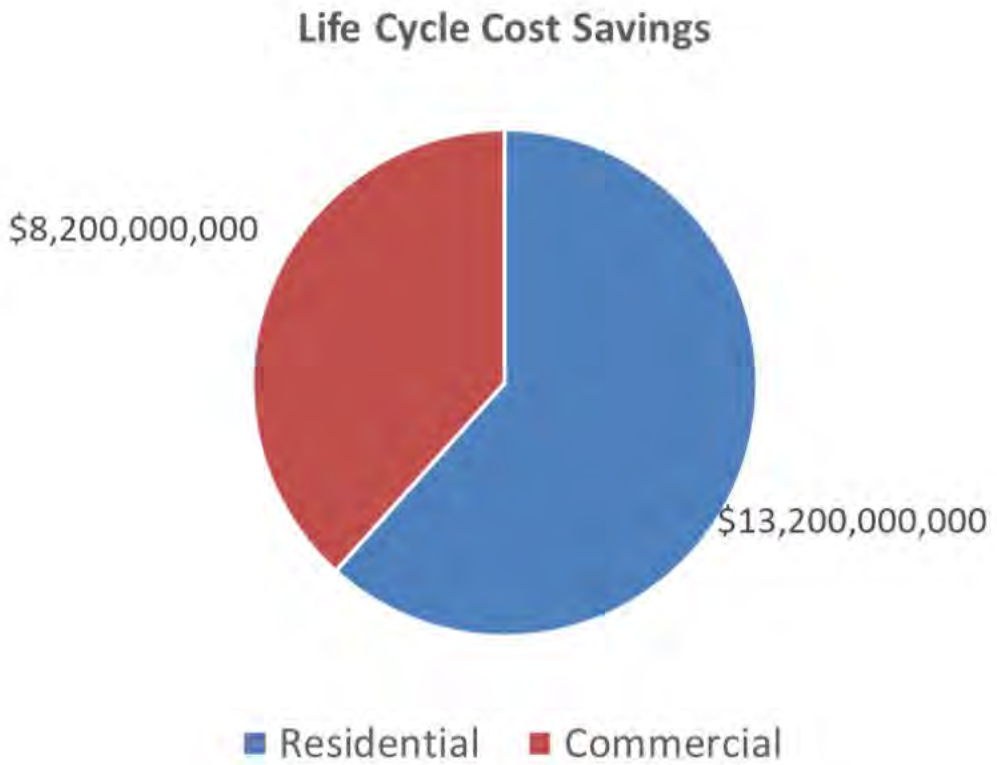
DOER Straw Proposal – Economic and Emissions Impact

- **DOER is proposing two updates:**
  - Update Stretch Energy Code, align with timing of the base energy code update
  - Issue new Specialized Opt-in Code as required by 2021 Climate Roadmap legislation by Dec 2022
- **500,000* tons/year** of GHG reductions in 2030,
  - rising to 694,000 tons/year by 2035
  - Other economic, health, resiliency and grid benefits
- **Over $21 Billion** in life cycle cost savings (combined construction and operating costs)



*Note: Emissions reduction and cost savings forecasts are conservative as they currently do not account for any solar PV additions to new construction or methane leakage from natural gas supply and use.

Straw Proposal for Comment

DOER is seeking comments on its Straw Proposal updating the Stretch Energy Code and Proposing the new, Specialized Stretch Energy Code.

DOER highly encourages written comments be submitted electronically to **stretchcode@mass.gov** with the subject line “Stretch Code Straw Proposal Comments”. Responses will be accepted until 5 pm on **March 9, 2022**. Written comments may also be submitted via mail to the Department of Energy Resources, 100 Cambridge Street, Suite 1020, Boston, Ma 02114, attention Nina Mascarenhas.

ENERGY CODE BACKGROUND

Building Energy Code in MA state law

2008 Green Communities Act

- **Base Energy Code**:

"To adopt and fully integrate the latest International Energy Conservation Code (IECC) and any more stringent amendments thereto as part of the state building code, in consultation with DOER."

MGL CH143, Section 94(o)

- Created DOER Green Communities Program and **Stretch energy code**:

"minimize, to the extent feasible, the life-cycle cost of the facility by utilizing energy efficiency, water conservation and other renewable or alternative energy technologies."

MGL CH25a. Section 10(c)

2021 Climate Act

- 50% emission reduction in 2030 (sub-limits to be established for buildings sector)
- DOER to **update the Stretch Code** from time to time, in consultation with BBRS
- DOER to develop: a **municipal opt-in specialized stretch energy code** that includes:
  - net-zero building performance standards
  - a definition of net-zero building
  - designed to achieve MA GHG emission limits and sub-limits.
  - may by phased in by building type

Session Laws of 2021 Chapter 8: Section 31

Statutory Timeline

- **July 2022**: EEA must establish specific 2025 and 2030 emissions reduction targets for the buildings sector
- **December 2022**: DOER must promulgate new specialized opt-in code
- **January 2023**: New Base Energy Code expected to go into effect
- **2030**: Massachusetts must achieve at least 50% reduction in GHG emissions

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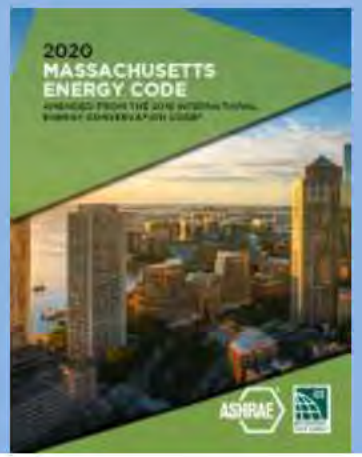
Today - two options for cities and towns:

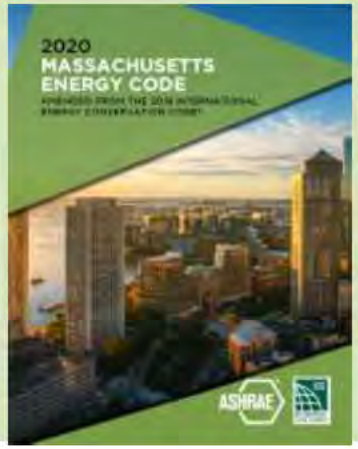
Base Energy Code

52 municipalities that are not designated Green Communities



Stretch Energy Code

299 municipalities that are or plan to become a Green Community



Base energy code last updated February of 2020, Stretch code last updated in January of 2017

One integrated MA energy code book viewable on the ICC website

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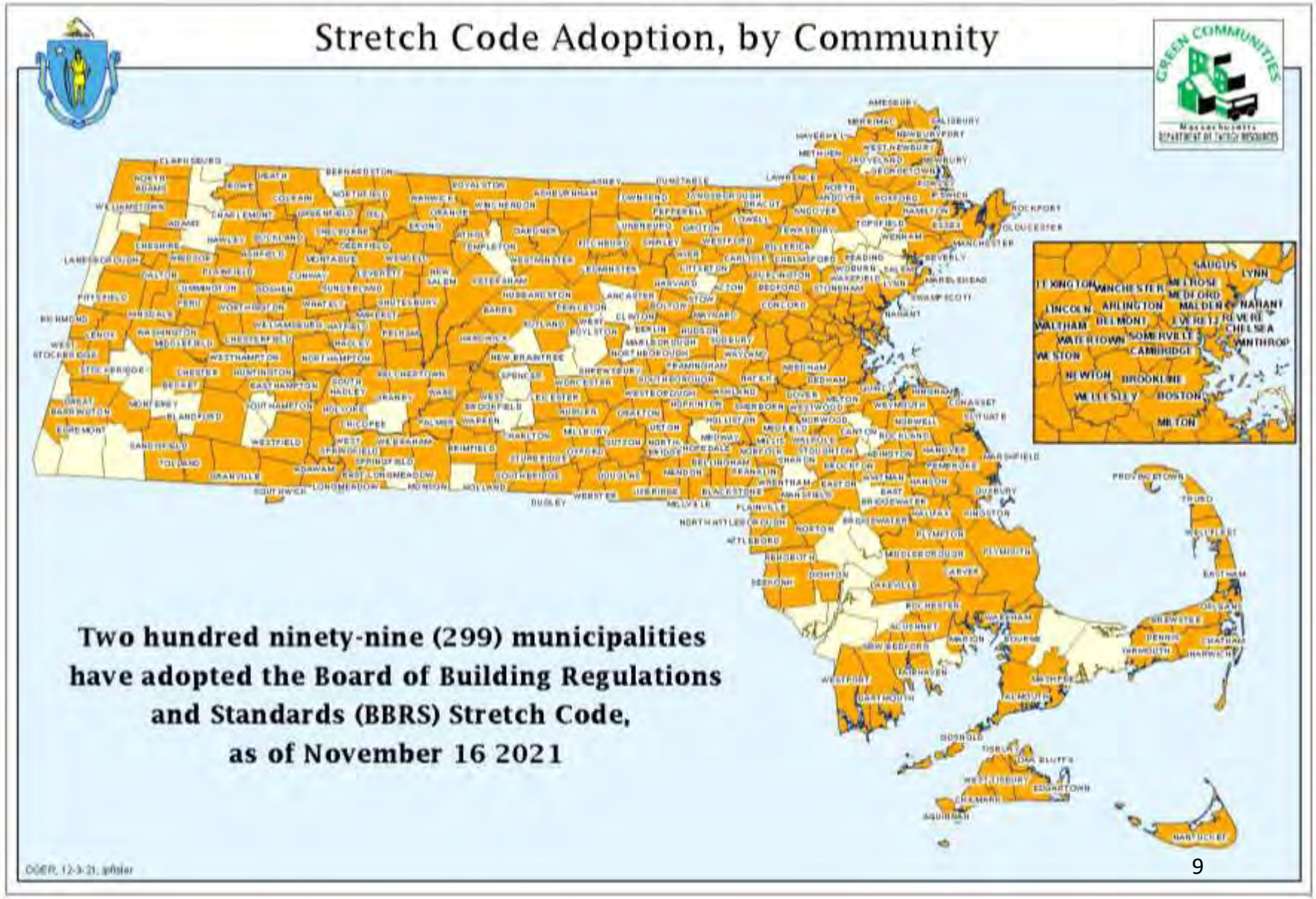
Today: Base code or Stretch code



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Starting in 2023 – 3 Energy Code options:

This straw proposal includes an update to the stretch code alongside the new specialized stretch option for Municipalities

Base Code
(10th Edition of MA Building Code)

- New Buildings in towns and cities that have not adopted a stretch code
- 52 communities
- BBRS update effective in 2023

Stretch Code
(Update)

- New Buildings in towns and cities that adopted, including all green communities
- 299 communities
- DOER update effective in 2023

Specialized Opt-in
(New Code Option)

- New Buildings in towns and cities that choose to opt-into this code
- Available for adoption Dec 2022

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Expected Timeline for code adoption

	Winter 2022	Spring 2022	Summer 2022	Fall 2022	Winter/Spring 2023	Summer 2023 and beyond
Updated Base Code	Draft on BBRS 10th edition code webpage		BBRS Public hearing on 10th edition	BBRS vote on final 10th edition	**Effective Jan. 2023** as part of 10th edition Code (MA IECC 2021)	
Updated Stretch Code	Outreach, public hearings, and comments on straw proposal	Draft code language available for public comment	Public hearings on draft code	Finalize code proposal & Publish Code	**Effective Jan. 2023** to align with 10th edition	Phase-in HERS requirements in Dec 2023
New Specialized Opt-in Code	Outreach, public hearings, and comments on straw proposal	Draft code language available for public comment	Public hearings on draft code	Finalize code proposal & Publish Code	**Finalized Dec. 2022 -** Municipal adoption begins	Likely effective dates - July 1, 2023, Jan 1, 2024

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Goal of Analysis: Achieve Least-Cost Decarbonization

Energy Code Analysis

- In 2019, DOER commissioned analysis of different building code standards specific to the Massachusetts climate.
- Building Type Variety: 12 building use types and size-specific analysis to align with needs of different building types
- Analyzed up-front costs, operational costs, and total cost of ownership.

Residential Low-Rise Team

PERFORMANCE SYSTEMS DEVELOPMENT

NORESCO

Commercial & Large Multi-Family Team

Steven Winter Associates, Inc.
Improving the Built Environment Since 1972

BRA+
BURO HAPPOLD

CONSIGLI
Est. 1905

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12 Building types for in-depth analysis

- Small office
- Large office
- Office-lab
- Elementary school
- High school
- High rise multi-family tower
- 4 story multi-family
- Multi-family mid-rise podium
- 6-unit multi-family
- Townhouse
- Single family Small
- Single family Large






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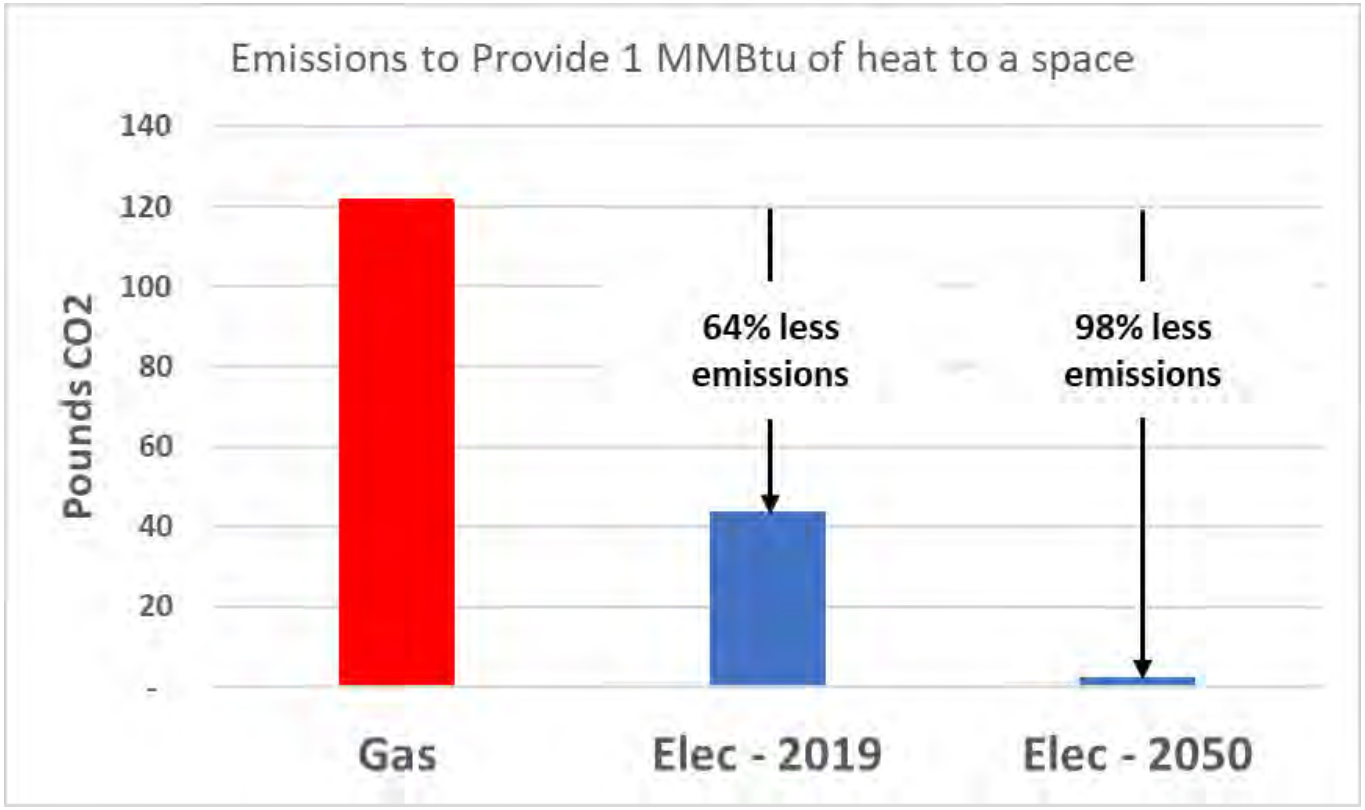
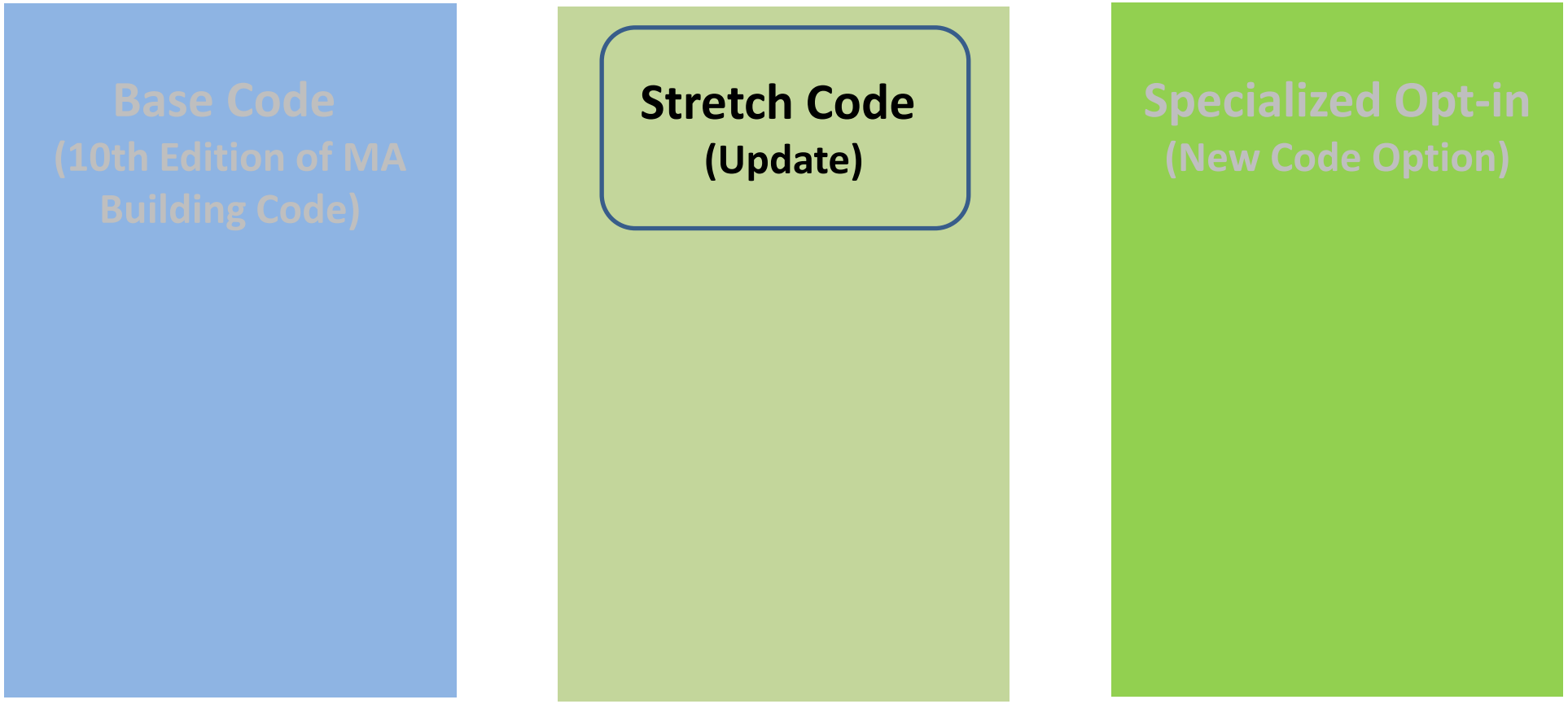
Key Consideration: Electrification in Residential & Commercial

- Electric heating compared to gas heating
  - 64% less emissions current
  - 98% less emissions in 2050
- Critical that buildings migrate toward electrification



Based on 95% efficient natural gas boiler vs. 320% efficient air source heat pump, 2019 emission rate of 478 lbs/MWh, 2050 emission rate of 27 lbs/MWh
https://www.mass.gov/doc/technical-support-document-draft-2019-ghg-emission-factors/download



RESIDENTIAL LOW-RISE PROPOSAL

One and two family homes, town homes, and low-rise multi-family up to 3 stories

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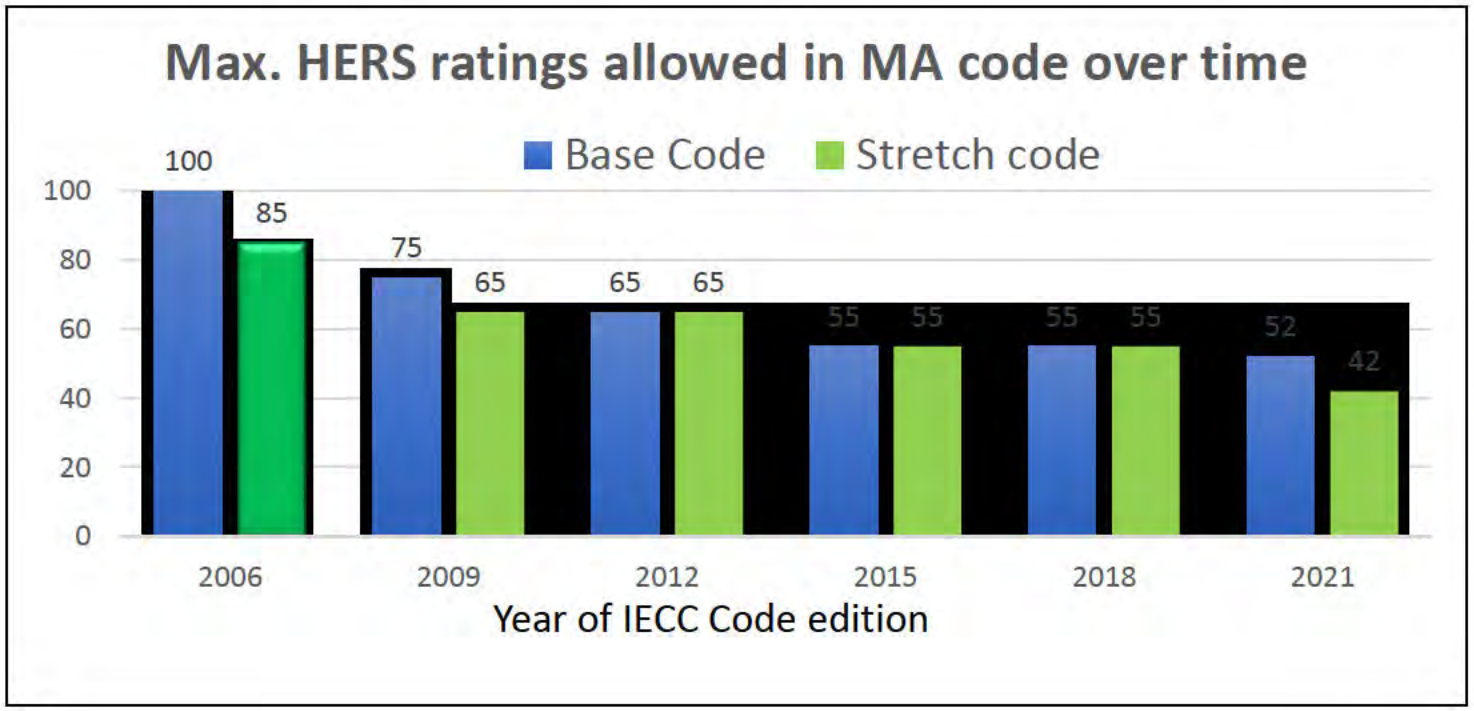
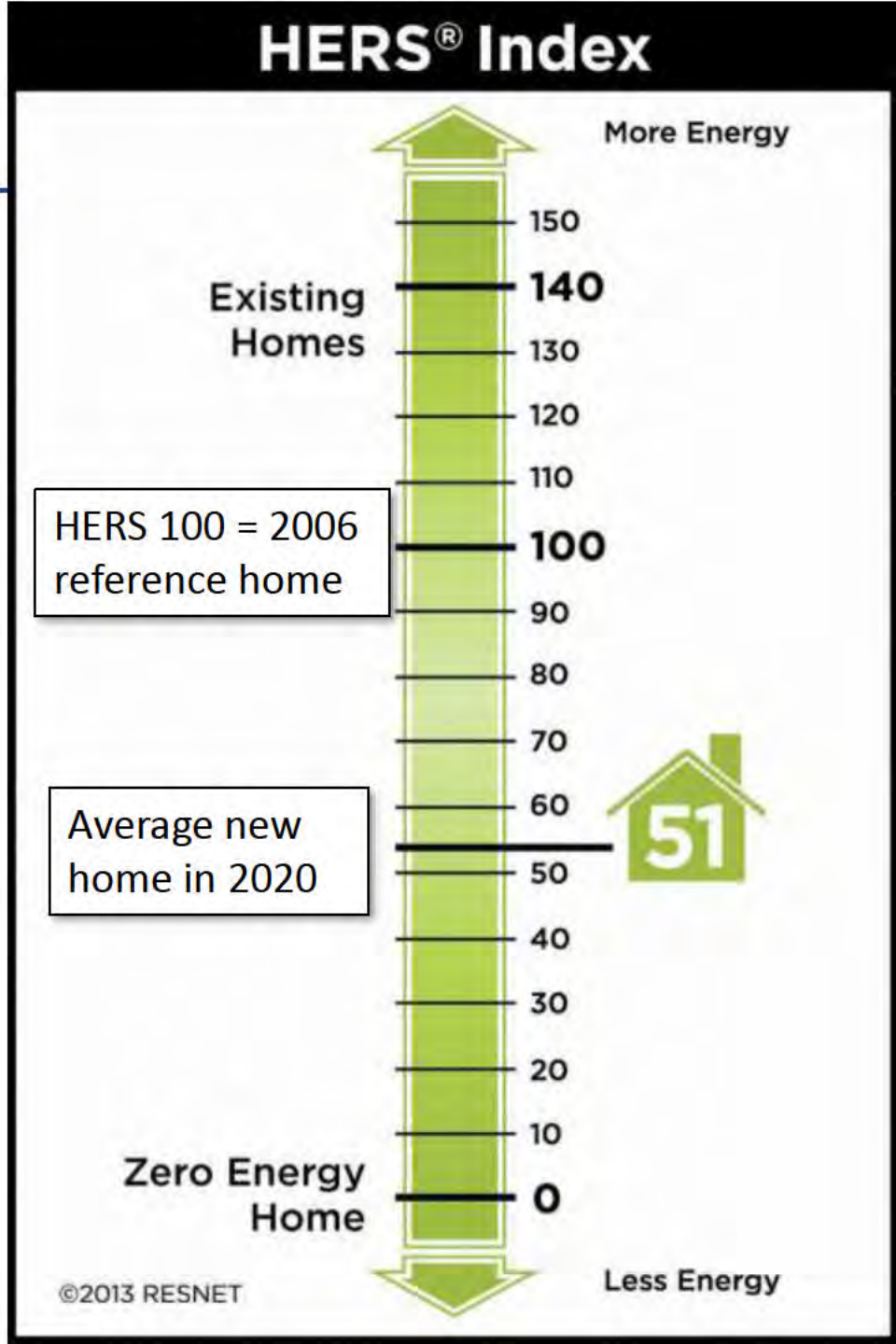
What is HERS?

- HERS (Home Energy Rating System) used in MA energy code since IECC 2006 edition
  - HERS 51 = Average in MA in 2020
  - 87% of new homes used HERS in 2020
  - HERS ratings qualify for Mass Save incentives & Federal tax credits





Stretch Code Update – Residential low rise

Proposing 3 Options for Code Compliance:

- **HERS 42** for fossil fuel heating (each unit)

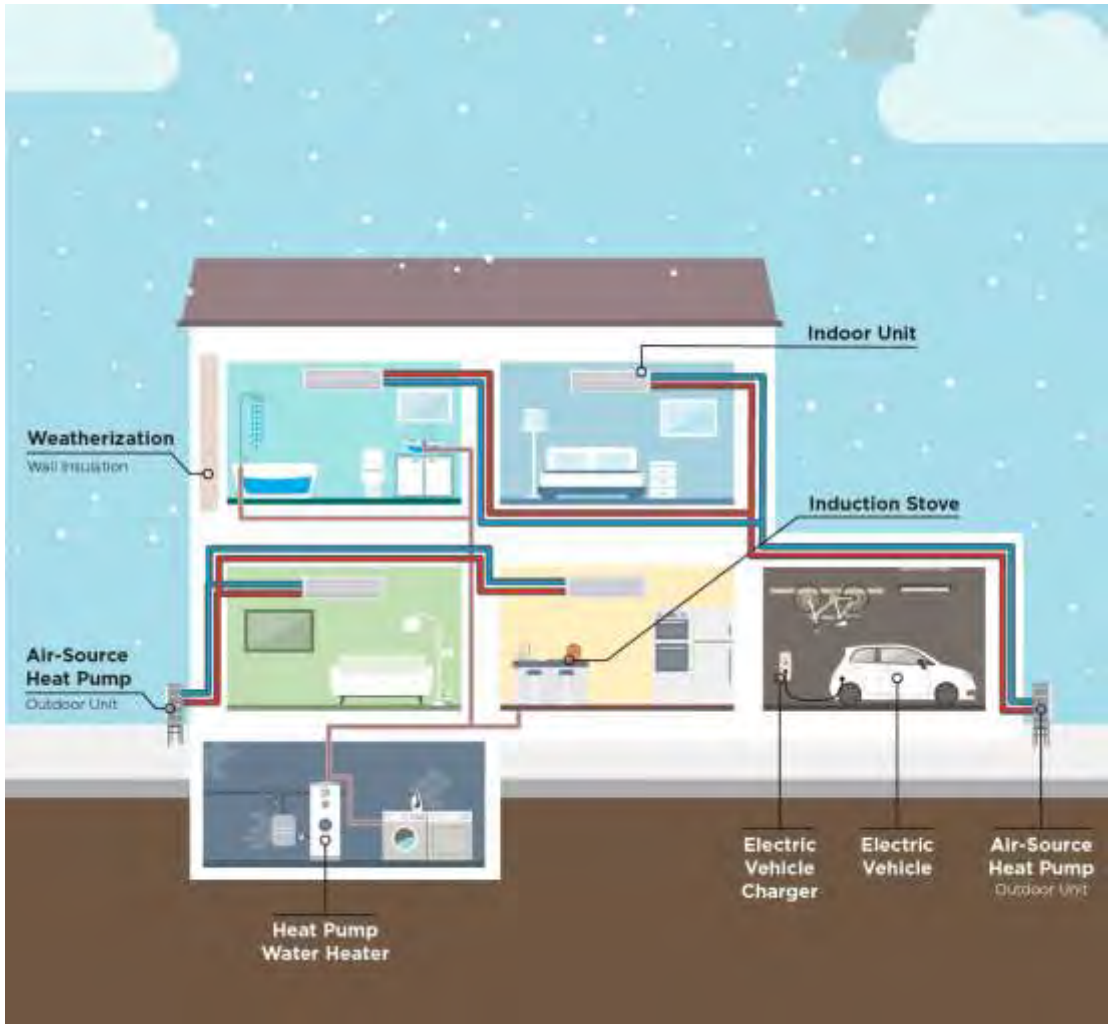
or

- **HERS 45** for electric heating (each unit)

or

- **Passivehouse** (whole building)

- Jan-Dec 2023 transition year with HERS 52/55
- Effective December 2023 HERS 42/45



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Residential Analysis Approach

1. HERS 52 base code baseline cost & efficiency

2. Ran 10,000 home scenarios to evaluate emissions and cost impacts

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

3. Representative homes selected for detailed analysis

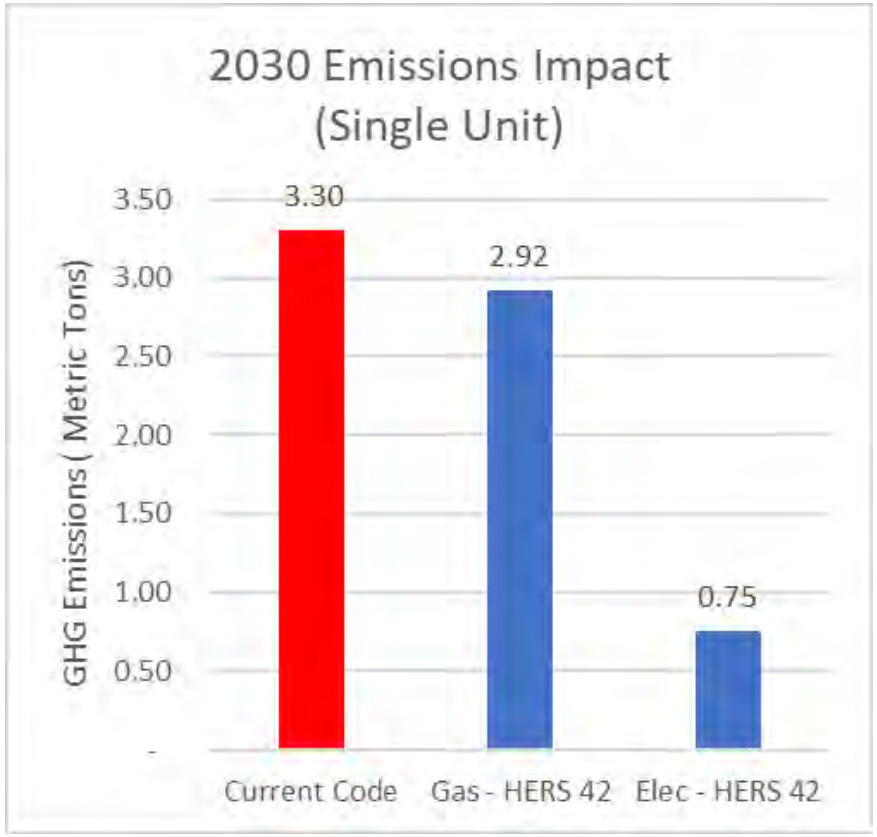
ekotrope
REM/Rate™

4. Detailed cost-benefit building case studies

Results of Residential Analysis

Why HERS 42?

- At HERS 42, both gas and electric heat are cost-effective to build and cheaper to operate.
- At or below HERS 42, most homes will choose electric heat because heat pumps can lower construction costs for builders and lower ownership costs for buyers.
- Heat pumps are more efficient and save significant GHG emissions compared to gas or propane heating.



Switching from gas heat to electric heat pump saves 75% of the GHG emissions in 2030, more in 2050

Results of Residential Analysis

What does HERS 42 mean for builders?

- **Electric-heated homes:** heat pumps significantly improve efficiency; better air sealing and ventilation is all that is needed to reach HERS 42-45
  - Incremental costs savings range from $11,938 to $28,597 after incentives

- **Gas-heated homes:** HERS 42 requires some combination of triple-glazed windows, improved insulation, better air sealing and heat recovery ventilation
  - Incremental costs for these improvements range from cost savings of $570 to an increase of $7,900 after incentives

Building with heat pumps will be lower-cost for builders but gas or propane heating is still permitted

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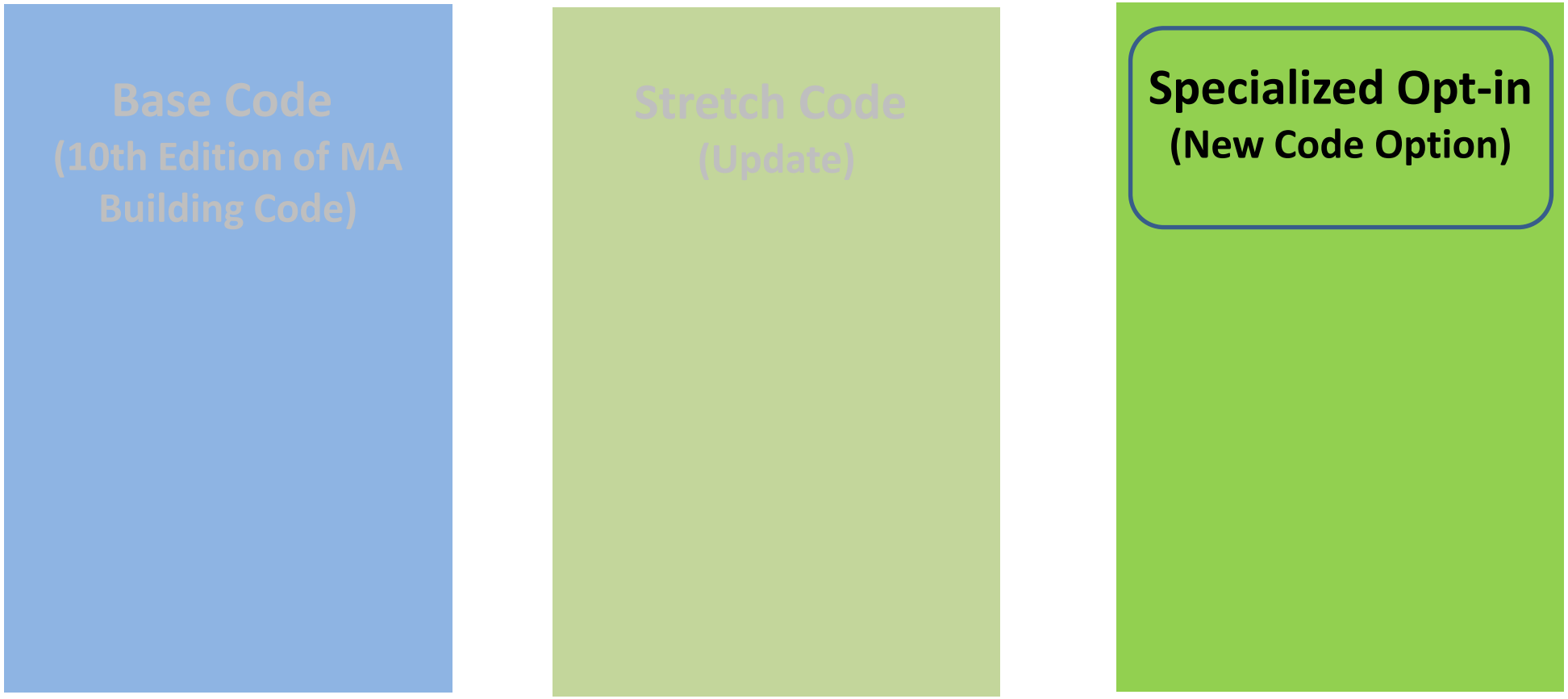
Coordination with Mass Save® 1-4 unit Incentives

- New Mass Save incentives for 2022-2024
  - ➢ $15k For All-Electric homes below HERS 45 and $25k below HERS 35 / Passivehouse

Figure 2-29: All-Electric Initiative (1-4)

Target (% savings over baseline or HERS score)	Tier 2: ≤ HERS 45 or ≥ 30% savings	Tier 1: ≤ HERS 35 or ≥ 50% savings
Incentive	$15,000 per home + $2,500 for each additional unit	$25,000 per home + $5,000 for each additional unit
Infiltration rate	≤1.5 ACH50	≤1.0 ACH50
Balanced Heat Recovery Ventilator/Energy Recovery ventilator (HRV/ERV)	Required	Required
EV-ready check list	Required	Required
Continuous envelope insulation	Optional	Required
Heat pumps for space heating	Required	Required
Domestic hot water	Electric DHW required, heat pump water heater optional	Heat pump water heater required



RESIDENTIAL SPECIALIZED OPT-IN CODE

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Specialized Code: Proposed Net Zero Definition

Net-Zero new construction is compatible, as-built, with the Commonwealth's net-zero emissions economy in 2050.

- Consistent with electrification and deep efficiency approach in EEA's 2050 Roadmap
- Does not necessitate onsite or offsite renewables, nor the assumption that an individual building is net-zero energy
- A building becomes net zero energy when MA electric grid is net zero

All-Electric:
no additional requirements, compliant as-built with net-zero in 2050

Fossil Fuel used:
Required solar PV and pre-wire for future electric heating, drying and cooking

Specialized Opt-in Code – Residential low rise

Proposing 3 Options for 'net zero' Code Compliance:

- **HERS 42** for gas/propane heating (each unit)

+ Rooftop solar (where unshaded)

+ pre-wired for electrification

or

- **HERS 45** for electric heating (each unit)

or

- **Passivehouse** (whole building)

+ wired for electrification

And in all cases

EV ready wire to parking spaces (20% of spaces)

Specialized Stretch Code (Net Zero) - Residential

Residential (1-2 family, townhouse & small multi-family)

- HERS 45: All - Electric home
  - All stretch code efficiency requirements
- HERS 42 Gas/propane or other fossil fuel
  - All stretch code efficiency requirements
  - Solar on roof where feasible
  - Electrification-ready (pre-wiring for stoves, dryers, hot water, heating)
- Passive House
  - Electric heat or electrification ready

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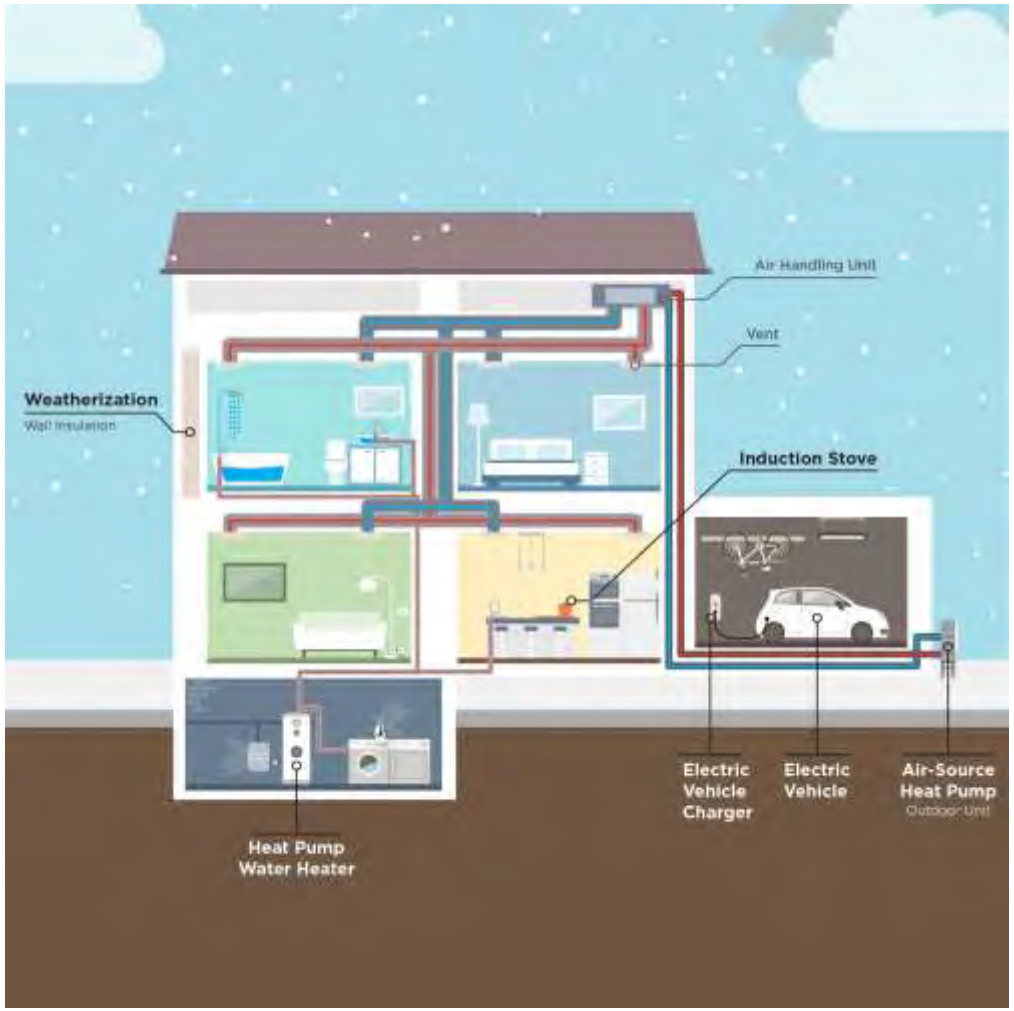
Net zero for all-electric homes: Solar ready – PV optional

Air source heat pumps



Ground-source heat pumps

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Net-zero requirements for homes with fossil fuels

- Solar PV requirement
  - Required solar PV installation on all unshaded roof with good solar access
  - Solar PV production may not meet full load

- Pre-wiring for future electrification
  - To be 2050 net-zero ready homes required to size electric panel and prewire to appliances for future electric conversion
  - E.g. install 240volt wire to cooking and dryer appliances, and adjacent to furnace & water heater

Base Code
(10th Edition of MA Building Code)

Stretch Code
(Update)

Specialized Opt-in
(New Code Option)

COMMERCIAL STRETCH CODE UPDATE

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Commercial Stretch Code

- Key considerations during evaluation (4 slides)
- Key findings from evaluations (1 slide)
- Proposed Stretch Code (6 slides)

Key Consideration: Optimization

Improved envelope + heat recovery

COST ADD

- Reduced air infiltration
- Wall “R” values
- Window “U” values
- Ventilation heat recovery

Reduced HVAC

COST DEDUCT

- Less distribution systems
- Smaller equipment
- Less rooftop equipment

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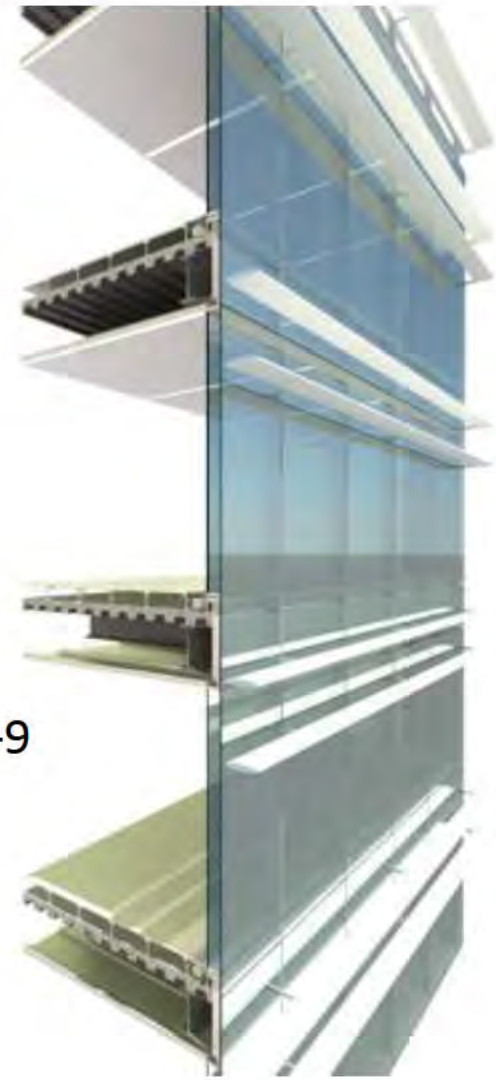
Key consideration: Curtain walls

- A “curtain wall” is
  - All glass (vision and opaque)
  - Much lower insulation performance
    - R-5 vs R-16 wall
- Often, the preferred approach
  - Aesthetics
  - Flexibility
- Created 2 versions of ‘optimized’ design
  - Curtainwall
  - Traditional, non-curtainwall

Regular wall: R-16



Curtain wall: R-5 to R-9

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Key consideration: Glazing

- Office and Lab/Office evaluated two levels of glazing:
  - High glazing (50% window)
  - Normal glazing (30-40% window)

- 50% window (measured on exterior):
  - 60-70% of all perimeters floor to ceiling height is window
  - Near “floor to ceiling” window from inside the building

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Key consideration: Air infiltration & Thermal bridging

Controlling air infiltration and thermal bridges - significant efficiency improvement

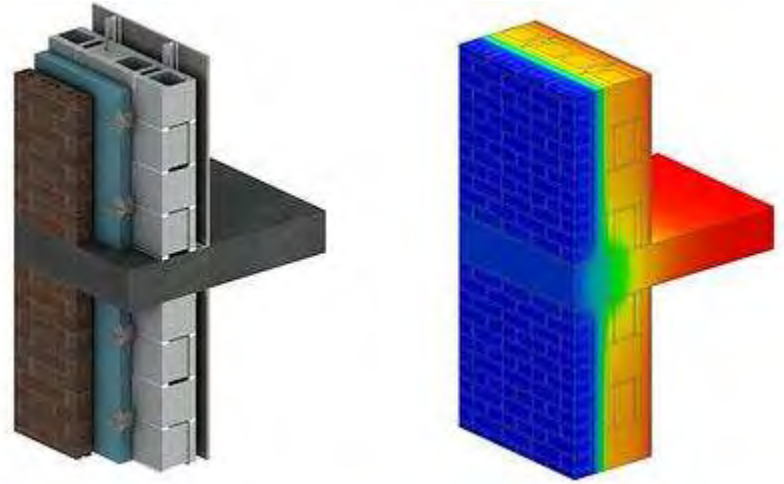
Credit: Steven Winters Associates

Air infiltration

- Testing required in updated base code to be effective Jan 2023 (IECC 2021)
- Optimized design lowers air leakage rate to 0.25 cfm/sf

Thermal bridging

- Accounting for thermal bridging
- Thermal breaks optimize insulation



Credit: Morrison Hershfield

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Key Findings: Cost & GHG Results for key Building Types

Increases efficiency requirements based on what is most **cost-effective by building type** to yield **optimized** proposal for gas and electric heated buildings.

Proposed code:

- Costs less upfront for office and office/lab.
- Lowers life cycle cost - all buildings
- Accommodates glass and curtain wall buildings preferred by developers
- Encourages, but does not, require electrification
- Allows flexibility for labs, hospitals
- Customizes heating limits based on building type

	Improves Life Cycle Cost?	Incremental Cost to Build	GHG Reduction
Primary School	✓	1.1 to 2.8%	26 to 39%
Secondary School	✓	0 to 0.5%	34 to 39%
Small office	✓	3.4 to 4.5%	25 to 50%
Large Office	✓	-4 to -4.6% **less**	31 to 33%
Lab/Office	✓	-0.7 to -1.2% **less**	29 to 67%
Multi-family	✓	< 1.9 to 2.9%	45% +/-

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Proposed Stretch Code: Pathways

DOER PROPOSAL: Five Pathways for Code Compliance depending on building use type:

- Prescriptive Pathway (Small buildings <20,000 sf only)
- Targeted Performance Pathway (Required for Offices & Schools, Option for Multi-family)
- Relative Performance Pathway (High ventilation and other buildings)
- Passivehouse (Option for all building types)
- HERS (Option for Multi-family)

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Proposed Stretch Code: Current/Proposed

Pathway	Current	Proposed
Prescriptive	IECC 2018 (MA amended)	IECC 2021 plus MA **additional commercial requirements**: air tightness, windows, ventilation, thermal bridging
Targeted Performance	Not an option	TEDI – Thermal Energy Demand Intensity limits by building type and size for Schools, Offices and Option for Multi-family. **Add'l commercial requirements** re: air tightness and widows/walls
Relative Performance	2013 ASHRAE (mandatory over 100,000 sf)	2019 ASHRAE App G plus MA **additional commercial requirements** (air tightness, etc) allowed for a) complex, high ventilation buildings and b) buildings not required to follow TEDI
Passivehouse	Optional for all types	Optional for all types
HERS	Option for Multi-family (HERS 55)	Option for Multi-family (HERS 42/45) effective in Dec 2023

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Proposed Stretch Code: Add'l Requirements

	Current Base & Stretch	Updated Stretch & Specialized
Envelope UA maximum	Mandatory – all commercial buildings	Improved for buildings with regular walls and accommodation for curtainwall buildings
Air infiltration	0.4 cfm/sf at 75 Pa	0.25 cfm/sf at 75 Pa
Ventilation Energy Recovery	Many exceptions which allow no energy recovery, otherwise up to 50% effectiveness	Largely reduces exceptions, generally 80% effectiveness
Electrification of space heating	Optional	High ventilation buildings: Partial electrification mandatory, all other buildings: optional

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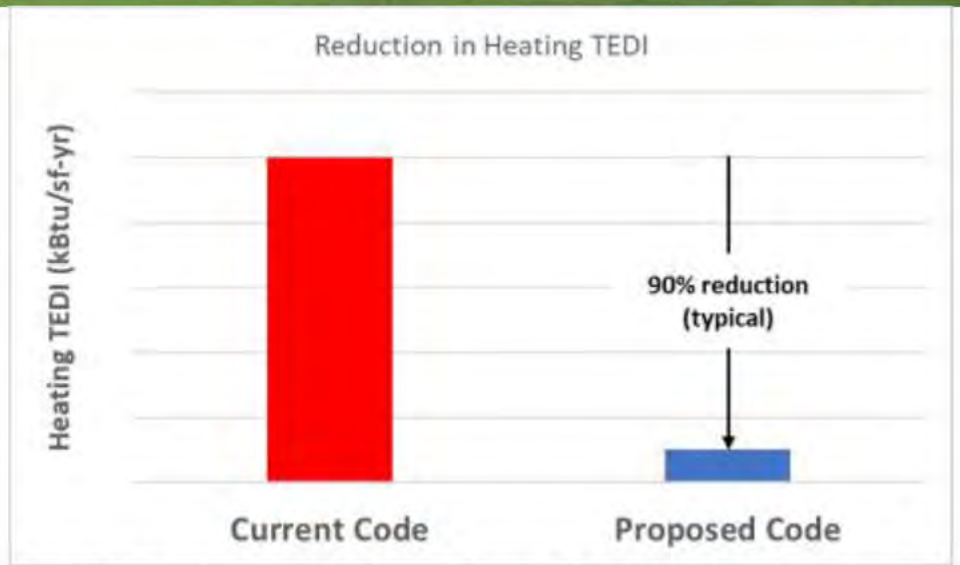
Proposed Stretch Code: Targeted Performance Path

- What is heating "TEDI":
  - **T**hermal **E**nergy **D**emand **I**ntensity
  - Amount of heating needed over 1 year

- Benefits to low TEDI
  - Easy to electrify
  - Cost effective
  - Low emissions

- Effective pathway to Zero Energy



The proposed code reduces heating TEDI by 90% for most buildings

Proposed Stretch Code: TEDI Limits

- **When TEDI applies**
  - Schools
  - Office (including town hall, courthouse, etc)
  - Multifamily (including dormitory)

- **Heating TEDI limits (kBtu/sf-yr)**

K-12 School < 100,000-sf	2.4
K-12 School >= 100,000-sf	2.2
Office < 100,000-sf	2.4
Office >= 100,000-sf	1.5
Multifamily	TBD

- **Plus**
  - Cooling TEDI limits
  - Vertical envelope UA backstop
  - Thermal bridge accounting
  - Infiltration limits and testing

Old Colony - affordable Multi-family - Boston

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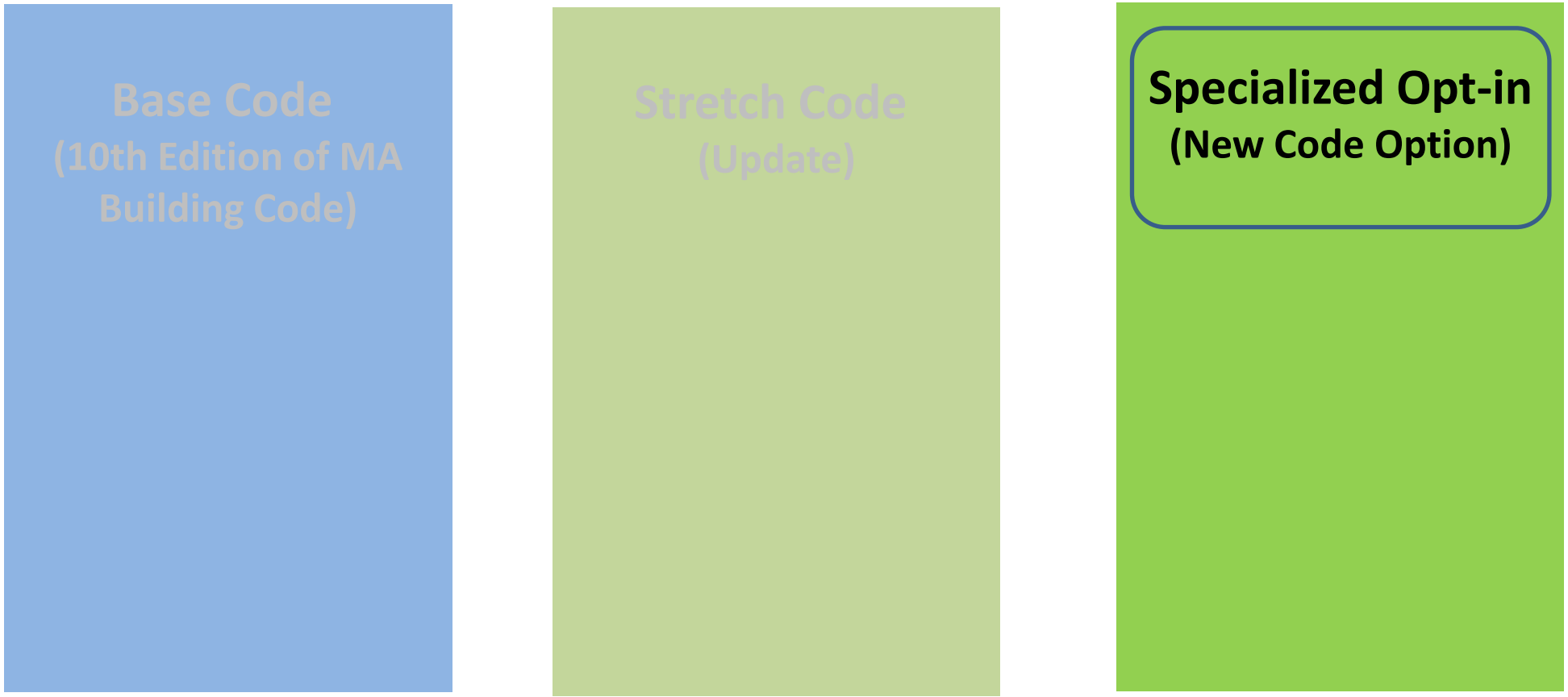
Proposed Stretch Code: Accommodation for Curtain wall

- Envelope performance backstop
  - Will be somewhat strengthened from current code
  - However, for curtain wall construction – will maintain about current level to accommodate builder preference

- Additional requirements if using curtainwall - demonstrate embodied carbon reduction from a choice of options
  - Low carbon concrete
  - Carbon sequestering materials (e.g. wood fibre-board, mass timber)
  - Recycled materials (e.g. Foamglass)
  - Reused materials/building reuse



COMMERCIAL SPECIALIZED OPT-IN CODE

Specialized Opt-in Code (Net Zero) - Commercial

Large Multi-Family → Passive House → Electric Heat or Electrification ready

All other Commercial Building Types →

- Passive House → All Electric or Electrification ready
- Gas or other fossil fuel → All stretch code efficiency requirements → Solar on roof where feasible → Electrification-ready (pre-wiring)
- All-Electric → All Stretch code efficiency requirements

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Specialized Opt-in Code – Commercial Requirements

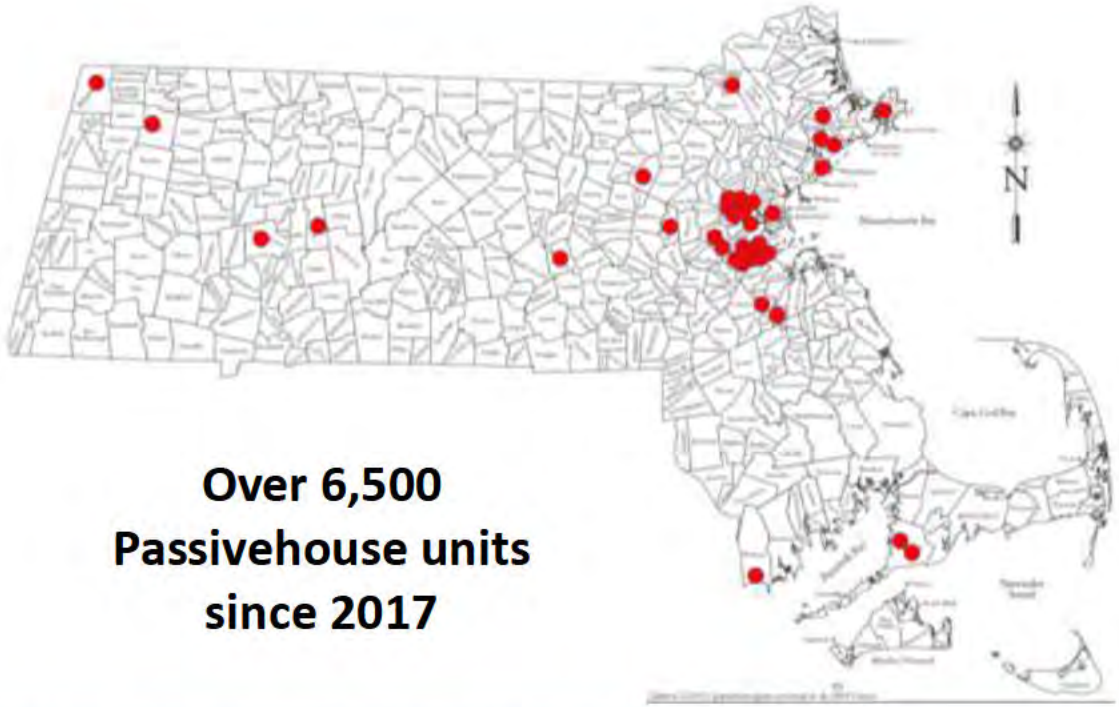
Pathway	Efficiency improvements – Same as Stretch code	Additional Requirements
Prescriptive	IECC 2021 plus MA additional commercial requirements: air tightness, windows, ventilation, thermal bridging	Additional EV ready wiring; & Buildings with fossil fuels must also add: • Solar PV on available roof space • Pre-wiring for future electrification
Targeted Performance	TEDI – Thermal Energy Demand Intensity limits by building type and size for Schools, Offices	
Relative Performance	2019 ASHRAE App G (site energy) plus MA additional commercial requirements allowed for a) complex, high ventilation buildings and b) buildings not required to follow TEDI	

Specialized Opt-in Code: Multi-family Requirements

- Passivehouse for Multi-family (6+ units):
  - Low-rise (up to 5 stories) required from Jan 2023
  - Mid-rise (6-9 stories) and high-rise (10+ stories) required from Jan 2024
- Targeted Performance Path (TEDI) in 2023 transition year for mid-rise and high-rise

Harbor Village – Affordable housing - Gloucester

Passivehouse & Multi-family – Recent Success



Over 6,500 Passivehouse units since 2017

Winthrop Center
Boston, MA

The Distillery
Boston, MA

Bunker Hill
Boston, MA

North Commons
North Hamptons, MA

Harbor Village
Gloucester, MA

Depot Village
Hanson, MA

What is Passivehouse? A building standard that includes:

- Super-efficient building envelope (approx. HERS 34)
- Improved indoor air quality with high performance ventilation

Net impact: Improved health, comfort, resiliency, and building quality, reduced HVAC equipment sizing, and low cost to maintain and operate

- **Passivehouse Growth.** Passivehouse is rapidly growing in 6+ unit multi-family with over 6,500 units in the Mass Save® incentive program pipeline versus less than 20 in 2018.
- 133 MA firms have Certified Passivehouse consultants, $1.7m for Mass Save training of 3,600 people in 2022-2024.
- **Multi-Family.** Passivehouse becomes most cost-effective for multi-family buildings, but standard can be used for all buildings

Passive House Costs for Multi-Family Low/High Rise

Passive House Challenge (2019)

1.4 to 2.8%

Actual costs (not estimates) from 8 low and mid-rise PH projects around Massachusetts

DOER Energy Code Analysis (2019)

1.9 to 2.9%

Detailed cost estimate by Consigli technical consultant

Pennsylvania Housing Authority (2015-2018)

-1.1% less

Actual costs (not estimates) from 74 PH projects and 194 non-PH projects

Since 2019, Mass Save provides technical assistance, training and $3,000/unit in incentives for multi-family Passive House construction

DOER
Massachusetts Department of Energy Resources

Summary – 3 Energy Code options:

This straw proposal includes an update to the stretch code alongside the new specialized stretch option for Municipalities

Base Code
(10th Edition of MA Building Code)

- New Buildings in towns and cities that have not adopted a stretch code
- 52 communities
- BBRS update effective in 2023

Stretch Code
(Update)

- New Buildings in towns and cities that adopted, including all green communities
- 299 communities
- DOER update effective in 2023

Specialized Opt-in
(New Code Option)

- New Buildings in towns and cities that choose to opt-into this code
- Available for adoption Dec 2022

Next Steps

- 4 Geographically targeted public meetings between February 28th and March 8th
- DOER webpage for stretch code development to sign up for outreach list
- Deadline for 1st round of public comments March 9th, 2022 submitted to: stretchcode@mass.gov

Town of Truro Net zero stretch code support 10/26/2021

-------- Original message --------
From: Darrin Tangeman <dtangeman@truro-ma.gov>
Date: 10/19/21 2:54 PM (GMT-05:00)
To: Bob Higgins-Steele <rehigginssteele@gmail.com>, carol_harris@comcast.net
Cc: Kelly Clark <ksclark@truro-ma.gov>, Rich Stevens <rstevens@truro-ma.gov>, Barbara Carboni <bcarboni@truro-ma.gov>
Subject: FW: Municipal Advocacy Letter for Net Zero Stretch Code

Good Afternoon Bob and Carol

As we discussed earlier in the year, you were seeking approval of the Net Zero Stretch Code by the Select Board. There have been some legislative delays and now there is a group of municipalities that are seeking to advocate for the completion of this process. Please see the email and attached letter. I was wondering if you might be in favor of the Town of Truro signing on to this advocacy? If so, would you be willing to come to our meeting on 10/26 and brief the select board on this issue and seek their approval? Please provide and comments or concerns you might have.

Thank you!

Darrin K. Tangeman, ICMA-CM
Town Manager
Town of Truro
PO Box 2030
24 Town Hall Road
Truro, Massachusetts 02666
508.214.0201
dtangeman@truro-ma.gov

From: Adam Chapdelaine <AChapdelaine@town.arlington.ma.us>
Sent: Tuesday, October 19, 2021 1:58 PM
To: Adam Chapdelaine <AChapdelaine@town.arlington.ma.us>
Subject: Municipal Advocacy Letter for Net Zero Stretch Code

Dear Colleagues in Municipal Government,

I hope that this message finds you well.

A group of advocates in Arlington have asked me to take the lead on circulating a municipal advocacy letter regarding the Net Zero Stretch Code and I gladly accepted the challenge. Thus far, the mayors/managers in Acton, Amherst, Arlington, Belmont, Brookline, Concord, Chelsea, Lexington, Malden, Medford, Melrose, Newton, Somerville and Weston have signed on.

I would greatly appreciate your support for this effort in the form of signing on to the letter. I have attached a copy of the letter to this email and also pasted the text of it below.

Thank you for any consideration that you can give this request and I hope to hear from you soon.

Best,

Adam W. Chapdelaine
Town Manager
Town of Arlington
730 Massachusetts Avenue
Arlington, MA 02476
(781) 316-3010

Arlington values equity, diversity, and inclusion. We are committed to building a community where everyone is heard, respected, and protected.

October XX, 2021
Secretary Kathleen A. Theoharides

Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Madame Secretary,

The undersigned represent chief executive/administrative officers of Massachusetts cities and town deeply engaged in the battle against climate change. We strongly support the Commonwealth's commitment to achieve net zero emissions by 2050 as well as the interim goals required by this year's "Next Generation Roadmap for Massachusetts Climate Policy." This and more has to be done. Fires in California, floods in Germany, and record June temperatures at home remind us of the urgency of our situation. As the recent IPCC report on Climate Change in 2021 shows, we are now well past the 11th hour.

The Next Generation Roadmap legislation signed by the Governor in March requires DOER to develop a specialized stretch energy code that includes net-zero building performance standards and a definition of a net-zero building. The statute lays out an ambitious process of public engagement as the Department develops the required code. We welcome the opportunity to participate in this process.

At the outset, we strongly believe that both the statute and practical reality call for a true net zero stretch code. The specialized stretch code is optional. No municipality is required to adopt it, and not everyone will. But for the towns and cities ready to lead the way, the stretch code promulgated by DOER must be strong enough to get the job done. Nothing less than net zero will suffice. The municipalities that opt in are eager to be the Commonwealth's test kitchen. They need bold policies to test.

A true net zero stretch code must cover all residential and commercial buildings. It must foster high performance building envelopes, such as those contemplated by Passive House standards. It must promote electrification, and at the very least provide the municipalities who opt in with clear authority to prohibit on-site combustion in new building and major rehabilitation. Moreover, since time is of the essence, any phase-in period must be short and supported by clear and convincing evidence.

There are many ways of reaching our goal and that of the statute. We welcome the chance to engage in discussion about means. As local governments, we understand the importance of pragmatism. It is essential, however, that the path chosen leads to the right destination.

We appreciate your enthusiasm and professionalism and that of your staff. We hope that the process you are beginning will result in a code that will maintain Massachusetts's place as a national leader in the fight against global warming. Other jurisdictions, including California and the District of Columbia, have moved decisively in this direction, and we do not wish the Commonwealth to be left behind. We strongly support the process that is unfolding and look forward to providing any assistance we can.
Respectfully,

[Signatories]

Recreational reading:

started by two women in cambridge

A net-zero future for gas utilities? Switching to underground thermal networks

https://www.canarymedia.com/articles/utilities/a-net-zero-future-for-gas-utilities-switching-to-underground-thermal-networks

Weston & Sampson
100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

March 4, 2022
Truro Public Safety
Building Envelope Improvements

Re: ***Responses to the Questions & Comments from the Energy Committee relating to the Existing Public Safety Building – Building Envelope Improvements, received February 17, 2022***

Question: What is the baseline and the goal off this project?

Response: *The baseline and goal of this project is to act as a pilot project for Cape Light Compact to see if the additional wall insulation to the existing envelope will reduce utility use by approximately 30%.*

Question: Was there energy modeling done?

Response: *There was not originally. COMCheck was done for the original design r and u values to show a baseline versus the current energy code, IECC 2018. Another COMCheck was done with the proposed r and u values to derive information, using the current energy code, IECC 2018.*

Question: What is target Energy Use Intensity (EUI) or Home Energy Rating System (HERS) rating? How will it be measured?

Response: *The Energy Use Intensity is not going to be utilized for this project. The Home Energy Rating System does not apply in this scenario. One of the ways the Town and Cape Light are going to be benchmark this project, is to utilize existing utility data and then refer to new utility data once construction is complete. The project is not being calculated using the Energy Use Intensity methodology.*

Question: Any idea of the ROI or payback period of this project as opposed to a replace - in -kind-project?

Response: *This is still being worked out. Cape Light is running calculations to secure grant funding, and we may be able to figure out the savings versus the expected construction cost.*

Question: The proposed Jan 2023 green communities stretch code is HERS 42 if this were a new building heated primarily with fossil fuel heat. There is no mention of large renovation projects in the proposed code. We need to keep this in mind as the code is being developed

Response: *Currently the existing building is not applicable to HERS as it's a commercial building. The doors, personnel and sectional doors are existing to remain, and the concern would be that any testing in the apparatus bay area may not pass a blower door test in general.*

Question: What determined the 1-1/2" rigid insulation as the maximum amount of insulation?

- Detail 1 A611 at the rake of the W& S Drawings is somewhat undefined.
- It appears that there is flashing tucked under the existing roof shingles that extends over the proposed envelope assembly. Was this the driver of the 1-1/2" thickness?

Response: *The thought of the 2x sleepers is that the 1 ½" depth of the rigid insulation was easily constructable and stayed within some of the existing conditions. The rake detail was not the driver of the 1 ½" insulation thickness. Another option would be to chamfer the top of the padded out wall and then provide the intended r-value wall assembly if warranted.*

Question: If more insulation is required to reach a desired R-Value could an alternate detail where the flashing is tucked under the existing 1x that receives the drip edge be considered? (More on that another time)

Response: *Yes, it could be considered if desired.*

Question: Per the existing building drawings online "PUBLIC_SAFETY_15WALL_SECTIONS1" there is an existing vapor barrier beneath the drywall on the interior of the wall. This appears to mean the building will need to dry to the exterior. Will this affect the choice of continuous exterior insulation (i.e., vapor open vs vapor closed) to prevent moisture problems? (I don't know I'm just asking – there is a lot of debate on this one)

Response: *The vapor barrier is typically, on the winter warm side, as they say in our area. Adding more insulation and a weather barrio, like a Tyvek Commercial Wrap will allow vapor to escape as it is currently doing. The vapor barrier will remain and continue to function as is on the inside of the interior gypsum board. The item we are adding on the outboard of the existing wall assembly will allow vapor to come and go through it, but not air.*

Question: U-value windows? Only spec is triple pane.

Response: *The U-value for the windows is approximately U = 0.25 as the baseline. There are a few windows that can get lower, but we are using this for modeling purposes. The existing windows are original to 1996 and are in need of being replaced based on their intended useful life cycle.*

Question: Question for Margaret. Is the social cost of carbon part of determination MassSave, Cape light's cost effectiveness in determining the cost effectiveness and/or the amount incentives and rebates available

Response: ***CLC doing calcs Social Cost= $128 Ton***

Question: The following appears a dozen times in the law Chapter 8 Session Law 2021" The Climate act:
"…that when determining cost-effectiveness, the calculation of program benefits shall include calculations of the social value of greenhouse gas emissions reductions, except in the cases of conversions from fossil fuel heating and cooling to fossil fuel heating and cooling."

Response:

Question: Will this project be 2050? Ready i.e., will the walls be 2050 ready as far as air infiltration and Insulation R-value, or is it possible it may need to be redone? The existing drawings w/ The R-19 and 1-1/2" of foil face we'd reach R-29. (Excluding drywall, and sheathing) R-40 is often recommended for Zone 5:

Response: *No this will not be 2050 Ready. The R-values and infiltration are being redone with an allotted budget that is best for the existing conditions. Currently the budget is not allowing us to go much further over the 1 1/2" of rigid insulation on top of the existing wall assembly.*

Question: NREL Passive house "A lot of scientific work went into developing the new standard, including modeling a test home in the various climate zones of North America. Dr. Joe Lstiburek's compay, Building Science Corporation, helped with the work, which was part of the Building America program. You can download the full report (pdf) from the National Renewable Energy Lab (NREL) website.

Response: *Thank you for the information.*

Question: R-values for insulation should be appropriate for the local climate. Case studies of zero energy projects around North America provide helpful examples. Wall insulation values range from R-19 in mild climates to R-40 in cold climates to as much as R-60 in very cold locations. "

Response: *Understood. We can't modify the existing walls on the Public Safety building within the budget allotted and for constructability regarding the existing details and issues that arise from those existing conditions.*

Question:https://zeroenergyproject.org/build/twelve-steps-affordable-zero-energy-home-construction-design/super-insulate-net-zero-building-envelope/

A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study December 2020

"Addressing these existing buildings is central to the meeting the decarbonization targets of the Commonwealth. Renovating existing buildings of any type, residential or commercial faces several barriers not experienced by new construction. First building system lifecycles are long, with HVAC systems often reaching 15-30 years and building envelopes exceeding 40. Second, replacement of HVAC is usually like-for-like during emergency replacement at end-of-life failure. It is thus imperative to know the level of action needed to electrify and reduce energy use in buildings and in which buildings those opportunities lie. This section evaluates the application of electrification and efficiency measures to representative building types in Massachusetts."

Response: *Thank you for the information.*

WESTON & SAMPSON ENGINEERS, INC.

Brian McCusker
Senior Project Manager, Architect
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COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

D.P.U. 21-90

DIRECT PRE-FILED TESTIMONY OF

KEVIN BOUGHAN

ON BEHALF OF

NSTAR ELECTRIC COMPANY
d/b/a
EVERSOURCE ENERGY

EXHIBIT ES-KB-1

July 14, 2021

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GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
BEV	Battery Electric Vehicle
CapEx	Capital Expense
CCS	Combined Charging System standard
CECP	Clean Energy and Climate Plan
CHAdeMO	A direct current fast charging standard
Climate Act	Chapter 8 of the Acts of 2021
CIAC	Contribution in Aid of Construction
CO_2	Carbon Dioxide
Customer premise work	Portion of make-ready infrastructure on the customer side of the meter
CY	Calendar Year
DCFC	Direct Current Fast Charging
DERMS	Distributed Energy Resource Management System
EDC	Electric Distribution Company
EJC	Environmental Justice Community
EV	Electric Vehicle
EVI-Pro Lite	A tool for projecting consumer demand for electric vehicle charging infrastructure
EVSE	Electric Vehicle Supply Equipment
FASP	Fleet Assessment Services Program
FCEV	Fuel-cell Electric Vehicle
FTE	Full-Time Equivalent
FY	Fiscal Year
GHG	Greenhouse Gas
GVWR	Gross Vehicle Weight Rating
GWSA	Global Warming Solutions Act

ICE	Internal Combustion Engine
IT	Information Technology
kW	Kilowatt
kWh	Kilowatt hours
L1	Level 1
L2	Level 2
LDV	Light-duty Vehicle (vehicle classes 1-2, or those vehicles <10,000 pounds)
LI/EJC	Low Income Customers and Environmental Justice Communities
LMI	Low- and Moderate-Income
MA	Massachusetts
MassEVIP	Massachusetts Electric Vehicle Incentive Program
MHDV	Medium- and Heavy-duty Vehicle (vehicle classes 3-6 and 7-8, or those vehicles above 10,000 pounds)
MOR-EV	Massachusetts Offers Rebates for Electric Vehicles program, including MOR-EV Trucks
MUD	Multi-Unit Dwelling
MW	Megawatt
NOx	Nitrogen Oxides
NPV	Net Present Value
NREL	National Renewable Energy Laboratory
O&M	Operations and Maintenance
OpEx	Operational Expense
Phase I Program	First phase of the Company's Electric Vehicle Program (DPU 17-05)
Phase II Program	Second phase of the Company's Electric Vehicle Program (DPU 21-90)
PHEV	Plug-in Hybrid Electric Vehicle

PHEV-20	Plug-in Hybrid Electric Vehicle with 20 miles of range
PIM	Performance Incentive Mechanism
$PM_{2.5}$	Particulate Matter 2.5
Proprietary Network	Chargers using a proprietary hardware or a restricted access network available only to certain vehicles brands
PY	Program Year
QEL	Qualified Equipment List
R&D	Research and Development
RFP	Request for Proposals
TCI-P	Transportation and Climate Initiative Program
TCO	Total Cost of Ownership
The Company	NSTAR Electric Company d/b/a Eversource Energy
Transportation Act	Section 29 of Chapter 383 of the Acts of 2020
Utility-side work	Portion of make-ready infrastructure on the utility side of the meter
V2G	Vehicle-to-Grid
V2H	Vehicle-to-Home
VGI	Vehicle Grid Integration
VIO	Vehicles in Operation
VMT	Vehicle Miles Traveled
ZEV	Zero Emission Vehicle
ZEV MOU	Zero Emission Vehicle Memorandum of Understanding

I. Introduction

Q. Mr. Boughan, please state your full name and business address.

A. My name is Kevin M. Boughan. My business address is 107 Selden Street, Berlin, Connecticut 06037.

Q. Please state your position.

A. I am employed by Eversource in the position of Manager, Research & Business Development, responsible for managing the Company's electric vehicle ("EV") development strategies including the development of specific EV charging development programs across Eversource.

Q. Please describe your educational background and training.

A. I graduated from Davidson College in 1997 with a Bachelor of Arts degree in History. In 2006 I earned a Master of Business Administration from Yale School of Management with a concentration in marketing and strategy.

Q. Please describe your professional experience.

A. From 2006 to 2017 I held several positions at Praxair, Inc., an industrial gases company in Danbury, Connecticut, in strategy and energy business development, ending my tenure in the position of Director, Global Market Strategy and Competitive Assessment. My experience includes evaluating and commercializing new energy products, auditing internal and project controls, evaluating management strategy and advising on corporate acquisitions. In 2017, I left my position at Praxair, Inc. to join Eversource as Manager, Research & Business Development in the Strategic Planning group.

Q. Have you ever testified before the Department of Public Utilities ("Department")?

A. Yes. I have testified before the Department in NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 19-23, the Company's 2019 Grid Modernization Cost Recovery Filing, NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 20-54, the Company's 2020 Grid Modernization Cost Recovery Filing, and NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 21-58, the Company's 2021 Grid Modernization Cost Recovery Filing, and D.P.U. 20-74, Petition of NSTAR Electric Company d/b/a Eversource Energy for approval of Supplemental Budgets for its 2018 to 2021 Grid Modernization Plan.

II. Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present the Company's proposal to implement a second phase of its Electric Vehicle Infrastructure Program in its service territory. I will describe the elements of this proposal and the benefits to customers and the Commonwealth. Further, my testimony will demonstrate the proposal's compliance with the directives of D.P.U. 20-69-A and the Department's relevant standards of review. In addition to my testimony, the Company is sponsoring separate testimony of Richard D. Chin, Exhibit-ES-RDC-1, proposing a commercial electric vehicle rate design tariff pursuant to Section 29 of Chapter 383 of the Acts of 2020 (the "Transportation Act") and Robert W. Frank addressing cost recovery. Together, these program elements constitute the Company's Electric Vehicle Phase II Program ("Phase II Program").

III. Program Summary

Q. Please summarize the Company's Phase II Program proposal.

A. The Phase II Program builds upon the Company's first Program by providing offerings to meet the diverse needs of all the Company's customers, building the infrastructure required to support statewide EV adoption, and helping to enable the Commonwealth's broader transition to a clean transportation future. Recognizing that this transition will require a complete shift in one of the economy's largest segments and that each of the Company's customers' needs are different, this Program aims to provide options to meet the diverse needs of all the Company's customers and provide shared benefits across all communities the Company serves. The Phase II Program is structured to both build the electric backbone for the transportation sector and facilitate EV adoption, ensuring the Commonwealth's homes, workplaces, fleets, communities, and highway-corridors are ready for EVs at the scale necessary to meet the Commonwealth's ZEV targets.

The Company's proposed Phase II Program includes the following offerings for:

a. **Public and Workplace Segment:** provides financial support for Electric Vehicle Supply Equipment ("EVSE") installations at public sites and workplaces, for Level 2 ("L2") chargers, and Direct Current Fast Charging ("DCFC")

b. **Residential Segment:** provides programmatic and financial support for EVSE and at-home charging enablement at:

   i. properties with 1-4-units; and

   ii. multi-unit dwellings ("MUDs") with five or more units;

c. **Fleet-Segment:** provides financial support for light duty fleet EVSE installations, fleet electrification advisory services and tools

d. **Other Offerings**

i. **Pilots to Increase Access to Electric Mobility in Environmental Justice Communities ("Equity Pilots")** to provide support for innovative programs that increase access to electric mobility in EJC and to accelerate electric fleet conversion for fleets that serve EJCs.

ii. **Workforce Development and Electrician Training** to support the EV workforce of the future, including new workforce entrants and incumbent workers.

iii. **Demand Charge Alternative Rate Structure** for commercial customers with a sliding scale of demand charges and volumetric charges, in accordance with the requirements of the Transportation Act.

The Company is proposing to run the Phase II Program for a period of four years. The Company has estimated the total cost of the Phase II Program will be approximately $190.2 million, as summarized in the following table:

Program Budget

Program Component	Total Budget ($M)
Public and Workplace Total	**$109.1**
Make-Ready	$85.0
EVSE Rebates	$17.2
Networking Incentive	1.2
EJC DCFC Hubs	$5.6
Residential Total	**$52.7**
Make-Ready	$32.9
EVSE Rebates	$9.2

Networking Incentive	$1.0
LI/EJC Turnkey Install	$6.2
Site Plans	$1.2
Vendor-Based Administration Costs	$2.1
Fleet Total	**$2.0**
Fleet Assessment Services	$2.0
Other Supporting Elements Total	$28.2
Equity Pilots	$5.0
Workforce Development and Electrician Training	$1.2
Company Staffing	$9.6
Marketing & Outreach	$10.1
IT and Back-Office System Costs	$0.3
Program Evaluation	$2.0
Total	$191.9

The Company's proposed Phase II Program will support the transition to a clean energy future by reducing the barriers for residents, site-hosts and fleet owners to adopt clean transportation choices while also providing the necessary support and resources for our diverse customers to adopt EVs. The Phase II Program will support the installation of cohesive networks of charging infrastructure, assist fleet operators to develop their own

electrification roadmaps, accelerate deployment of at-home charging, and increase equitable access to the benefits of clean transportation. Not only do utilities play a key role in deploying the infrastructure to support increased EV adoption, but they are critical players to ensure the transition happens with a balance of equitable access and affordability, beneficial electrification, grid optimization, and the needs of the clean energy future.

Q. What are the goals of the Phase II Program?

A. The Company's goal is to create a future in our region where clean transportation is universal and the environmental and public health benefits are shared by all the Company's customers and communities. Although the transition to net-zero GHG emissions will happen over multiple decades, the investments necessary to support our customers in this transition must begin immediately and be aggressive. This proposal supports the Commonwealth in reaching its near-term and long-term transportation and climate goals through the acceleration of infrastructure deployment and EV adoption.

Q. How are EJCs considered across the Phase II Program offerings?

A. The Company has developed each segment of the proposal to more directly address the unique needs of EJCs and low-income customers. A guiding principle of the Phase II Program is to ensure that the proposed EV offerings are implemented equitably. EVs present a tremendous opportunity to mitigate the GHG emissions and particulate matter that exist disproportionately in EJCs. The installation of EV infrastructure and enabling EV miles driven within EJCs will provide increased access to clean transportation and

promote public health. The Company recognizes that today, the upfront costs to EV adoption are high and that there is a need to tailor programs for low-income customers, so they are not left behind in the transition to EVs.

The Company is laying the foundation for equitable access to clean transportation with specially designated EJCs and low-income offerings outlined by program segment in the table below. Additional information is detailed in the individual program segment sections.

Overview of EJC and Low-Income Offerings

Public and Workplace	**Increased Incentives** • 100% make-ready costs and full rebate for all EVSE installed in EJCs • Network incentive ($480 / port) for all ports installed in EJCs **Unique Offerings** • Fully funded DC Fast Charging Hubs in EJCs **Expectations** • 20% of ports deployed in EJCs
Residential	**Increased Incentives** • Make-ready and EVSE support of up to $1,700 for 1-unit properties (compared to $700 for non-EJCs) and up to $2,700 for 2-4-unit properties (compared to $1,400 for non-EJCs) • 100% make-ready costs and full rebate for EVSE installed at large MUDs in EJC • Network incentive ($480 / port) for all ports installed at large MUDs in EJCs **Unique Offerings** • Turnkey installation and increased financial support for LI/EJC to cover costs of residential make-ready and managed-charging capable L2 EVSE

	• EV Site Plans will help large MUDs (many of which are in EJCs) develop a plan for EVSE
Fleet	**Increased Incentives** • 100% make-ready costs and full rebate for EVSE for light duty fleets in EJCs **Unique Offerings** • 100% make-ready costs and EVSE rebate for MD-HD fleets that serve EJCs (part of Equity Pilots program) **Expectations** • 40% of 150 private and non-profit Fleet Assessments conducted in EJCs
Other Offerings	**Pilots to Increase Access to Electric Mobility in Environmental Justice Communities ("Equity Pilots")** • 100% EVSE for fleets and workplaces that serve low-income communities • MUD Installations with Car Sharing component

Q. Are you sponsoring exhibits with your joint testimony?

A. Yes. The table below lists the exhibits that we are sponsoring with our testimony:

Exhibit	Description
ES-KB-1	Testimony of Kevin Boughan
ES-KB-2	Program Investment & Development Summary
ES-KB-3	Summary of Estimated Phase II EV Program Costs
ES-KB-4	Summary of Estimated Costs by Cost Recovery Approach
ES-KB-5	Estimated Program Staffing Requirements
ES-KB-6	Estimated Residential 1-4 Unit Charging Offering Costs
ES-KB-7	Estimated Multi-Dwelling Charging Offering Costs
ES-KB-8	Estimated Public and Workplace Offering Costs
ES-KB-9	Company Stakeholder Outreach
ES-KB-10	Electric Vehicle Site Host Agreement

IV. Background

Q. Please provide an overview of the Commonwealth's environmental policies related to the promotion of electric vehicles.

A. The Commonwealth of Massachusetts has positioned itself as a leader in the United States to tackle the challenges posed by climate change by implementing ambitious programs and policies to maximize equity, the health and wellbeing of the Commonwealth's residents, and environmental benefits. As one of the first states in the nation to pass ambitious greenhouse gas reduction targets in 2008, the Commonwealth has continued to lead with the passage of An Act Creating A Next-Generation Roadmap For Massachusetts Climate Policy, Chapter 8 of the Acts of 2021 (the "Climate Act")[1] establishing a commitment to net-zero emissions by 2050, with a minimum of a 50 percent reduction in greenhouse gas ("GHG") emissions by 2030 and a minimum of 75 percent by 2040. The Company not only supports the Commonwealth with these goals but has also committed as a company to reach net-zero emissions by 2030. These collective goals will require swift innovation and action across all sectors of the economy.

With transportation being the largest contributing sector to GHG emissions in the Commonwealth (42% as of 2017)[2] and a significant source of pollutants that contribute to ground level ozone and other air pollution problems that adversely impact public health in the region, transportation electrification and EVs provide the opportunity to significantly

[1] St. 2021, c. 8, *available at* https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8.

[2] Transportation Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study December 2020; https://www.mass.gov/doc/transportation-sector-technical-report/download

reduce emissions in the short- and long-term, while also supporting our grid to enable a clean energy future. Decarbonizing the transportation sector will be challenging, but the transition to a decarbonized and electric transportation future is vital and requires an immediate and aggressive set of responses in order to meet the Commonwealth's Climate Act goal of net-zero emissions economy-wide by 2050.[3]

The Company and its peer electric distribution companies play an important role in accelerating this transition and will continue to be key enablers and partners to our customers, communities, and the industry as EV adoption grows exponentially in the coming years. Paired with support from complementary federal and state resources, such as the Massachusetts Offers Rebates for Electric Vehicles Program ("MOR-EV")[4] and the forthcoming Transportation and Climate Initiative Program ("TCI-P"),[5] the Company's comprehensive Phase II Program will ensure the Commonwealth, its communities, residents, and businesses have the infrastructure and support needed to facilitate widespread EV adoption.

Q. How many electric vehicles are in Massachusetts today?

A. Based on information shared with Eversource by National Grid, as of January 1, 2021, there were only approximately 36,000 EVs registered in the Commonwealth, or about 0.6%

[3] Climate Act, § 8.

[4] Massachusetts Offers Rebates for Electric Vehicles Program, https://mor-ev.org/.

[5] Transportation and Climate Initiative Program, https://www.mass.gov/info-details/transportation-climate-initiative-tci

of light-duty-vehicles ("LDVs") in operation in the state.[6] In 2020, EVs were roughly 3.0% of new vehicle sales in Massachusetts.[7] This puts Massachusetts seventh in the nation in EV sales, but far from the leader (California is at nearly 8.0%).[8] Nationwide, the United States averaged 2.0% of new vehicles sales in 2020, far from EV sales leaders Europe (10%) and China (5.7%).[9] In 2020, approximately 70% of new EVs sold in the Commonwealth were battery electric vehicles ("BEVs") and 30% were plug-in hybrid electric vehicles ("PHEVs"), along with a single fuel-cell electric vehicle ("FCEV"), highlighting the importance of public and at-home charging infrastructure for BEVs.[10]

As of January 1, 2021, there were roughly 32 medium and heavy-duty electric vehicles ("MHDVs") in the Commonwealth out of roughly 204,000 MHDV in the Commonwealth. All were BEVs and most are transit or school buses. However, there are currently more than 50 MHDV models available, and more than 125 models are expected to be available by 2023.[11] The total cost of ownership ("TCO") for BEV MHDVs continue to decline as manufacturing scales, and adoption is expected to transition quickly as each segment

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[6] IHS-Polk Vehicle in Operation data for Massachusetts as of January 1, 2021. Data purchased by the Company. See also https://ihsmarkit.com/products/automotive-market-data-analysis.html ("IHS Polk")

[7] ibid

[8] Alliance for Automotive Innovation, 2020 Vehicles Sales by State, accessed May 5, 2021, at https://www.autosinnovate.org/evagenda.

[9] 2021 IEA EV Outlook https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets.

[10] Company analysis of IHS-Polk data.

[11] Zero-Emission Technology Inventory (ZETI) tool by CALSTART. *https://globaldrivetozero.org/resources/zero-emission-technology-inventory/* .

reaches TCO parity. State government resources, such as the approximately $10 million MOR-EV Trucks Program, will accelerate that vehicle transition.

Q. What is the pace of EV adoption necessary to meet the Commonwealth's decarbonization goals?

A. As explained in the MA 2050 Decarbonization Roadmap Report:

> The current pace of EV adoption in the Commonwealth lags the pace necessary to achieve decarbonization targets compliant with the Global Warming Solutions Act (GWSA). Without new policy intervention (by the Commonwealth, California, or the federal government), less than 500,000 vehicles are projected to be electrified in 2030. In contrast, a pace consistent with meeting GWSA targets implies that over one million of the 5.5 million light-duty vehicles (LDVs) projected to be then-registered in the Commonwealth are electric in 2030."[12]

In addition to the Commonwealth's broad and ambitious climate goals, Massachusetts was among the first states to join California and others, setting its zero-emission vehicle ("ZEV") MOU targets of 300,000 LDV registered by 2025[13] and 30 percent and 100 percent of all new MHDV sales to be ZEV by 2030 and 2050 respectively.[14] With approximately 36,000 LDV and 32 MHDV currently registered in the state, the investments and actions taken over the next few years will be critical to accelerate and support this

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[12] Transportation Sector Report: A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study December 2020 accessed July 12, 2021 at https://www mass.gov/doc/transportation-sector-technical-report (p.4).

[13] New England States for Coordinated Air Use Management (NESCAUM), Multi-State ZEV Action Plan: 2018-2021, accessed July 12, 2021, at https://www.nescaum.org/documents/2018-zev-action-plan.pdf

[14] Northeast States for Coordinated Air Use Management, Multi-State Zero Emission Medium- and Heavy-Duty Vehicle Initiative – Memorandum of Understanding (2020), accessed July 12, 2021, at https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf

transition successfully. Longer term, the state's interim Clean Energy and Climate Plan ("CECP") noted the need for approximately 750,000 to 1,000,000 EVs by 2030.[15]

Q. What is the current state of public charging infrastructure in the Commonwealth?

A. The Company considers "publicly accessible" charging infrastructure to generally refer to parking locations that any member of the public can access and use, although there may be costs to do so (i.e., parking or access fees, fees for use of the charger, etc.). Related, some public charging networks are proprietary, indicating they only serve a subset of EVs on the road due to hardware compatibility (e.g., Tesla's plug standard) or network restrictions (e.g., Rivian is using the CCS fast charging standard but intends to limit many of its sites to Rivian customers[16]). Proprietary or restricted access networks arise more for fast charging than L2 charging, where nearly all vehicles can use the J1772 plug standard and there are few restrictions by vehicle brand.

As of June 30, 2021, there were approximately 3,504 publicly accessible L2 ports and 360 publicly accessible DCFC ports in Massachusetts. Of these publicly accessible ports, 1,913 L2 and 188 DCFC are located in the Company's service territory, about 54% of the statewide total. In our service territory public charging access is growing, with approximately 73% of all publicly accessible L2 ports installed in the past 18 months. Public DCFC growth is slower, adding 64 ports in the past 18 months. Public DCFC

[15] MA Interim Clean Energy and Climate Plan for 2030 (Strategy T2, p.21), https://www mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download

[16] https://electrek.co/2021/03/18/rivian-reveals-map-planned-fast-charging-stations-wall-charger/

development is also somewhat nuanced due to different charging standards, proprietary networks, and business models (e.g., use of Volkswagen settlement funds via Electrify America).

However, these high-level port counts can obscure the local realities of EV charging access. Public ports in Company territory were located at approximately 953 sites, however there are only 24 sites with two or more DCFC ports.[17] Existing DCFC ports are also split across the CCS, CHAdeMO, and Tesla charging standards, further reducing the likelihood of drivers being near a compatible port. At a local level, a significant number of customers live and drive in areas with minimal public EVSE today, sometimes referred to as "charging deserts."

Q. What is the current state of at-home charging?

A. At-home charging access is critical to enabling and sustaining personal EV ownership. Among current EV owners, generally considered early adopters, approximately 95% had access to at-home charging in 2020, representing 80-85% of all EV charging energy.[18] The

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[17] Alternative Fuels Data Center, U.S. Department of Energy, available at https://www.afdc.energy.gov/stations/#/analyze?region=US-MA&country=US&fuel=ELEC. (Data as of June 30, 2021) The Company filtered the data to derive the approximate number of public Level 2 and DCFC ports in Massachusetts. (Under "Advanced Filters", Filter '"Location" as "United States" and "Massachusetts", filter "Fuel" by "Electric" and "Charger Types" using both "Level 2" and "DC Fast" separately, filter "Station" by "Public" and "Available").

[18] 2020 Survey of Rhode Island EV owner from Rhode Island Electric Transportation Initiative Evaluation Final Report – Rate Year 2, page 17 (http://www ripuc ri.gov/eventsactions/docket/4770-NGrid-RY2%20Transportation%20Initiative%20Annual%20Report%20Combined%20(10.30.2020).pdf) ("RI RY2 Evaluation Report") and Finding 9 from the Phase I Program Year 2 evaluation report, D.P.U. 21-67 Exhibit NG-MM-1 ("Phase I PY2 Evaluation Report").

vast majority of BEV drivers today have L2 charging at home (95% of Tesla owners and 60% of non-Tesla BEV owners), whereas two-thirds of PHEV drivers use Level 1 chargers at home.[19] An estimated 5% of all residential customers are L2 "EV ready" today (i.e., they have an existing 240-volt outlet near their car), although almost none of the 36% of customers living in duplex or multi-family properties have L2 EV ready spots today.[20] The Company estimates over 50% of its residential customers face a significant barrier to at-home charging, although those barriers are addressable with utility planning and financial support, especially as vehicle and charger costs are expected to decline over time.

The importance of at-home charging access does not undercut the need for a robust network of public and workplace charging to ensure that customers without at-home charging access can own and operate EVs and to ensure that all customers can meet the entirety of their driving needs, including days away from home or with long-distance driving. The dynamic of drivers mostly relying on at-home charging, while still requiring robust public charging, is a major part of the difficult economics to operate profitable public EVSE, especially in the near-term with low numbers of EVs. Commercial fleet operators are faced with similar needs. Commercial fleets will primarily rely upon charging at a centralized depot but will also require the use of public charging infrastructure. The Company's

[19] RI RY2 Evaluation Report, Figure 4-2, page 18.

[20] *Estimating EV charging infrastructure costs across major U.S. metropolitan areas*, International Council on Clean Transportation , Aug 2019, Table 6 available at: https://theicct.org/publications/charging-cost-US

proposed Phase II Program addresses public, workplace, at-home, and commercial fleet charging infrastructure.

Q. Is there outside funding available to support EV adoption and EV charger deployment?

A. Yes. In addition to the existing utility programs in the Commonwealth, there are other state and federal programs and incentives that help to support EV adoption and the deployment of EV chargers. Although these programs have helped to move the market, there is much more needed to accelerate deployment of chargers and adoption of EVs. As learned during the Company's current EV offerings, the more alignment, compatibility, and cross leveraging of these resources, the better experience and process we can provide customers.

Specifically, in addition to the availability of federal tax incentives, the Commonwealth currently has six grant programs, funded by the Volkswagen Settlement and administered by the Massachusetts Department of Environmental Protection, that are aimed at supporting electrification of the Commonwealth's transportation network. These programs have been beneficial for customers and have allowed the Company to maximize the impact of its Phase I Program. However, as learned through the Company's stakeholder outreach, it can be complicated, confusing, and burdensome for customers to navigate multiple funding programs offering similar or overlapping resources. Feedback from customers highlighted the desire for a more streamlined process. The Company aims to coordinate and leverage the funding for customers whenever feasible and recommends coordination

with state entities to develop aligned and complementary offerings to ease the process for customers.

Q. What are the barriers to EV adoption?

A. The barriers to widespread EV adoption are multiple, although all are surmountable with sustained policies and investment. Key barriers to EV adoption currently include (but are not limited to):

- high costs (especially the upfront vehicle purchase and charger installation);
- lack of charging infrastructure; and
- range anxiety (the fear of being unable to complete a trip); [21]

These primary barriers to EV adoption were first identified by the Company in its testimony in D.P.U. 17-05 Exhibit ES-GMBC-1, page 103-104, and multiple industry studies confirm they remain the same today[22].

EVSE have their own set of barriers, which can be broadly classified into those affecting installation and those affecting operation. EVSE financial viability at public, workplace, and MUD sites hinges on station utilization,[23] which is largely determined today by the

[21] Barriers as summarized in Matteo Muratori et al 2021 Prog. Energy 3 022002 doi.org/10.1088/2516-1083/abe0ad, and further supported by research from the Phase I PY 1 Evaluation Report (for example, Finding 7) and Phase I Program Year 2 Evaluation Report (for example Table 4-22).

[22] Autolist, August 2019, Survey: Price, range and weak charging network are top reasons consumers avoid EVs, https://www.autolist.com/news-and-analysis/survey-electric-vehicles; and Georgia Institute of Technology School of Public Policy, June 2020, http://www.news.gatech.edu/2020/06/09/what-do-electric-vehicle-drivers-think-charging-network-they-use; and Volvo Reports: The State of Electric Vehicles in America, Feb 2019, https://www.media.volvocars.com/us/en-us/download/249123

[23] Muratori et al page 15, "PEV-charging economics vary with location and station configuration and depend critically on equipment and installation costs and retail electricity prices, which are dependent on utilization."

number of nearby EV owners, trends in vehicle technologies (i.e., vehicle range and charging capabilities), and station pricing. EVSE tend to face difficult paths to financial sustainability without ongoing subsidies from the site hosts. Sites with "dedicated" vehicles, however, such as MUDs and commercial fleet depots will be able to integrate EVSE into their larger operations over time. Public DCFC are more likely to be financially self-sustaining in the long run,[24] however their near-term paths to profitability are still limited due to a small BEV population fragmented across multiple charging standards (CCS, CHAdeMO, and Tesla) and the financial impacts of demand charges at low-levels of station utilization. Near-term charging economics, combined with the lack of existing public and private charging infrastructure, signal a strong need for utility support for charging infrastructure and customer programs to help accelerate EV adoption and meet the Commonwealth's climate goals.

Q. How does the Phase II Program address these barriers to EV adoption?

A. Utility support for charging infrastructure and customer-facing charging programs can address many, but not all, of the top barriers to widespread EV adoption. The need for expanded networks of public charging infrastructure, access to at-home charging, and infrastructure planning and support for high-powered charging sites (such as fleet depots or highway rest stops) all require strong utility involvement. Financial support to address EVSE installation costs is paramount in each situation. Additionally, the Company

[24] Muratori et al page 15, "it is likely that DCFCs will be profitable with sufficient demand."

proposed an alternative to traditional demand rate-based structures to facilitate faster charging for electric LDVs, MHDVs, and fleet vehicles targeted to EVSEs at lower levels of utilization, which may reduce barriers to initial investment in new DCFC stations.

Q. How did the Company size the Phase II Program?

A. Through the Company's experience electrifying approximately 350 public, workplace and large MUD customer sites in its Phase I program, the Company has established and validated processes for standardized infrastructure and EVSE installation at scale. This experience has informed the Company's ability to execute EVSE installations given field engineering, construction, and contractor resources, the pipeline of interested customers, and our ability to recruit and commit site hosts. The Company has used these experiences to estimate an aggressive but attainable pace of infrastructure build of continued EVSE deployment, while accounting for new and expanded offerings within. For newly introduced components of Phase II, the Company relied on its experience in implementing similar programs to size appropriate aggressive but attainable goals, balanced with the Commonwealth's decarbonization goals.

Q. Did the Company size the Phase II Program with the Commonwealth's decarbonization goals in mind?

A. Yes. In addition to sizing the program based on the Company's operational experience, the Company estimated future charging needs and program sizes using a mix of approaches for the following segments: Public and Workplace; Residential, including those with 1-4-units, and MUDs (5 or more units); and Commercial Fleets. Overall, the segments are sized

to support the Commonwealth's ambitious EV adoption goals, focusing on the Company's service territory's share of the LDV ZEV MOU goal.

The size of the largest segment of the Phase II Program, Public and Workplace, comports with the output of the EVI-Pro Lite tool from NREL using an approach agreed upon by the Company, Eversource, and Unitil. and reflecting the statewide light-duty ZEV MOU target of 300,000 EVs in 2025. The outputs from EVI Pro Lite were split to reflect the estimated EVSE necessary to achieve the goals based on each utility's share of vehicles in the Commonwealth.[25] The size of the proposed Eversource public and workplace programs reflect approximately 80% of this output from EVI Pro Lite to allow for deployments that might occur without the use of utility make-ready funds.

The MUD offering size reflects significant year-over-year growth in MUD ports enabled (relative to the Phase I Program). The Residential 1-4-unit offerings are sized based upon expected vehicle sales. The Residential 1-4-unit offerings are sized to serve roughly 15% of new EVs sold under the light-duty ZEV MOU forecast, reflective expected customer eligibility and participation.

The Fleet Segment is sized to support the light-duty ZEV MOU target in 2025. Commercial fleet operators are poised to quickly transition to electric fleets, as more EV models of all

[25] National Grid analysis of IHS-Polk vehicles in operation data as of April 1, 2021.

types become available in the coming years, corporate decarbonization goals continue to accelerate, and TCO approaches parity with ICE vehicles.

V. Phase II Program Proposal

A. Comparison of Phase I and the Proposed Phase II Program

Q. Please provide an overview of how the Phase II Program differs from the Phase I Program.

A. The Company's Phase I Program, as authorized in D.P.U. 17-05 in 2017, with additional bridge funding authorized in D.P.U. 20-74[26] in 2021, "seeks to help accelerate EV charging infrastructure development within its service territory, encourage EV purchases and contribute to GHG emissions reduction in the Commonwealth"[27] by investing in infrastructure beyond the meter up to the charging station, filling a funding need that would not otherwise be met by the private market. Through June 2021, the Company has installed charging ports at 335 customer sites, enabling 2,879 ports, (including 50 large MUD customer sites, and approximately 20% of ports installed at EJCs) and is on track to meet or exceed program goals.

This program has provided the Company with the experience and insights necessary to deploy charging infrastructure at scale and to integrate EV charging load with the Company's electric system.

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[26] NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 20-74 at 40 (Feb 4. 2021).

[27] NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 20-74, 2021 Grid Modernization Program Extension and Funding Report at 49.

The Phase II Program builds on the success of the Phase I program, through expanded offerings that address the diverse needs of different market segments as a means of advancing the Commonwealth's near-term 2025 and 2030 decarbonization goals and to help the Commonwealth be on a trajectory to achieve its net-zero emissions target by 2050. While the Phase II Program builds share some of the program components of the Phase I program, the scale and breadth of the Phase II Program components is significantly larger given the Company's experience and commitment to facilitate the Commonwealth's achievement of its decarbonization goals. Please see the table below for a summary of the Program offerings.

Segment offerings	**Phase I**	**Phase II**
Public/Workplace Segment		
L2 Make-Ready	Yes	Yes
L2 Non-EJC EVSE Rebates	No	Yes
L2 EJC EVSE Rebates	Yes	Yes
DCFC Make-Ready	Yes	Yes
DCFC Non-EJC EVSE Rebates	No	Yes
DCFC EJC EVSE Rebates	Yes	Yes
DCFC EJC Charging Hubs	No	Yes
Primary Metered Customer Side Infrastructure Incentive	No	Yes
Networking Incentives	No	Yes

Residential Segment		
L2 Wiring Incentive	No	Yes
L2 Charger Rebate	No	Yes
EJC Turnkey Solution	No	Yes
Large MUD L2 Make-Ready	Yes	Yes
Large MUD L2 Non-EJC EVSE Rebates	No	Yes
Large MUD L2 EJC EVSE Rebates	Yes	Yes
Large MUD Networking Incentive	No	Yes
Large MUD EV Site Ready Plans	No	Yes
Fleet Segment		
Assessment Services	No	Yes
Light Duty Make-Ready	No	Yes
Light Duty Non-EJC EVSE Rebates	No	Yes
Light Duty EJC EVSE Rebates	No	Yes
MD-HD Fleets Serving EJC Make-Ready and EVSE Rebate (Pilot)[28]	No	Yes
Other Offerings		
Workforce Development and Electrician Training	No	Yes
Demand Charge Alternative	No	Yes
Equity Pilots	No	Yes

[28] MD-HD pilot program is a component of the Company's Equity Pilots offering.

Q. How does the Phase II Program build on the Phase I Program?

A. Over the course of the Phase I program, the Company learned many lessons. These lessons informed the design of the Phase II Program.

Q. Please provide a summary of lessons learned in Phase I.

A. The Company has learned many lessons through the implementation of the Phase I Program. In particular, those lessons relate to operational execution, site host recruitment and market segmentation.[29]

Operational Execution

- To participate in the program and complete installation of charging station infrastructure, many documents must be review and executed by the customer. These documents can have long lead times, leading to a delay in infrastructure deployment. The Company has taken steps to alleviate documentation delays through introducing the Site Host Agreement as one of the first steps in the enrollment process. Additionally, the Company introduced a Site License Agreement which gives the Company permission from the Site Host to access the site and perform work until a permanent easement for the facilities is granted. These revisions have helped reduce delay.[30]
- The Company determined the cost to deploy the infrastructure to support 10 ports to be only marginally more expensive than the cost to support 5 ports. Additionally, consolidating to this one level 2 use case allows the Company to standardize electrical infrastructure equipment and enable procurement efficiencies. Going forward, the Company will support 10 charging ports, where possible.[31]
- The Company determined that ongoing maintenance of electric equipment situated behind a customer meter involved unique requirements that are not generally part of the normal course of operations for the Company. The Company determined that continuing to own and maintain "customer side infrastructure" would require expansion of the current operations organization and increase O&M costs. The

[29] Eversource Energy, D.P.U. 21-30 2020 Grid Modernization Annual Report at 129 (April 1, 2021).

[30] Id.

[31] Id. at 129-130.

Company recommends that upon completion of installation in Phase II, the customer will retain ownership of the "customer side infrastructure".

- The Company determined more assistance was needed to scale program implementation to the level anticipated in Phase II. As such, the Company issued an RFP and contracted with 15 additional partners.[32]
- Standardization of physical components, where possible, reduces costs through the ability to scale and to maximize deployment efficiency. Additionally, to the extent possible, site design and engineering has been standardized.[33]
- The EV infrastructure vendor channel in the Commonwealth needs to grow. As such, the Company conducted various vendor workshops with charging station manufacturers and electric distributors, designed to educate them on the program, Eversource standards and processes, and the local market conditions and value propositions.[34]
- Being diligent in upfront engineering and design work is key to limiting surprises and unexpected cost adders during the construction process.[35]

Site Host Recruitment

- Customers have varying levels of EV knowledge. As such, the Company created coordinated Print, Social Media, and Mailing campaigns to appropriate C&I customers, and multi-unit dwelling property owners. The Company also conducted targeted outreach to various sectors, including EJ Community site hosts. To assist the customer, the Company created a customer package and roadmap to completion of sites and convenes quarterly stakeholder events to solicit customer and community stakeholder feedback.[36]
- Rebates or incentives are helpful in defraying or eliminating the cost of the EVSE to the site host and eliminating barriers to participation in the program. With the Mass EVIP grants, there can be timing issues. As such, it is important to be well-coordinated.[37]
- There has been interest in hosting more than 10 charging ports, which is the current program's maximum. Having the flexibility to selectively choose exceptions where

[32] Id. at 130.
[33] Id.
[34] Id.
[35] Id. at 131.
[36] Id.
[37] Id. at 132.

a greater number of chargers makes sense and helps to accelerate EV adoption is beneficial to advancing the Commonwealth's goals.[38]

Market Segmentation

- The Company discovered multi-unit dwellings to be a challenging use case. Parking spaces in multi-unit dwellings tend to be a scarce resource and often building owners do not yet see EV charging as an amenity by which to increase property value and attract tenants.[39]
- One of the requirements for participation in the Program is that the charging station site must be separately metered, and therefore must be wired directly to Eversource equipment. As a result, many customers who were initially flagged as good targets based on parking characteristics such as universities, airports and other large campus customers, were ineligible because they have their own distribution network behind the meter.[40]
- The Company has been successful in deploying infrastructure in EJ Communities. The Company surpassed its 10 percent target of capital deployed at installations in EJ Communities. In the first three years of the Program, the Company deployed approximately 20 percent in EJ Communities.[41]
- The deployment of DC fast chargers has not been successful. The Company has concluded that there are two primary barriers to customers willing to be site hosts for DC fast chargers: 1) the high upfront cost of the hardware/software; and 2) high anticipated operating costs.[42]
- The originally identified EV adoption barriers of upfront cost of EVs, lack of available charging infrastructure and EV range remain today.[43]

Q. Did the Company meet with stakeholders to gather feedback on Phase I Program?

A. Yes. Throughout the program thus far, Eversource has presented updates and solicited continual program feedback from multiple stakeholders in the Make-Ready Program.

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38 Id.

39 Id. at 133.

40 Id.

41 Id.

42 Id. at 133-134.

43 Id. at 134.

Specifically, the Company met with the Massachusetts Department of Energy Resources ("DOER"); EEA; Department of Transportation; Massachusetts Bay Transportation Authority; Massachusetts Department of Environmental Protection; Environmental Business Council of New England; Sierra Club of Massachusetts; Union of Concerned Scientists; Natural Resources Defense Council; Acadia Center; The Energy Consortium; the Zero Emission Vehicle Commission; Georgetown Climate Center, Green Energy Consumers Alliance; National Grid; Electrify America; Plug-In America; Nissan; General Motors; Tesla; multiple charging station vendors; multiple towns and municipalities in Massachusetts.

In addition to meeting with the various stakeholders identified above, Eversource presented at various forums to help its sight host recruitment and general raise awareness efforts. The Company attended and spoke at quarterly meetings hosted by the Advanced Energy Group to provide regular updates on program status and recent activities, and to solicit and incorporate feedback from the public.

Lastly, Eversource maintained close coordination with National Grid through quarterly meetings to share lessons learned and discuss opportunities to collaborate jointly on the deployment of the EV programs.

A list of the stakeholders engaged throughout this process is included in Exhibit ES-KB-9.

Q. Did the stakeholder engagement and feedback ultimately help inform the design of the Phase II Program proposal?

A. Yes. The Company utilized the feedback received from stakeholders to inform the design of the Phase II Program. The Company received broad stakeholder support for the scope and scale of this Program, specifically the expanded nature of the programs to serve all customer segments and prioritize equity throughout. Key themes and feedback that were incorporated into this proposal include:

<u>For Public and Workplace Segment</u>:

- Providing incentives for L2 EVSE will encourage site densification, encouraging more ports to be installed at each customer location.
- Because of the high upfront cost equipment, DCFC EVSE incentives are necessary to adequately support the installation of fast charging sites.
- Operation of low utilization, high power draw DCFC is a barrier to deployment without appropriate demand charge alternatives.
- Need for an increased bench of qualified contractors to install behind the meter equipment.
- Participation in the program should not exclude customers who own their own distribution network but are otherwise excellent candidates to be site hosts.

<u>For Residential Segment</u>:

- Home charging is a critical component of the EV charging eco-system, and solutions for integrating EV load should be implemented.
- Provide higher levels of financial support to LI/EJC customers to ensure residents are supported to be able to make their homes or apartments EV ready.
- Expand upon the definition of the equity group to include customers on the Company's low-income discount rate.
- Provide no-cost and turn-key EV charging installs for LI/EJC customers.

<u>For Fleet Segment</u>:

- Support for MHDV electrification to enable MOR-EV Trucks Program, through fleet assessments for public, non-profit and private fleets.

For Other Program Components:

- Recognizing that port installation and enablement in EJCs is important, and that solutions for expanding access to electric mobility for EJC and low-income customers should be expanded and new solutions explored and validated.

VI. Consistency with Department Standard of Review

Q. Has the Department established a standard of review for EV charging proposals that is relevant to this proposal?

A. Yes. The Department opened an investigation regarding EVs and EV charging in 2013.[44] At the conclusion of the first part of the investigation, the Department established the standard of review to be applied to any electric distribution company's proposal for cost recovery associated with ownership and operation of EVSE. Specifically, any such proposal must: (1) be in the public interest; (2) meet a need regarding the advancement of EV in the Commonwealth not likely to be met by the competitive EV charging market; and (3) not hinder the development of the competitive EV charging market.[45]

Q. In your opinion, does the Phase II Program meet the Department's standard of review?

A. Yes. The Phase II Program meets each of the Department's criterion. The Phase II Program supports the Commonwealth's public policy goals, meets a need for ramping up the EVSE in the state that has not been met by the competitive market and is not likely to be met by 2025 and supports, rather than hinders, the development of the competitive market by

[44] Order On Department Jurisdiction Over Electric Vehicles, The Role Of Distribution Companies In Electric Vehicle Charging And Other Matters, D.P.U. 13-182-A at 13 (August 4, 2014), affirmed in D.P.U. 17-05 Revenue Order and in D.P.U. 17-13 Final Order.

[45] Id.

expanding the opportunities for market participants to gain experience in owning and operating EVSE. The Company has carefully designed and sized the Phase III Program offerings to address existing market barriers to EVSE and EV charging. The Phase III Program will promote and work with qualified EVSE vendors in the Commonwealth and help make Massachusetts residences EV ready for the future. The Company will address herein how each element of the Phase II Program is consistent with the Department's standard of review for utility EV proposals.

Q. Did the Department provide directives in D.P.U. 20-69-A relevant to EV proposals?

A. Yes, the Department's Order in D.P.U. 20-69-A provides that each company must file an EV proposal with: (1) a commercial EV rate design proposal addressing alternatives to demand charges; and (2) any new or expanded EV charging infrastructure proposals. The filing must be made on or before July 14, 2021.[46]

For EV infrastructure proposals, the Department directed the Massachusetts electric distribution companies ("EDCs") to coordinate future EV infrastructure program proposals to ensure a consistent approach for host recruitment and incentives – at a minimum and ensure the proposal is not duplicative of other build out incentive programs.[47] Additionally, new proposals should mitigate barriers that impede recruitment of DCFC site hosts for strategic locations.[48] Further, the Department directed the EDCs to incorporate analyses of

46 Grid Modernization, D.P.U. 20-69-A at 40-41 (May 21, 2021).

47 Id. at 46.

48 Id. at 47.

traffic and EV charging patterns to identify priority locations for public stations and coordinate and propose statewide and company-specific performance metrics associated with EV charging infrastructure programs.[49]

For EV charging incentives, the Department directed the EDCs to avoid overlap by coordinating their EV charging incentive offerings. Additionally, the Department noted in any proposal, the EDCs should address issues related to customers charging their EV in multiple service territories.[50]

Lastly, for any proposed alternatives to traditional demand rate structure, the Department directed the EDCs to consider the following: (1) converting kW-based charges to kilowatt-hour-based charges; (2) off-peak charging demand charge rebates or discounts; and (3) sliding scale demand charges based on the load factor of the electric vehicle charging site.[51] Additionally, the Department provided that all proposed demand charge alternatives should be based on EV charging data collected through one of the following: (1) smart chargers or networked chargers; (2) EV telematics; (3) interval meters installed at request of customer.[52] The EDCs must coordinate development of demand charge alternative proposals for C&I EV customers, including public EV charging site hosts with L2 and/or

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49 Id.

50 Id. at 49, n. 32.

51 Id. at 42.

52 Id. at 42-43.

DCFC stations.[53] The EDCs must identify a timeline and approach to transition all proposed demand charge alternatives to the future demand charge rate designs that will be enabled through the full deployment of advanced metering functionality.[54] Finally, any proposed tariff included as part of the EDC's demand charge alternative proposals must be filed as an exemplar tariff.[55]

Q. In your opinion, does the Phase II Program satisfy the D.P.U. 20-69-A directives?

A. Yes, the Phase II Program satisfies the Department's D.P.U. 20-69-A directives. The Company coordinated extensively with the Massachusetts EDCs on the development of its EV infrastructure program to ensure a consistent approach for host recruitment and incentives. In particular, the Company worked with National Grid and Unitil to make sure the EDCs' proposed programs are as consistent as possible. Based on the Company's and National Grid's respective experience to date with EV charging programs, the companies worked together to revise their program designs with the goal of offering all Massachusetts customers a consistent offering and EV charging experience. The Company also developed new offerings to address barriers to the recruitment of site hosts for the deployment of DCFC stations, as discussed further in Section VII. A. The Company also worked with National Grid and Unitil to propose common statewide performance metrics for the programs, as discussed in Section VI. Lastly, the Company coordinated with the EDCs on

53 Id. at 43.

54 Id.

55 Id.

the development of a demand charge alternative offering. As part of this coordination, the EDCs discussed a timeline and approach to transition all proposed demand change alternatives to the future demand charge rate designs that will be enabled through the full deployment of advanced metering functionality. The Company proposes a sliding scale of demand and volumetric charges for commercial customers, based on the load factor for the EV charging stie, as discussed in the prefiled testimony of Richard D. Chin, Exhibit-ES-RDC-1.

Q. How closely aligned are the EDCs' electric vehicle proposals?

A. The Company coordinated with National Grid and Unitil throughout the process of designing this proposal. As a result of that coordination, the EDCs' proposals include consistent rebate levels, eligibility requirements, and delivery methods for the Public and Workplace Segment and Residential Segment. Based on the companies' respective experience with earlier programs, however, there are slight differences, including that Eversource is not proposing a pole-mounted L2 charger offering and is not offering any L1 charger incentives for long-dwell time sites. Eversource's Phase II Program also differs from National Grid in its Fleet Segment. Eversource is proposing a smaller-scale Fleet Pilot, as compared to National Grid's fleet offering. Additionally, National Grid's Phase III Program includes an off-peak rebate offering that Eversource has not included.

The Company and National Grid also coordinated with Unitil on the development of these offerings. However, as this is Unitil's first EV charging incentive program, and due to Unitil's service territory size, the program offerings differ to a greater extent.

Q. Will the Company incorporate analyses of traffic and EV charging patterns to identify priority locations for future public charging stations?

A. The Company has included in its proposal an effort to ensure public DCFC are installed in a number of strategically important locations within the program term. Beyond that initiative, however, the Company's Phase I and proposed Phase II Programs offer consistent financial support across the service territory, only differentiating support by market segment (e.g., public versus MUD charging) and whether the site is in an EJC. Thus, public station locations are otherwise largely determined by customers.

Going forward, Eversource is working to develop an adoption propensity and travel model for electric vehicles in the state of Massachusetts. Using state targets, the propensity models will allow the identification of areas with a high likelihood to adopt electric vehicles. In combination with GPS tracking based travel data, a detailed yearly model showing travel at a census track level (where are vehicles originating and where are they going to). In combination, Eversource will be able to develop location specific EV charging profiles, adoption rate forecasts, and determine need for charging infrastructure. Eversource is also cooperating with the MassCEC and the Commonwealth of MA to access EV registration information as an input into the EV models.

Q. Did the Company and EDCs coordinate to develop statewide performance metrics to report on the progress of their EV charging infrastructure programs?

A. Yes, the Company consulted with National Grid and Unitil regarding performance metrics[56] that each company would report for their service territory and programs. The Company proposes to track and report on the following statewide performance metrics for its Phase II Program:

- Program implementation metrics:
  - Total number of charging sites developed;
  - Total number of ports installed by port type (i.e., L2 and DCFC) by market segment (e.g., public, workplace, MUD, fleet, and EJC);
  - Program financial support provided to DCFC stations;
  - Program financial support provided to stations in EJCs; and
  - Total number of participants in the Workforce Development and Electrician training.
- Program benefit metrics:
  - EVSE utilization (e.g., kWh delivered per port per year); and
  - CO2 emissions avoided from EVs relative to ICE vehicles.

Q. Did the Company coordinate with the EDCs to develop company-specific performance metrics to report on the progress of its Phase II Program for EV charging infrastructure programs?

A. Yes, the Company and National Grid propose to track and report on the following performance meters for the Residential Segment:

- Total number of Residential Charger Rebates distributed;
- Total number of Residential Make-Ready Rebates distributed;

[56] As part of its Phase I program, the Company currently tracks through the Grid Modernization Annual Reporting mechanism the following metrics: total Make-Ready sites developed, capital invested in DCFC infrastructure, capital invested in EJCs, charger utilization (kwh/port), % of residential customers within a 20 and 40 mile range of Make-Ready site, and EV adoption / CO2e reduction.

- Total number of Residential LI/EJC Offerings distributed.

The Company also proposes two Company-specific metrics related to its Equity Pilots program offering.

- Number of MD-HD ports deployed and vehicles electrified; and
- Number of car sharing vehicles supported.

Q. Is the Company proposing to recover incentives associated with these metrics?

A. No. The statewide and company-specific performance metrics listed above are for purposes of reporting progress on the Company's Phase III Program over time. In addition to these reporting metrics, however, the Company is proposing two performance incentive mechanisms that will track the progress of other aspects of the Phase III Program and provide an opportunity for the Company to earn incentives based on its progress. These performance incentive metrics are described in detail in Section IX, herein.

VII. Program Details

A. Public and Workplace Segment

Q. Please describe the Public and Workplace Segment.

A. Building off the success of the Phase I Program as previously described, the Public and Workplace Segment will provide similar make-ready infrastructure incentives and expand those offerings based on the lessons learned from the Phase I Program. The Company has found that additional financial incentives and offerings are needed to sufficiently spur EV adoption, make public and workplace charging more affordable for site hosts, and equitably serve its customers. The Public and Workplace Segment will include the following offerings:

i. a Make-Ready offering for L2 and DCFC installations with utility-side make ready incentives, customer-side make ready incentives, EVSE rebates, and a networking stipend for eligible ports;

ii. an offering to support DCFC charging hub installations in EJCs;

The Commonwealth's Decarbonization Roadmap's Transportation Technical Report[57] highlights the continued need for Public and Workplace charging to accelerate EV adoption at the pace necessary to reach the Commonwealth's goals.

Q. What is the goal of the Public and Workplace Segment?

A. The goal of the Public and Workplace Segment is to provide an expanded charging network that enables EV drivers to have sufficient charging options away from home within the Company's service territory. The Public and Workplace Segment will provide incentives for make-ready infrastructure for L2 chargers, and DCFC. The Company proposes to provide make-ready incentives to enable approximately 3,350 Public L2 Ports, approximately 2,760 Workplace L2 Ports[58], and approximately 27 MW of Public DCFC ports. The Company will remain flexible to deploy these ports according to customer and market interest.

[57] Massachusetts Executive Office of Energy and Environmental Affair's (EEA) 2050 Decarbonization Roadmap Study, Transportation Sector Technical Report, https://www mass.gov/doc/transportation-sector-technical-report/download Section 5.1.2.4.

[58] Light duty passenger vehicle fleet charging ports are included as a segment of the Workplace charging program. For consistency with National Grid's proposal, this fleet program is described below in Section VII. C.

Public and Workplace Approximate Port and MW Targets	
Public L2	~3,350
Workplace L2	~2,760
Public DCFC	~27 MW

The Public and Workplace Segment aims to deploy approximately 20% of its ports within EJCs. The Company is proposing to install a MW target of DCFC as the capacity of DCFC ports can range from 24-kW to 350-kW. It is important to note that a port target may not result in equal outcomes for meeting the Commonwealth's DCFC needs, which serves as the motivation for adopting a capacity-based target.

Q. How did the Company size the Public and Workplace Make-Ready offering?

A. As described above, the Company used a combination of its experience from the Phase I program to project the ability to deploy EV infrastructure at scale and the output of the EVI-Pro Lite[59] tool to inform the sizing and port distribution of the Make-Ready offering within the Public and Workplace Segment. EVI-Pro Lite is an accepted and useful tool in helping to size EVSE infrastructure, however the outputs of the tool are highly sensitive to variability in the inputs. For example, a 1 percent shift in the input of percent of drivers with access to home charging changes the L2 and DCFC outputs by 2-3 percent. Similarly, a 1 percent shift between share of PHEVs and BEVs changes the number of L2 chargers

[59] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, Alternative Fuels Data Center, Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite, available at: https://www.afdc.energy.gov/evi-pro-lite

by about 3 percent. Without being able to predict the exact ratio of BEVs to PHEVs on the road, as well as the exact future charging behaviors of those EVs, the Company emphasizes the importance of maintaining flexibility in the deployment of these port targets as well as their associated budgets.

When using EVI-Pro Lite, the Company started with the Commonwealth's light-duty ZEV MOU target for the end of 2025 which was scaled to the fraction of the Commonwealth's vehicles in operation that exist in the Company's service territory. The rest of the inputs to EVI-Pro Lite include: 50 percent PHEV support (approximately half of PHEV miles are electric), 77 percent of charging is done at home, 67 percent of vehicles being BEV-250, 5 percent of vehicles being PHEV-50, and 28 percent of vehicles being PHEV-20. As stated previously, the offering proposes to deploy EVSE to match the charging need for approximately 80 percent of the ZEV MOU target to align with National Grid. The Company believes this is a reasonable target accounting that some chargers may be installed without the assistance of the Company's make-ready incentives. Additionally, EVI-Pro Lite outputs a DCFC count of 150-kW chargers. As discussed earlier, not all DCFC provide the same charging capacity, and the Company proposes to target the overall DCFC capacity given by EVI-Pro Lite, which is by 150-kW DCFC port count.

Public and Workplace Make-Ready Offering

Q. Please describe the Public and Workplace Make-Ready offering.

A. The Company proposes continuing a Public and Workplace Make-Ready offering to provide the charging infrastructure needed to support the Commonwealth's ZEV MOU target, and other decarbonization goals including the 2030 CECP. As in the Phase I program, the Public and Workplace Make-Ready offering will provide incentives for make-ready infrastructure for L2 and DCFC.

The portion of the make-ready infrastructure on the utility side of the meter ("the utility-side work") will be completely paid for by the Company.

The portion of the make-ready infrastructure on the customer's side of the meter ("the customer premise work") will be covered up to 100-percent of the average installation cost of the average cost for that installation type, not to exceed actual installation costs. To account for certain site-specific characteristics and potential cost-shifts in the industry, the Company may allow up to 150-percent of the average costs on a case-by-case basis. The average cost for the customer premise work for each installation type will be recalculated periodically to keep up with market dynamics.

As in the Phase I program, Eversource will install the "utility-side Infrastructure," and contract with third-party electrical contractors to install behind-the-meter "customer-side Infrastructure." Specifically, the EV infrastructure that Eversource is installing includes the following: (1) distribution primary lateral service feed; (2) necessary transformer and

transformer pad; (3) new service meter; (4) new service panel; and (5) associated conduit and conductor necessary to connect each piece of equipment.

In the case of customers who own their own distribution network ("primary metered customers") the company will invest in the "customer-side infrastructure" only.

While the process of installation will remain the same for all customers, in contrast to the Phase I program, upon completion of installation, the customer will retain ownership of the "customer side infrastructure".

Consistent with implementation of the Company's Phase I program, the Company will install infrastructure to support a standard 75 kva use case for all Level 2 deployments to reduce costs through the ability to scale and to maximize deployment efficiency through the ability to order and inventory necessary equipment.

Q. Will the Company offer EVSE Rebates as a part of the Public and Workplace Segment?

A. Yes. the Company is proposing to offer the following EVSE rebates for L2 and DCFC EVSE which are broadly aligned with National Grid's and Unitil's proposed programs. Regarding DCFC, the Company experienced in its Phase I Program that DCFC deployment was challenging due to the high upfront costs for site hosts. However, when MassEVIP offered a limited DCFC EVSE rebate, the Company saw an increase in the number of DCFC project applications. Given the need for greater DCFC deployment, the Company is proposing to add DCFC EVSE rebates in the Phase II Program.

A summary of the proposed rebate levels is in the table below.

Public and Workplace EVSE Rebates

L2 EVSE Rebate Levels	
Customer Segment	Rebates Levels
EJC	100% of installed costs for up to 10 ports
Muni	50% of installed costs for ports 3-10
Other (Non-EJC/on-Muni Public and Workplace)	50% of installed costs ports 5-10
DCFC EVSE Rebate Levels	
Customer Segment	Rebates Levels
Public, Non-EJC	$40,000/port; Ports must be above 50 kW, minimum 100 kW/site, site max EVSE incentive ($400,000).
Public, EJC	$40,000/port for ports above 50 kW and up to 150 kW, minimum 100 kW/site, site max EVSE incentive ($400,000) For ports 150 kW and above, up to $80,000/port

In all cases, the customer will own and operate the EVSE.

Q. Will the Company offer EVSE Rebates to Public and Workplace Segment customers who participated in the Phase I program?

A. Yes. Customers who have sites that were enabled as part of the Phase I program will be eligible to receive rebates for up to 50% (100% for EJCs) for any new incremental EVSE purchased after Phase II approval and installed on existing make-ready infrastructure. The Company's budget assumes that approximately 100 Phase I Make-Ready sites will take advantage of this offering, supporting approximately 300 incremental L2 ports, without the need for additional Male-Ready infrastructure. The Company estimates the cost of rebates to Phase I customers to be approximately $720,000.

Q. Will the Company offer a network stipend as part of the Make Ready offering?

A. The Company will require networking for all L2 and DCFC chargers. Networking allows customers to more effectively locate and efficiently use chargers via mapping and queueing in charging apps. Additionally, networking provides the Company with charging data which can be leveraged for future program design and current program refinements. The Company recognizes the challenge posed to some site hosts by networking fees. Therefore, the Company proposes to offer a stipend to support 4 years of networking at a level of $480/port for networking for Municipal L2 and DCFC, and any EJC chargers.

Q. What are the eligibility requirements for participation in the Public and Workplace Make-Ready offering?

A. The Company's eligibility requirements for participation in the Public and Workplace Make-Ready offering will be the same as in the Phase I Program, as enumerated in the Company's Electric Vehicle Site Host Agreement (Exhibit ES-KB-10), with the exception as noted above that customers who own their own distribution network will be eligible for customer side infrastructure funding and EVSE incentives.

Q. How is the Company proposing to enable DCFC access in EJCs?

A. DCFC access within or in close proximity to EJCs is a critical part of ensuring an equitable transition to clean transportation. All communities need accessible DCFC, but EJCs have unique needs, often having higher percentages of MUD's (therefore more complicated or limited at-home charging), as well as often having a higher percentage of ride hailing drivers, and drivers who do not have access to home charging or parking (so called, "garage orphans"). The Company proposes to introduce a DCFC charging hub offering.

This offering seeks to deploy 4 to 5 charging hubs, each with approximately four 175kW DC fast chargers in EJCs. The Company will fully fund the utility side and customer side make ready infrastructure and provide rebates for the full cost of the EVSE and installation, and a networking rebate. The Company will issue an RFP to solicit interested owner/operators of the DCFC charging hubs to ensure a consistent and coordinated approach to siting, and operation.

Q. What is the Company's proposed budget for the Public and Workplace Charging Program?

A. The Company's proposed budget is in the table below.

Budget/Costs

Estimated Public and Workplace Segment Budget	
Category	*Budget*
Utility Side Make Ready (Capital)	*~$48M*
Customer Side Make-Ready (O&M)	*~$37M*
EVSE Rebates (O&M)	*~$17M*
Networking Rebate (O&M)	*~$1M*
EJC DCFC Hub	*~$6M*
Total	*~$109M*

Q. How is the Public and Workplace Segment consistent with the Department's Standard of Review for utility EV proposals?

A. The Public and Workplace Segment is in the public interest as it sets incentives at a level that will foster an accelerated deployment of EVSE, while efficiently utilizing ratepayer funds. In this way, the Public and Workplace offerings will also meet the needs that have

not and will not likely be met by the competitive EV charging market. Finally, the Company is not proposing to meet one-hundred-percent of the market need so not to overshoot ZEV MOU target deployment of charging stations by not crowding out EVSE deployments that might not be able to accept utility make-ready funding.

B. Residential Segment

Q. Please provide a description of the offerings for the Residential Segment.

A. Given the importance of at-home charging and the needed scale to support it, the Company is proposing Residential offerings to support all residential customers. The Residential offerings include:

1) for 1-4-unit properties:
   i) support for EVSE costs; and
   ii) residential make-ready, which encompasses:
      (a) 240V wiring near the customer's parking space (e.g., in garage, driveway, or parking lot);
      (b) 240V outlet equipment and installation;
      (c) EVSE installation; and
      (d) associated panel upgrades, service upgrades, and permits; and
2) for MUDs:
   i) an expanded make-ready program; and
   ii) support for site-specific EVSE plans for 20+ unit properties.

The financial and programmatic support is tailored to housing types (i.e., 1-unit, 2-4 unit, and 5-or-more unit residences) and equity-related criteria (e.g., customer lives in an EJC, customer is on a discounted rate). The goal of the offerings is to enable ubiquitous at-home charging for the Company's residential customers to accelerate EV (particularly BEV) ownership and enable the lower-cost, more convenient, and more grid-optimized charging

that at-home EVSE provides. The Residential offerings will advance the adoption of EVs in the Commonwealth, which is in the public interest and is not likely to be done by the competitive market in time to meet the Commonwealth's climate goals.

Support for 1-4-unit properties will decrease the upfront costs associated with at-home charging by offering two types of rebates: one towards residential make-ready and one towards managed charging capable EVSE. Enrollment in a managed charging program is required to take advantage of both rebates. The Residential Make-Ready Rebate will address the variable and significant costs associated residential make-ready, including 240V wiring in the garage or driveway of a property. The Company proposes to provide customers in 1-unit properties with a rebate up to $700 and customers in 2-4-unit properties up to $1,400, not to exceed actual costs. The Charger Rebate will support at-home charging by reducing the equipment costs of managed charging capable L2 EVSE. The Company proposes a one-time rebate per residential account of up to $300 to offset the incremental cost difference between a networked and non-networked L2 EVSE. Finally, the LI/EJC Offering will provide increased financial and enhanced programmatic support to qualifying customers.

Support for MUDs will follow the design of the Public and Workplace Segment described earlier and build upon the lessons learned from the Phase I Program. In summary, MUDs will receive financial support to cover 100% utility-side costs, up to 100% of average

customer-side make-ready costs, 100% of typical EVSE costs for sites in EJCs and 50% of EVSE costs for all other MUDs, and the Networking Stipends where requested.

Overview of Residential Segment Offerings

Offering	**Description**
1-4-Unit Properties	
Residential Make-Ready Rebate	Reduces the costs associated with residential make-ready and EVSE installation in a customer's driveway or garage. Up to $700 for customers in 1-unit properties, and up to $1,400 for customers in 2-4-unit properties, not to exceed actual costs. Enrollment in a managed charging program is required to take advantage of this rebate.
Charger Rebate	Reduces the cost of purchasing managed charging capable EVSE. Up to $300 per customer towards the cost of a managed charging capable L2 EVSE, not to exceed actual costs. Enrollment in a managed charging program is required to take advantage of this rebate.
LI/EJC Offering	Increased financial support and turnkey assistance for qualifying customers. No-cost managed charging capable L2 EVSE and residential make-ready up to $1,700 for customers in 1-unit properties and up to $2,700 for customers in 2-4-unit properties, not to exceed actual costs.
5+ Unit Properties (MUDs)	
Support for utility-side infrastructure	100% of actual costs (with the right of the Company to deny program support to high-cost projects)
Support for customer-side infrastructure	Up to 100% (with the right of the Company to approve support up to 150% of the average cost per port on a case-by-case basis)

EVSE and EVSE installation support	Up to 100% of the average cost per port for sites in EJCs and 50% of the average cost per port for other sites, budgeted at $4,000 per L2 port and $2,000 per L2 port respectively, but not more than actual costs.
Networking Rebate	Upfront rebate of $120 per port / year for 4 years ($480 per port)
20+ Unit Properties	
EV Ready Site Plans	Up to $6,000 to cover the cost of a site plan on the long-term infrastructure and equipment approach to installing at least one L2 port per residential unit. (Ideally done before any further make-ready or EVSE installations take place.)

Q. How has the Company supported at-home charging in its prior programs?

A. The Company has only supported at-home charging in a limited capacity to date. The Company has successfully activated 239 ports (465 ports enabled) at 50 MUDs as part of the Phase I Program through June 2021. At-home charging is often less accessible to people living in MUDs than in single-family residences. The Company also offers a managed charging demand response program for residential EV drivers, providing incentives for participating customers. The current managed charging program, ConnectedSolutions[60], does not directly promote access to at-home charging, but serves to optimally integrate EV charging load to the grid.

[60] https://www.connectedsolutionsev.com/

Q. Why is at-home EV charging important for advancing EV adoption?

A. At-home EV charging is critically important to enabling EV ownership, reducing the cost of EV ownership,[61] and creating opportunities to manage EV charging in grid-optimized and consumer-friendly ways.[62] At-home EV charging has been rated as a primary criterion for those considering buying an EV,[63] and second most important criterion needed to increase EV consideration.[64] Further, at-home charging can meet the charging needs of over 95% of travel days for long-distance BEVs, a sign of its tremendous importance in a BEV-oriented future.[65] Finally, research shows that EV owners with L2 charging at home are half as likely to discontinue their EV ownership (i.e., go back to internal combustion engine ("ICE") vehicles) as those with Level 1 charging at home, highlighting the importance of L2 at-home charging to the EV ownership experience.[66]

Approximately 95% of EV owners in 2020 had access to at-home charging,[67] resulting in 80-85% of charging happening at home.[68] The vast majority of BEV drivers today have L2

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[61] Borlaug et al., *Levelized Cost of Charging Electric Vehicles in the United States*, Joule (2020), https://doi.org/10.1016/j.joule.2020.05.013 reports the lowest cost charging being at-home charging, with potential Lifetime Fuel Cost Savings (relative to internal combustion engine vehicles) of $4,500 to $9,400 for a BEV in Massachusetts. Fuel savings are maximized when at-home charging under time-of-use rates is maximized.

[62] Residential Electric Vehicle Rates That Work, SEPA, November 2019, page 10. https://sepapower.org/resource/residential-electric-vehicle-time-varying-rates-that-work-attributes-that-increase-enrollment/

[63] 2018 NG Customer Council EV Research, slides 8-9, and 2020 DNV GL EV Study Results, slide 19.

[64] 2020 DNV GL EV Study Results, slide 19.

[65] Wei, W., Ramakrishnan, S., Needell, Z.A. et al. Personal vehicle electrification and charging solutions for high-energy days. Nat Energy 6, 105–114 (2021)available at: https://doi.org/10.1038/s41560-020-00752-y, Figure 7, page 110.

[66] "For access to level-2 charging from home compared to level-1, there are 52.8% lower odds of discontinuing [EV] ownership. … This shows the importance of having higher speed level-2 charging at home over low speed level-

charging at home (95% of Tesla owners and 60% of non-Tesla BEV owners), whereas two-thirds of PHEV drivers use L1 charging at home.[69]

Q. Are there barriers to residential at-home charging?

A. Yes, there are still many barriers for customers to charge at-home, especially those who do not live in single-family residences. These barriers include:

- having limited existing electric service or panel capacity to add EV charging;
- parking spots with no or limited existing electrical access;
- renting (e.g., landlords lacking incentives to invest their funds on EVSE, given the low share of EVs on the road today; tenants not wanting to invest their own funds on equipment and infrastructure for a property they do not own);[70]
- having only on-street parking;
- determining fair EVSE management, access, and payment/pricing approaches for EVSEs serving renters, multi-unit dwellings, or other shared parking, compounded by a lack of familiarity with these concepts among decision makers (e.g., condo boards); and
- other circumstances resulting in high installation or operating costs or lack of interest among the decision-makers to enable at-home charging.

Further, residential EVSE purchase and installation costs can be high and variable,[71] adding to the upfront cost barrier EVs still face relative to internal combustion engine

1 charging." From Hardman, S., Tal, G. Understanding discontinuance among California's electric vehicle owners. Nature Energy (2021) available at https://doi.org/10.1038/s41560-021-00814-9 .

67 2020 Survey of Rhode Island EV owner from *Rhode Island Electric Transportation Initiative Evaluation Final Report – Rate Year 2* at 17.

68 80% figure from Department of Energy available at https://www.energy.gov/eere/electricvehicles/charging-home. 85% figure is the share of charging at home for those with home-charging, 2020 Bloomberg New Energy Finance EV Outlook, at 185.

69 *Rhode Island Electric Transportation Initiative Evaluation Final Report – Rate Year 2*, Figure 4-2, page 18.

70 "Homeowners are six times more likely than renters to own an electric vehicle." from Lucas W. Davis (2019) Evidence of a homeowner-renter gap for electric vehicles, Applied Economics Letters, 26:11, 927-932, available at: https://doi.org/10.1080/13504851.2018.1523611

71 *Estimating EV charging infrastructure costs across major U.S. metropolitan areas*, International Council on Clean Transportation, August 2019, at 4. https://theicct.org/publications/charging-cost-US.

vehicles.[72] These cost and access issues are significant especially to the Company's customers living in two-or-more-unit dwellings in EJCs. And while there is a growing amount of free or low-cost charging available at public and workplace locations, in the long run customers without home charging are likely to face far greater fueling costs for their EVs as they pay the more expensive retail charging rates.[73]

Of particular importance to multi-unit dwellings is the need to plan for future EVSE and charging loads to help reduce cost and simplify EVSE installations. Many residential sites, in the long run, will need to provide one L2 port per residential unit (a ratio that some new construction building codes are adopting[74]). For example, a 30-unit building will need at least 30 L2 ports in the long run but will likely only use a few of them in the next couple years. Given these long-term needs, it is imperative to plan for charging infrastructure growth over time, as well as anticipate any cost efficiencies from consolidating the make-ready and construction work. Without proper planning, MUDs may start down an "incremental" path that does not scale well, only adding a few chargers at a time—resulting in higher construction and infrastructure costs—and possibly struggling to match the few EVSE locations with those of EV owner's parking spots. The utility can play a unique and

[72] The 2020 Bloomberg New Energy Finance EV Outlook, Figure 295 shows a purchase price gap for BEVs, relative to ICE vehicles, in 2020 of nearly $4,000.

[73] "The United States Needs More Fast Chargers: China Can Show How," Rocky Mountain Institute Blog (January 29, 2021), available at: https://rmi.org/the-united-states-needs-more-fast-chargers-china-can-show-how/.

[74] British Columbia has many examples of such codes at https://pluginbc.ca/policy/. E.g., The City of Nelson requires "One stall per dwelling unit is required to be EV ready in new single family and multi-unit residential." Massachusetts only requires one EV Ready space for certain new construction with 15 or more parking spaces.

critical role in supporting site planning for long-term EVSE needs, helping sites anticipate EV-related load growth and find cost-reduction strategies. Without utility support, such forward-looking approaches are unlikely to occur.

One to Four Unit Offerings

Q. Please describe the financial and programmatic support the Company is proposing to offer customers in 1-4-unit properties.

A. The Company is proposing to offer two types of rebates to encourage residential charging: 1) a Residential Make-Ready Rebate towards the cost of necessary electrical upgrades required to install at-home EVSE; and 2) a Charger Rebate for the purchase of a managed charging capable L2 EVSE. These offerings enable at-home charging and solve unique challenges for residents in 1-unit properties, 2-4-unit properties, and LI/EJC customers. LI/EJC customers are defined as: 1) customers who are on the Company's low-income discount rate or 2) customers who reside in a property that meets at least one of the EJC criteria outlined by the Commonwealth.[75] If a customer meets one of these two criteria and lives in a 1-unit property, they qualify for the LI/EJC Offering only if they own or lease a

[75] In Massachusetts a neighborhood is defined as an Environmental Justice population if any of the following are true: Block group whose annual median household income is equal to or less than 65 percent of the statewide median ($62,072 in 2010); or 25% or more of the residents identify as a race other than white; or 25% or more of households have no one over the age of 14 who speaks English only or very well - English Isolation. https://www mass.gov/info-details/environmental-justice-populations-in-massachusetts. In the Company's Phase I program, potential Make-Ready locations are required to meet two of these criteria in its Eastern Massachusetts service territory. In an effort to align the EDC programs, Eversource is proposing that only one criteria needs to be met for EJC incentive eligibility.

new or used EV with a purchase price of less than $50,000, a purchase price requirement reflective of the Commonwealth's MOR-EV rebate.[76]

Q. Please describe the Residential Make-Ready Rebate offering.

A. The Company is proposing a Residential Make-Ready Rebate to enable at-home L2 EV charging by reducing the costs associated with residential make-ready infrastructure. The Residential Make-Ready Rebate would enable at-home charging for the property's current inhabitant(s) and would "future proof" the Company's territory for at-home EV charging by providing L2 EV charging capability to the property's future inhabitants. The Residential Make-Ready Rebate provides a one-time rebate per residential account to offset the high and variable costs to enabling L2 charging at home. The Company proposes to provide customers in 1-unit properties with a rebate up to $700 and customers in 2-4-unit properties up to $1,400, not to exceed actual costs.[77] Customers receiving this rebate would be required to enroll in the Company's managed charging programs, ConnectedSolutions, which incentivizes customers to limit charging on system peak days (typically in the summer). The minimum enrollment period the program is expected to be at least 1 year, with an option to opt out after the 1-year period.

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[76] The State's MOR-EV rebate requires the purchase price of a new vehicle to be less than $50,000. https://mor-ev.org/eligible-vehicles. (Accessed June 29, 2021).

[77] The rebate amounts are informed by International Council on Clean Transportation's findings that the average cost to install an L2 charger is $680 in a detached house and $2,000 in an attached house. Hardware and installation costs are included, and installation is composed of labor, materials, taxes, utility upgrades, and permits. Average costs do not include the L2 EVSE. Estimating EV charging infrastructure costs across major U.S. metropolitan areas, International Council on Clean Transportation, August 2019, at 6. Available at: https://theicct.org/publications/charging-cost-US.

The Company will consider good cause exceptions to the managed charging enrollment requirement for a portion of customers in 2-4-unit properties because they have shared parking or do not own or lease an EV. Because the Residential Make-Ready Rebate requires enrollment in the Company's managed charging program, the Company will avoid duplication by disallowing customers who obtain the Residential Make-Ready Rebate to also obtain ConnectedSolutions enrollment incentives but would otherwise allow participation incentives from the program.

Q. Please describe the Residential Charger Rebate offering.

A. The Company is proposing a Charger Rebate to support at-home charging by reducing the costs of managed charging capable L2 EVSE. The rebate would be applied to the purchase of a managed charging capable L2 EVSE from a Qualified Equipment List ("QEL") that will be developed by the Company. If this offering is approved, the Company will conduct a more comprehensive evaluation of EVSE available in the market and use those results to establish the rebate level and participation requirements. For purposes of the cost estimate developed for this filing, the Company has assumed a rebate amount of $300 per residential account. Rebates would be distributed on a first-come, first-served basis. Customers receiving this rebate would be required to enroll in the Company's managed charging programs, ConnectedSolutions for a minimum of 1 year, with an option to opt out after the 1-year period. Because the Charger rebate requires enrollment in the Company's managed charging program, the Company will avoid duplication by disallowing customers who obtain the Residential Make-Ready Rebate to also obtain ConnectedSolutions enrollment

incentives but would otherwise allow participation incentives from the program. The Company expects that Customers would have the option to obtain the Charger Rebate instantaneously at point of sale via the Mass Save Marketplace or downstream after purchasing a charger on the QEL through a different retailer.

Q. Are there unique benefits provided to LI/EJC customers?

A. Yes, the Company expects LI/EJC customers to be eligible to receive no cost managed charging capable L2 EVSE and residential make-ready infrastructure, up to $1,700 for customers in 1-unit properties, and up to $2,700 for customers in 2-4-unit properties, not to exceed actual costs. The EVSE and residential make-ready work that qualifies reflect the same requirements outlined for the Residential Make-Ready Rebate and Charger Rebate. Like the Residential Make-Ready Rebate, customers receiving the LI/EJC Offering would be required to enroll in the Company's managed charging program, ConnectedSolutions, for a minimum of 1 year. The Company will consider good cause exceptions to the managed charging enrollment requirement for a portion of customers in 2-4-unit properties because they have shared parking or do not own or lease an EV. Because the LI/EJC Offering requires enrollment in the Company's managed charging program, the Company will avoid duplication by disallowing customers who obtain the Residential Make-Ready Rebate to also obtain ConnectedSolutions enrollment incentives but would otherwise allow participation incentives from the program.

Q. How many customers does the Company expect to serve with the Residential Make-Ready Rebate, Charger Rebate, and LI/EJC Offerings?

A. The Company's proposed Residential EV Charging Program targeted at 1-4-unit properties seeks to enable approximately 16,000 ports at customers' properties. The Residential Make-Ready Rebate and the Charger Rebate can be "stacked," meaning that customers would be eligible to obtain both rebates.[78] If a customer receives the LI/EJC offering, they are neither eligible to receive the Residential Make-Ready Rebate nor the Charger Rebate (and vice versa). The offerings are estimated to address approximately 15% of the customers needed to reach the ZEV MOU light-duty passenger vehicle goal by the end of 2025.

Five or More Unit Offerings (MUDs)

Q. Please describe the MUD Make-Ready offering.

A. The Company proposes a make-ready offering to serve MUDs with 5-or-more residential units. The program will be a revised and significantly expanded version of the Phase I Program for this segment. The program will provide support in line with the Public and Workplace offering. As in the Phase I program, Eversource will install the "utility-side Infrastructure," and contract with third-party electrical contractors to install behind-the-meter "customer-side Infrastructure." Specifically, the EV infrastructure that Eversource is installing includes the following: (1) distribution primary lateral service feed; (2) necessary transformer and transformer pad; (3) new service meter; (4) new service panel; and (5) associated conduit and conductor necessary to connect each piece of equipment.

[78] The Company estimates 100% of customers who obtain a Charger Rebate to also obtain a Charging Readiness Rebate. If a customer receives an Equity Group rebate, they are not eligible for neither the Charger Rebate nor the Charging Readiness Rebate.

While the process of installation will remain the same for all customers, in contrast to the Phase I program, upon completion of installation, the customer will retain ownership of the "customer side infrastructure".

To enable larger port deployments per site, the Company will increase the standard use case as described in the Public & Workplace program offering to support up to 20 L2 ports at MUD customer locations.

The MUD offering will cover 100% of the costs for utility-side make-ready work with the Company retaining the right to review and deny program support for high-cost projects. The MUD offering will cover up to 100% of average costs per port for customer-side make-ready work, but not more than actual costs, with the ability for the Company to approve up to 150% of the average cost per port on a case-by-case basis.

The program will also provide financial support for qualified EVSE and EVSE installation and activation costs, budgeted at $4,000 per L2 port for MUDs located in EJCs and $2,000 per L2 port for all other MUDs, but not more than actual costs. These financial support levels reflect an $8,000 dual-port station purchase and installation cost benchmark ($4,000 per port) and the program funding 100% of the cost per port for sites in EJCs and 50% of the cost per port for all other MUDs. Actual rebates offered may vary over time as the station price benchmark changes and based upon the availability of third-party funding and customer interest in program. The Company will offer these rebate levels on all qualified EVSE installed at MUDs and does not propose any site-level caps on program funding at

this time. Customers choosing qualified networked EVSE may also request support for networking costs. The Networking Stipend will cover up to $120 per port per year for four years. Combined, the program's financial support is estimated to cover 85% of average infrastructure and EVSE installation costs and likely 100% for EJC sites.

Q. Please describe the EV Ready Site Plan offering.

A. To help larger MUDs gain comfort with installing EVSE, reduce costs, and plan for future EVSE growth, the program will offer financial support for EV Ready Site Plans. EV Ready Site plans will create a plan for the infrastructure, EVSE, and charging management practices required to provide at least one EVSE per parking spot per housing unit located on the property (or 100% of resident parking spaces if there are fewer parking spaces than housing units). EV Ready Site Plans will be created by qualified charging station installers or electricians and will adhere to a set of minimum requirements regarding their contents and the cost-saving approaches considered, including a description of the property, number of units, number parking spots, type of parking (e.g., shared or assigned), and existing electric service type and remaining capacity; approaches to managing on-site EV loads to minimize infrastructure costs, sometimes referred to as EV Energy Management Systems; types of EVSE considered and why they are appropriate for that site, and recommendations regarding phased implementation approaches (e.g., "install infrastructure for these 20 parking spaces first"). Interested MUD properties with twenty or more housing units are eligible to do an EV Ready Site Plan. The Company expects to contribute up to $6,000 per EV Ready Site Plan and has budgeted for 200 plans over four years.

Q. How will the EV Ready Site Plans support the MUD Make-Ready offering?

A. The EV Ready Site Plans will have three primary benefits. First, they will generate interest in the program for larger properties. By having a plan in place, decision makers can become comfortable with the investments and changes required (i.e., parking management, costs and pricing of station use, etc.) which will spur interest in the make-ready program.

Second, the site plans will allow the Company to authorize greater investments in make-ready infrastructure. For MUDs with EV Ready Site Plans, the program will allow infrastructure work to support additional EV ready parking spots (beyond any parking spots installing EVSE) in accordance with their plan. In practice, this will typically mean installing additional conduit, sizing the service or electric panel differently to anticipate future load growth, and potentially supporting on-site EV-related energy management systems, such as power-sharing EVSE. The Company estimates the make-ready costs for these incremental ports enabled to be lower due to the economies of scale of larger make-ready projects, offsetting the net costs of offering EV Ready Site Plans.[79]

Third, the Company expects site plans to help potentially reduce utility-side infrastructure costs through the use of EV energy management systems, such as power sharing between EVSE or devices that support power sharing between EVSE and the rest of the property.

[79] *Estimating EV charging infrastructure costs across major U.S. metropolitan areas*, International Council on Clean Transportation, August 2019, Table 3, at 3. https://theicct.org/publications/charging-cost-US.

This is particularly important for MUDs as the long-term expectation for EVSE growth is high and on-site load constraints will be prevalent.

Q. How did the Company size the MUD offerings?

A. The MUD offerings are sized to support up to 2,200 L2 ports enabled at approximately 110 sites over four years.

Q. Is the Company applying any lessons learned to the MUD program design?

A. Yes. MUDs are incredibly diverse across their size, density and layout, parking, tenure (rent/own), resident demographics, and many other factors. In order to achieve these ambitious targets, the program needs to be responsive to market and customer feedback. Lessons learned for MUDs include:

- MUDs have been installing an average of 5 ports per site to date, but larger MUDs will need far more than that in the long term. EV Ready Site Plans will help address long-term EVSE planning and help decision makers get comfortable with an EV future. The Company also will provide this segment with a 20-L2 port infrastructure standard use case to support this learning, as described above.
- Different parking arrangements, such as shared versus assigned parking, may warrant different EVSE approaches. EV Site Ready plans will guide site host and utility approaches to serving this diverse segment.

Q. What new approaches does the Company expect to use to achieve these ambitious MUD targets?

A. To achieve the ambitious targets of this offering, the Company expects to test new lead generation and implementation approaches, including:

- EVSE rebates to increase demand
- A program manager dedicated to the MUD segment.
- More active marketing and outreach, including increased use of town and community partnerships and targeted marketing to MUD property managers and

residents about the program. Partnerships may include Community Based Organizations, and other organizations and programs.

- Leveraging EV Ready Site Plans to help larger MUDs plan for future EVSE installation. For example, many condos need some assurances of the plans, costs, and management practices for their EVSE. A site plan can give them an opportunity to get comfortable with those before committing to a decision or investment.
- Bringing more data-driven approaches to identifying areas of high MUD concentration to inform marketing, community partnerships, program goals, and implementation approaches.

The path ahead will require rapid and continual growth in the pace of MUD installation activity, supported by the appropriate resources and flexibility to respond to changing market and customer needs. Overall, the MUD Make-Ready offering is budgeted at $29,300,000, as detailed in the table below.

Q. What is the Company's proposed budget for the Residential Program?

A. The proposed Residential Program budget is $50.6million over the program term, with $21.3 going to 1-4-unit properties and $29.3 going to MUDs.

Residential Segment Estimated Outcomes and Budget

Offering	Budget ($M)	Outcome
1-4-unit Properties		
Residential Make-Ready Rebate	$11.2	16,000 ports enabled.
Charger Rebate	$3.8	
LI/EJC Offering	$6.2	
Vendor-Based Administration Costs	$2.1	
5+ Unit Properties (MUDs)		

Utility-side Make-ready	$15.2	2,170 ports enabled.
Customer-Side Make-ready	$6.5	
EVSE Rebates	$5.3	
Networking Incentive	$1.0	
20+ Unit Properties		
EV Ready Site Plans	$1.2	200 EV Ready Site Plans
Total Residential Program		
Total	$52.7	

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Q. How do the Residential offerings meet the Department's Standard of Review for utility EV proposals?

A. The Company has analyzed evidence on EV sales, charging and travel behaviors, and trends for future EV technology to inform its Residential offerings. Given the importance of at-home charging to enable greater levels of EV adoption, the difficult path to installing and operating EVSE for many residential customers, and the long-term infrastructure cost reductions possible via well-planned at-home charging, the Company has a unique and important role to reduce station installation costs, directly enable a large number of installations, and anticipate and manage the associated grid-impacts. This is a role that will not otherwise be met by the private market. Failure to support customers in addressing these barriers will result in far slower and less-equitable EV adoption than the Commonwealth's policy goals demand and will result in far more public EVSE required to be built.

C. Fleet Segment

Q. What are the Fleet Segment offerings and what outcomes do they achieve?

A. The Fleet Segment is an introductory offering for the Company which provides make ready and EVSE support for passenger vehicle fleets and introduces Fleet Assessment Services for all fleet customer types. This segment accelerates climate goals, improves community health with cleaner air, provides equitable access to clean transportation, creates insights for long-term EV planning, and supplies crucial tools & services for fleets to accelerate their clean transportation transition.

In addition to the passenger vehicle fleet offering, and the Fleets Assessment Services offering, the Company proposes to use the learnings from the Fleet Assessment Services effort to inform the development of a Medium-Heavy Duty make-ready offering which will be proposed in 2023 for intended start in 2024. A separate pilot offering for Medium-Heavy Duty fleets that are located in or serve EJCs will be addressed in the Equity Pilots description below.

Q. What are the main components of the Fleet Segment?

A. The Fleet Segment consists of three main components:

1. **Fleet Make-Ready Offering (Fleet Make-Ready):** Support for light duty passenger vehicle fleets in the Company's service territory.
2. **EVSE Rebate Offering:** Support for 50% of EVSE costs for all passenger vehicle fleet customers (upon customer purchase of the first four ports), and 100% of EVSE costs for EJC-eligible fleet customers.
3. **Fleet Assessment Services Offering:** Provide Fleet Assessment Services for up to 100 private & non-profit fleet customers. In addition, the program will develop online self-assessment tools for customers to conduct fleet electrification planning and estimate TCO savings.

Q. Please describe the Fleet Make Ready offering

A. The Company proposes a make-ready offering to serve passenger vehicle fleets within the Company's service territory. The program will provide support in line with the Public and Workplace offering, and is budgeted within that component.[80] The Fleet offering will cover 100% of the costs for utility-side make-ready work with the Company retaining the right to review and deny program support for high-cost projects. The Fleet offering will cover

[80] The passenger fleet Make-Ready offering is identical to and budgeted within the Public and Workplace offering. It is described in this section separately for continuity of presentation among the EDC programs.

up to 100% of average costs per port for customer-side make-ready work, but not more than actual costs, with the ability for the Company to approve up to 150% of the average cost per port on a case-by-case basis.

The program will also provide financial support for qualified EVSE and EVSE installation and activation costs, budgeted at $4,000 per L2 port for MUDs located in EJCs and $2,000 per L2 port (after the first four ports) for all other fleets, but not more than actual costs. These financial support levels reflect an $8,000 dual-port station purchase and installation cost benchmark ($4,000 per port) and the program funding 100% of the cost per port for sites in EJCs and 50% of the cost per port (after the first four ports) for all other fleets. Actual rebates offered may vary over time as the station price benchmark changes and based upon the availability of third-party funding and customer interest in program.

Q. Are private and public fleets eligible for the Fleet Make-Ready offering?

A. Yes. In order to accelerate fleet EV deployments as rapidly as possible, the Fleet Make-Ready offering is designed to support the needs for both private and public fleets. As part of its interactions with stakeholders, and to ensure equitable distribution of the Fleet Segment supports, the Company will monitor and adjust the allocation of funds to projects in order to maintain an equitable distribution to a diverse set of customers and projects (e.g., limiting support for a specific private fleet project if that customer segment has received an unbalanced portion of the Fleet Make-Ready offering funds).

For fleets to be eligible for the EJC level of support, fleet operators must either be registered in or operate more than 50% of the time within census block groups that meet any of the

Commonwealth's EJC definitions. This expands on the Commonwealth's eligibility for the MOR-EV Trucks program, which includes census block groups within the income eligibility component of EJC definition.

Q. Please describe the Fleet Assessment Services offering

A. The Company is proposing fleet assessment services for up to 100 private and non-profit fleet customers. The services would be targeted to customer segments, including but not limited to: corporate, delivery, private transport, refuse, and general services.

In addition, the Company proposes to develop online fleet planning and TCO tools for fleet customers. Standardized reports and scalable educational tools are key factors in a fleet operator's decision-making process, and these tools help fleet customers of all sizes transition to clean transportation, providing services including (but not limited to): Fleet Make-Ready offering eligibility, vehicle availability, funding options, infrastructure and EVSE choices, fuel savings calculator, TCO estimates, and electric rate summaries. This offering is built in response to the company's engagement with fleet customers, industry stakeholder events, and experience with current fleet assessment services programs in Massachusetts and Rhode Island. The Company has conducted exploratory discussions with several potential vendors to provide these services and expect the tools to be easily scaled to all fleet customers in its service territory and completed within one year of the start of the offering. In order to maintain a consistent customer experience for fleet operators across the state, the Company will collaborate with National Grid to procure these online fleet planning and TCO tools for fleet customers. The companies will conduct

a joint RFP to select a single vendor, share development costs, and coordinate on an ongoing basis to ensure the capabilities and user experience are consistent for fleet customers in both territories.

Q. Why is the Company not proposing a Make-Ready offering for Medium-Heavy Duty fleets at this time?

A. The Company believes that the learnings from a Fleet Assessment Services offering will be critical to developing a Make-Ready offering that serves the needs of fleets that is specific to our service territory. To date, the Company has not yet proposed or implemented a Fleet Assessment Services offering, and as such, our information about the potential electrification needs and costs for fleets in our service territory is not comprehensive enough to propose an efficient Make-Ready offering at this time.

Q. Does the Company plan to address the needs of Medium-Heavy Duty fleets?

A. The Company proposes to take learnings from the first two years of initial Fleet Assessments to propose a Make Ready program at that time.

Q. What is the proposed budget of the Fleet Segment?

A. The Fleet Segment represents a total budget of approximately $2 million in the years 2022-2025. The budget for this program offering is presented in the table below. The budget for the fleet Make-Ready offering is included in the Public and Workplace offering.

Estimated Fleet Segment Outcomes and Budget		
Offering	**Budget ($M)**	**Outcomes**
Fleet Assessment Services	$2.0	• 100 private & non-profit fleet assessments

		• Online fleet electrification planning and TCO savings tools
Segment Total	$2.0	

Q. How does the Fleet Segment meet the Department's standard of review for EV proposals?

A. The Company has used its experience in providing make-ready infrastructure, in its territory to inform this introductory Fleet Segment design. Fleet LDVs and MHDVs represent more than 30% of the commonwealth's CO_2 emissions, and therefore represent a significant portion of the public's interest in clean transportation solutions. In addition, the current needs of fleet operators in the commonwealth are not being met entirely by the private market, and this proposed Fleet Segment provides the holistic infrastructure support, assessment services, and EVSE rebates necessary to effectively scale the fleet vehicles to meet ZEV goals. Finally, these fleet offerings are designed to be complementary to existing services from the private market, as the infrastructure support, incentives, and rebates will complement and accelerate the rapidly evolving technology solutions and business models of the private market.

VIII. Pilots to Increase Access to Electric Mobility in EJCs ("Equity Pilots")

Q. Why is the Company introducing Equity Pilots offerings?

A. Every community member deserves clean air and access to clean transportation vehicles, for both their own transportation needs and from the goods and services operated in their community. The offerings are designed to augment the standard make-ready and EVSE incentives that incentivize deployment of charging stations in EJCs to ensure new and innovative models can be explored and implemented to achieve the clean air and energy goals of these communities.

The Commonwealth's EJC communities suffer disproportionate pollution impacts: Black, Asian, and Latinx residents are exposed to approximately 30% more vehicle pollution than white residents, while almost 70% of all white residents live in areas with concentrations below the state average.

Q. Please provide an overview of the Company's proposed Equity Pilots offerings.

A. The Equity pilots offerings include two components: a car sharing program for EJC residents, and make-ready support for MD-HD fleets that serve EJC communities.

Q. Please describe the Company's EJC Car sharing offering.

A. The Company proposes to participate as a partner in an equity focused electric car sharing program that serves as a complement to public transportation. Carsharing programs reduce emissions by removing internal combustion vehicles from the roadways, relieve traffic congestion, and reduce parking needs.

Other partners that the Company intends to work with to develop and implement this car sharing program may include vehicle providers, community-based organizations, carsharing platform operators, municipalities, and other environmental justice community stakeholders.

The Company intends to provide Make-Ready support for charging infrastructure in line with the EJC Public & Workplace offering but may also provide additional operational and financial support to ensure program success.

Similar carsharing pilot programs have been successfully launched in Sacramento, CA[81] and Portland, OR[82].

The Company estimates that its role in the car sharing program will cost approximately $2,000,000 to develop and implement. Actual costs may be higher or lower depending on final program structure.

Q. Please describe the Company's EJC MD-HD Fleet offering.

A. The Company proposes to provide make-ready and EVSE incentives for MD-HD fleets that serve EJC communities. These fleets may include but are not limited to: school bus, community transport services, and last mile delivery fleets. While the Company has not proposed a MD-HD make-ready program at scale, the Company recognizes that a segment

[81] See http://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Electric-Vehicles/EV-Strategy_Progress-Report_Final_July-2020.pdf?la=en

[82] See https://learn.sharedusemobilitycenter.org/wp-content/uploads/2018.06_cev_casestudy_FINAL.pdf

of its customer base has reached a more advanced stage of its electrification journey. Because of the importance of access to electric mobility to EJCs noted above, to the extent that those customers are located in or serve EJCs, the Company proposes to dedicate $3,000,000 to accelerate these deployments through support for charging infrastructure and EVSE. The Company expects that this proposed budget will support the electrification of approximately 120 MD-HD vehicles.

Q. What is the proposed budget of the Equity Pilots?

A. The total budget is $5.0 million, as noted below.

Offering	**Budget ($M)**
EJC Car Sharing	$2.0
EJC MD-HD Fleet Electrification	$3.0
Total Equity Pilots	$5.0

VIII. Workforce Development and Electrician Training

Q. Please provide an overview of the Company's proposed Workforce Development and Electrician Training Program offerings.

A. The EDCs are proposing to co-sponsor two statewide offerings to invest in the EV workforce of the future. These offerings are 1) a Workforce Development initiative to support underrepresented entrants to the electric vehicle workforce and 2) an Electrician Training initiative to upskill incumbent electricians.

Q. Why is Workforce Development and Electrician Training needed?

A. The rapid growth of the EV market emphasizes the importance of understanding its current workforce and opportunities for continued growth and development. Developing a skilled workforce is an investment, not a cost.[83] The transition to EVs presents a strong opportunity to support inclusive, quality jobs for all Massachusetts residents. The Company's proposed Workforce Development and Electrician Training program helps ensure incumbent electricians and future EV workforce entrants have access to developing the needed skillsets and technical knowledge to be included in the EV transition.

To reach the ambitious port targets proposed in the Phase II Program, as well as provide a positive customer experience, the Company views workforce development and electrician training as necessary. The EV workforce needs to grow over the next four years to meet the demand created by this proposal. Ensuring a seamless customer experience is imperative to the Company. It is critical that the workforce is knowledgeable about charging infrastructure and can provide expert advice to customers on the topic.

To ensure equity in the EV transition, investments need to be made in both people and in capital. Charging infrastructure can be viewed by some as a symbol of displacement and

[83] California Workforce Development Board, A Jobs and Climate Action Plan for 2030 at ii, available at: https://laborcenter.berkeley.edu/wpcontent/uploads/2020/09/Putting-California-on-the-High-Road.pdf

gentrification. Workforce development initiatives targeted at low-income residents and residents in EJCs can foster acceptance of equitable infrastructure deployment. [84]

Q. Please describe the Company's proposed Workforce Development initiative.

A. The Workforce Development initiative aims to collectively (among the EDCs) support approximately 75 participants, prioritizing populations underrepresented in the EV workforce. The proposed initiative has the following targets:

- Create a sustained increase in the supply of qualified electric vehicle workers;
- Increase the diversity of the workforce; and
- Foster participation from low-income residents and residents in EJCs to increase their awareness of EVs, EV infrastructure, and the EDCs' EV offerings, ultimately driving EV program participation in hard-to-reach communities.

The EDCs propose to partner with a vendor that has expertise in workforce development to identify market needs, develop curriculum, outline a structure to the initiative, and execute it. Workforce development needs currently under consideration include, but are not limited to, the design, development, manufacture, repair and installation of EVs and charging infrastructure.

Q. Please describe the Company's proposed Electrician Training initiative.

A. In addition to promoting the development of new entrants to the electric vehicle workforce, the EDCs are also proposing to sponsor a state-wide Electrician Training initiative to upskill incumbent electricians. Achieving the Company's ambitious port targets outlined in the Phase II Program will require a strong pipeline of electricians. The initiative aims to

[84] Slowik, P. "*Expanding Zero-Emission Mobility Equity and Access*," ZEV Alliance and ICCT 2019 at 9. http://www.zevalliance.org/wp-content/uploads/2019/12/ZEV_access_workshop_report-_fv.pdf

collectively (among the EDCs) train more than 1,000 electricians. The initiative has the following goals:

- Educate existing electricians on electrical work related to electric vehicle charging infrastructure across segments (Public and Workplace, Residential, and Fleet);
- Educate existing electricians on the EDCs' EV-related offerings; and
- Develop a list of qualified electricians that the co-sponsors can share with customers;
- Ensure electricians can provide a seamless and well-informed customer experience.

To achieve these goals, the co-sponsors will facilitate training by partnering with organizations such as the Electric Vehicle Infrastructure Training Program and the charging station providers.

Q. Do comparable workforce development and electrician training initiatives exist?

A. The Company is not currently aware of existing local, state, or federal workforce development or electrician training initiatives to support the electric vehicle workforce of the future. The co-sponsors will coordinate with key partners (i.e. IBEW, MassCEC, the MA Clean Cities Coalition, MassHire, etc.) to develop the proposed initiatives, avoid duplication, and ensure consistency. Furthermore, the co-sponsors will explore opportunities to recruit additional sponsors that are aligned with the goals of the workforce development initiative, such as automakers and charging station providers, in order to expand the initiative's reach and/or decrease each sponsor's costs.

Q. What is the proposed budget for the Electrician Training and Workforce Development initiatives?

A. As outlined in the table below, the total budget for the Workforce Development and Electrician Training initiatives is approximately $2.3M and will be split between the EDCs. Collectively between the EDCs, the Workforce Development initiative aims to reach approximately 75 participants, and the Electrician Training initiative aims to reach approximately 1,000 trainees. The Company proposes that the offering be examined after 2 years to determine if this segment warrants increased support.

Program	Total Budget (Split between the EDCs)	Eversource Budget	Outcome
Workforce Development	$2,000,000	$1,000,000	Approximately 60 participants statewide
Electrician Training	$300,000	$150,000	Approximately 1,000 trainees statewide

IX. Performance Incentive Mechanisms ("PIMs")

Q. What is the purpose of a PIM?

A. The purpose of a PIM is to better align the utility's regulatory and financial interests with the interests of the public. A PIM provides a regulated utility with a financial incentive to pursue an outcome aligned with a public policy objective, shared by regulators and key stakeholders, which typically falls outside of the utility's core service obligations and may be uneconomic or impractical for the utility to pursue otherwise. A PIM may also provide a utility with an incentive to drive outperformance in areas that are related to its core business.

The Company is proposing a PIM with the goal of controlling the cost of EVSE deployment.

Q. What PIM is the Company proposing?

A. The Company proposes one Cost Containment PIM. The Cost Containment PIM is comprised of two independent metrics: (1) L2 EVSE Cost Containment; and (2) DCFC Cost Containment.

Q. Please provide an overview of the Company's PIM proposal.

A. The Company proposes one PIM consisting of a total of two metrics.

Table _: Summary of PIM

PIM	Description	Metric
Cost Containment	• Minimize ratepayer cost per port • Maximize EVSE enabled • Share savings with customers	L2 Cost Containment: $[(Cost\ Target\ per\ L2\ Port - Actual\ Cost\ Per\ L2\ Port) * (Ports\ Enabled) \times 30\%]$
		DCFC Cost Containment: $[(Cost\ Target\ per\ DCFC\ kW - Actual\ Cost\ Per\ DCFC\ kW) * (kW\ enabled) \times 30\%]$

Q. What are the Department's criteria for evaluating PIMs?

A. The Department set forth its standard for evaluating a proposed incentive mechanism in D.P.U. 18-150. The Department uses a two-prong test to evaluate whether an incentive mechanism is appropriate: (1) whether the PIM satisfies certain threshold principles; and (2) whether the PIM meets the design guidelines. D.P.U. 18-150, at 120. For the first prong, the PIM must first be found to meet the threshold principles that: (1) it advances specific public policy goals; and (2) the affected activity is clearly outside a distribution company's public service obligations. If the PIM meets the threshold principles, the Department will evaluate whether the proposed incentive mechanism meets the second prong design guidelines, where the incentive mechanism must: (1) be designed to encourage program performance that best achieves the Commonwealth's energy goals; (2) be designed to enable a comparison of (i) clearly defined goals and activities that can be monitored, quantified, and verified after the fact to (ii) the cost of achieving the target to the potential quantifiable benefits; (3) be available only for activities where the distribution company plays a distinct and clear role in bringing about the desired outcome; (4) be consistent across all electric and gas distribution companies, where possible, with deviations across companies clearly justified; (5) be created to avoid perverse incentives; and (6) ensure the distribution company is not rewarded for the same action through another mechanism. D.P.U. 18-150, at 121.

Q. Please describe the proposed Cost Containment PIM.

A. The Cost Containment PIM will establish cost targets for the Public and Workplace, MUD, and Fleet charging station offerings within the Phase II Program to identify the expected cost to achieve a given outcome. In the case of L2, a cost per port, and in the case of DCFC, a cost per kW enabled are proposed. Based upon the Company's actual port and kW deployments, the PIM will calculate any savings against the cost targets and allow the Company to retain a 30% share of those savings as an incentive while the other 70% of the savings will be benefits for customers. Finally, the Company is proposing limits regarding minimum and maximum earnings potential. The Company proposes that it must reach at least 75% of the total L2 port enabled target for the Public and Workplace, MUD, and Fleet offerings, or roughly 6,200 L2 ports, and for DCFC approximately 20,000 kW installed (roughly 114 175kW stations). In addition, the Company proposes to cap the total cost containment incentive at $7 million over the term, or roughly 3.6% of the proposed Phase II Program budget.

Q. What are the benefits of the Cost Containment PIM?

A. The Cost Containment PIM will encourage in a more cost-efficient program with lower costs and bill impacts for a given level of charging deployments. Given the still early stage of the EV market, there are likely areas of cost reduction potential the Company will be able to find if it is highly motivated to discover and pursue them. A cost containment incentive has been proposed and reviewed previously in D.P.U. 18-150.[85]

[85] D.P.U. 18-150 at 126.

Q. Please describe the method for measuring the two Cost Containment metrics.

A. The Company is currently required to perform annual cost recovery filings for the Phase I Program. In future cost recovery filings, the Company will use the program costs and outcomes for L2 ports and DCFC kW enabled to determine program savings. Any project level utility-side make-ready, or customer-side make-ready for L2 or DCFC projects will be applied to their respective outcomes. Any projects installing both L2 and DCFC will use appropriate methods of allocating costs, if needed. The Company proposes the PIM as a one-time measurement done at the end of the Phase II Program.

Q. Please describe the proposed cost targets and how they were established.

A. The Company is proposing a method to determine the cost per L2 port and cost per kW target that reflects the total of utility-side make-ready, and customer-side make-ready. For L2 ports, the Company proposes to use the average cost of Company support per L2 port from the Phase I program for utility-side and customer-side make-ready work. For DCFC, the Company proposes to use vendor quotes and support from the Phase I program per kW installed for utility-side make-ready, customer-side make-ready. The Company expects final historical cost targets to be calculated after the Phase I program is complete.

Q. Please describe the actions the Company may take to achieve Cost Containment PIM goals.

A. While the Company always works to be judicious with costs, an incentive allows additional dedication of resources to drive novel or effort-intensive opportunities to create customer value. The Cost Containment PIM will incentivize the Company to manage each type of cost. To minimize utility-side make ready, the Company will restrict program support to

overly expensive service upgrades, and work with site hosts to find locations for EVSE that minimize costs while retaining locational value for EV drivers. For customer-side make-ready costs, the Company will be judicious in approving above average financial support levels and will strive to reduce costs per port installed. Finally, because the incentive scales with the number of installations and amount of cost savings, the Company will strive to be maximally efficient in program administration, supporting as many projects as possible within the program budget.

Q. Does the proposed Cost Containment PIM meet the Department's criteria for PIM proposals?

A. Yes. The Phase II Program advances the specific public policy goal of electrifying transportation to improve societal and environmental outcomes. In its D.P.U. 18-150 Order, the Department found that a charging station cost containment PIM generally meets the threshold principles but noted the need to use actual costs in determining cost targets.[86] The Company has now filed three years' worth of cost recovery information and has used that data to develop the proposed cost targets.

The proposed Cost Containment PIM also meets all the Department's design principles for evaluating PIM proposals, as it supports the Commonwealth's clean energy goals by supporting access to clean transportation ownership and operation; can be clearly monitored, quantified, and verified; demonstrates the Company's clear and distinct role to facilitate, interconnect, and plan for EV charging; and does not lead to double collecting of

[86] D.P.U. 18-150, at 85-87, 125-127.

incentives (i.e., the Company is not otherwise rewarded or incentivized to reduce such costs.

Q. Did the Company perform a net benefit analysis for the Cost Containment PIM?

A. No, the two metrics are designed to allow the Company to earn an incentive for maximizing budget efficiency and EVSE deployment, the incentives are based on actual savings delivered to customers rather than an estimate of net benefits.

Q. How does the Company propose to report on PIM performance results and what process is proposed for Department review and confirmation of these PIM targets being achieved?

A. The Company proposes to report on PIM performance results in the cost recovery filings. Once the cost and performance targets are finalized, the Company can include an assessment in each Phase II Program cost recovery of the calculated savings against the cost targets.

X. Resources Needed for Program Implementation

Q. What resources did the Company include to implement the Phase II Program?

A. In order to successfully implement the Phase II Program, the Company is proposing to include the following necessary resources: Company Staffing, Information Technology, Marketing and Outreach, Program Management, and Evaluation. The Company is filing Exhibits ES-KB-2, ES-KB-3 and ES-KB-5 that describe the program implementation budget estimates, including marketing, Company staffing, IT investments, and program evaluation.

Company staffing ("FTEs"[87])

Q. What are the Company's proposed staffing needs?

A. The Phase II Program expands the Company's existing EV offerings, requiring additional staffing resources. The Company is proposing 12.0 incremental FTEs, as outlined in Exhibit ES-KB-5. The estimated cost of all incremental FTEs for the duration of the Phase II Program is ~$10M in labor cost.

Information Technology (IT)

Q. What IT resources has the Company included in the budget for the Phase II Program?

A. The Company is filing Exhibit ES-KB-2 that includes the budget for Information Technology (IT) for the following purposes:

1. Investment in a workflow management platform to manage customer applications to the Public and Workplace, MUD, and Fleet segment offerings and track and document program deployment progress. The Company estimates $220,000 over the term of the program.
2. The Company is requesting $60,000 for IT staff time required to help evaluate RFPs and support administration of the residential 1-4-unit offerings, as those offerings expect to use customer data to help administer rebates.

Q. Why are the investments in IT resources necessary for the Phase II Program?

A. The Phase II Program has ambitious targets for the number of EVSE ports installed. In addition, the number of Company staff required to administer the program will increase. Investment in the software will allow the Company to efficiently scale its administration of the program, improve customer experience, improve data management, and enable workflows that better support the larger project management team required for such an

87 Full time equivalent.

effort. While the Company may continue to leverage Excel-based tracking for some elements of the Phase II Program, there is a need for a more robust, secure system to improve administration efficiency and effectiveness and the customer experience.

XI. Marketing and Outreach

Q. Please describe the Company's proposed approach to Marketing and Outreach.

A. The Company is proposing a Marketing and Outreach Plan to drive awareness of and participation in the proposed EV offerings, including new customer offerings among residential, commercial, and fleet customers through targeted outreach and communications. Consumer education pertaining to electric vehicle charging continues to be a barrier, making a dedicated Marketing and Outreach Plan a vital component of the proposal and the success of each program to meet participation targets.

The Company's communication channels have a reach throughout its service territory, and the Company communicates with customers regularly through a variety of channels including bills, home energy reports, email, social media, billboards, digital, print and radio media serving as a trusted advisor for their energy needs. The Company proposes that it leverage these capabilities to execute a Marketing and Outreach Plan that will: empower residential and commercial customers to make informed decisions about the benefits of installing EV charging stations for home, business or public charging; highlight opportunities to accelerate fleet electrification; and increase access to charging among LI/EJC customers.

In addition to traditional marketing and outreach techniques, the Company intends to leverage existing and future community and stakeholder relationships to target hard to reach customers, underserved and overburdened populations, as well as other customer segments. Working with municipalities, state agencies, CAP agencies/local non-profit organizations, the Chambers of Commerce, the EVSE installer network, car dealerships, etc., the Company will be able to expand its reach and ensure customers are aware of the resources available to them. The Company also plans to utilize existing points of contact with customers, such as those through the Energy Efficiency programs, to co-market programs, maximize reach and customer experience, and lower costs.

Q. Why is a Marketing and Outreach Plan necessary?

A. The Marketing and Outreach Plan will enable the Company to meet the ambitious port and fleet vehicle targets of the Phase II Program. Phase II introduces EV offerings for new customer segments, including 1-4 unit Residential customers, and fleet customers, and expanded offerings for EJC/LI customers, and new program elements including EVSE and networking rebates, and rebates for primary metered customers.

Lessons learned from the Phase I Program Evaluation have helped inform the Marketing and Outreach Plan. These lessons include:

- Marketing and outreach should be targeted and customized to specific customer segments, especially traditionally hard to reach segments like large MUDs
- Site host and EVSE visibility can increase customer awareness of the availability of EVSE
- Awareness of EVSE incentives can be primary driver of site host recruitment success

These lessons learned support the importance of Marketing and Outreach in driving the success of the Phase II Program.

Q. How will the Company develop the Marketing and Outreach Plan?

A. The Company will work with an advertising agency, informed by findings from currently offered programs, communication to internal EV/Energy Efficiency teams, and external partnerships to develop a Marketing and Outreach Plan that will:

- identify and prioritize residential customers who are likely to install charging infrastructure in their homes;
- perform dedicated outreach to targeted environmental organizations, non-profits, state agencies, and consumer advocacy groups to ensure the Company is reaching LI/EJC customers and appropriate stakeholders across the jurisdiction;
- identify and prioritize consumer and site host benefits for EV charging accessibility and increase site hosts' familiarity with EV charging as an amenity for employees, customers, tenants, or visitors;
- identify corporate parties and commercial customers that may benefit from fleet electrification and on-premises charging;
- develop messages that highlight the Company's charging infrastructure and fleet offerings and deliver them through multiple channels, listed below, and direct communication to internal teams and external partners:
    - Company channels (website, social media, bill inserts, call centers, sales team)
    - Partner channels (EVSE vendors, local auto dealers and automakers, and trade groups)
    - Press coverage
    - Purchased media
    - EV advocacy groups
    - Site host communication and engagement.

The Company will leverage existing marketing and outreach efforts (such as within EE, municipal programs, etc.) to increase uptake, lower costs, and provide a streamlined

customer experience. The Company proposes the above-mentioned foundational tactics will be refined with the advertising agency using data derived from research with input from the partners prior to any campaign launch.

Q. What are the estimated costs of the Marketing and Outreach Plan?

A. The Company estimates the cost of the Marketing and Outreach Plan to be approximately $10,132,000 (or approximately 5.0% of the total proposed Phase II Program budget). The Company identified similarly themed awareness and participation campaigns to establish costs for the Marketing and Outreach Plan.

XII. Program Management

Q. Is flexibility important in managing the Phase II Program?

A. Yes, to meet the needs of our customers and to be positioned to respond to the evolving transportation market, the Company is requesting flexibility to adjust our spending and the details of our offerings over the four-year term of the Program. To meet the ambitious goals of the Commonwealth through a market and customer-driven program, the Company is requesting the ability to move funds within and between program segments. This will enable the Company to optimize its strategy in real time. Specifically, we are proposing the flexibility to move funding, without prior approval, between offerings within the program segments and move up to 20 percent of the Phase III Program funds from one program segment to another. To ensure the needs of customers are being met given the quickly evolving market and to enable the Company to effectively support the Commonwealth's transportation electrification goals in an agile manner, the Company also

proposes to have the flexibility to adjust components within the offerings, including incentives and rebate levels, customer eligibility requirements, and the distribution of port types.

Q. Is the Company considering any mid-term review of the four-year Phase II Program?

A. Yes, to address more substantive changes, the Company is interested in having the flexibility to initiate a mid-term review at the end of the second year of the Program. During this review, substantial modifications could be proposed with supportive justification and evidence. Program modifications that could be considered include, but are not limited to, EVSE ownership models, pilot program scale and scope, and program administration costs and considerations.

XIII. Program Evaluation

Q. How will the Company evaluate the Phase II Program?

A. The Company proposes to implement a comprehensive evaluation of the Phase II Program, assessing its impacts and, where possible, drawing conclusions on their effects on EV adoption. The Company will hire an independent, third-party evaluation expert to complete this work. Upon selection of the vendor, a detailed evaluation workplan will be completed to clarify the researchable questions and the evaluation methods to be utilized.

Q. What will be the objective of the evaluation?

A. The overall goal of the evaluation will be to characterize the Phase II Program implementation and to assess the effectiveness of its offerings. The evaluation will be

conducted over a four-year program period. The evaluation will be focused on, but not limited to:

- tracking, documenting, and assessing program performance, and participation;
- understanding the experiences of participating customers in each of the program components;
- assessing barriers to non-participants, and identify opportunities to engage them;
- characterizing the experiences of low-income customers and other disadvantaged groups within each program (see additional details below);
- evaluating accessibility of charging stations for customers across the Company's territory;
- studying how program incentives, rebates and funding sources affect the adoption of EV charging stations and fleet vehicle conversion;
- identifying program barriers and barriers to electric fleet vehicle adoption; and,
- determining how program elements affect customers' charging behaviors at home, in public, and at workplaces.

Q. How will the Program impact on LI/EJC customers be evaluated?

A. The research will evaluate equity considerations with respect to the Phase II Programs by characterizing the efforts to reach and serve low-income and other disadvantaged customers. The study will assess program performance and participation and identify barriers to deploying charging stations for electric vehicles and electric fleet vehicles in EJCs, as well as the experiences of LI/EJC customers served by the Residential Program. The evaluators will conduct special outreach efforts for EJCs and low-income customers as needed to ensure diverse voices are heard; these efforts may include mixed-mode surveys, in-depth interviews with CAP agencies and municipal partners, and interviews or surveys with income-eligible owners and property managers.

Q. What type of tasks will be performed in the evaluation of the Phase II Program?

A. Evaluation activities may include : (1) periodic surveys of a broad or targeted sample of Eversource customers, both residential and non-residential; (2) pre- and post-surveys of residential and commercial customers who frequent residential charging stations and site host facilities; (3) surveys or interviews of participating and non-participating site hosts; (4) the collection and analysis of program and charging data; and (5) in-depth interviews with program and support staff, external stakeholders, market actors, and industry experts as needed.

Q. What type of reporting will occur?

A. Evaluation results will be shared with the program team as they are completed in order to inform ongoing program improvement. The evaluation will cover the four-year term of the

programs. After each year, an annual report will be produced summarizing evaluation results. After the conclusion of Year 4, a final evaluation report will be completed in the months following the programs' completion.

Q. What is the proposed budget for evaluation?

A. The Company has budgeted approximately $2,000,000 of program costs to fund evaluation efforts. Actual evaluation expenses may be higher or lower.

Q. Will the Company remain flexible during the evaluation?

A. Yes, as needed over the course of the four-year program, the Company will coordinate with the independent evaluator to develop or modify research tasks to characterize the effects of the program and identify areas of continued process improvement.

XIV. Cost Recovery

Q. What is the Company's proposal regarding cost recovery of the proposed Phase II Program?

A. Please see the testimony of Robert W. Frank for the Company's proposal regarding cost recovery.

XV. Conclusion

Q. Does this conclude your testimony?

A. Yes, it does.

Eversource Multi unit Dwelling Incentives

Residential Segment Estimated Outcomes and Budget

Offering	Budget ($M)	Outcome
1-4-unit Properties		
Residential Make-Ready Rebate	$11.2	16,000 ports enabled.
Charger Rebate	$3.8	
LI/EJC Offering	$6.2	
Vendor-Based AdministrationCosts	$2.1	
5+ Unit Properties (MUDs)		
Utility-side Make-ready	$15.2	2,170 ports enabled.
Customer-SideMake-ready	$6.5	
EVSE Rebates	$5.3	
NetworkingIncentive	$1.0	
20+ Unit Properties		
EV Ready SitePlans	$1.2	200 EV Ready SitePlans
Total Residential Program		

Total	$52.7	

Overview of Residential Segment Offerings

Offering	Description
1-4-Unit Properties	
Residential Make-Ready Rebate	Reduces the costs associated with residential make-ready and EVSE installation in a customer's driveway or garage. Up to $700 for customers in 1-unit properties, and up to $1,400 for customers in 2-4-unit properties, not to exceed actual costs. Enrollment in a managed charging program is required to take advantage of this rebate.
Charger Rebate	Reduces the cost of purchasing managed charging capable EVSE. Up to $300 per customer towards the cost of a managed charging capable L2 EVSE, not to exceed actual costs. Enrollment in a managed charging program is required to take advantage of this rebate.
LI/EJC Offering	Increased financial support and turnkey assistance for qualifying customers. No-cost managed charging capable L2 EVSE and residential make-ready up to $1,700 for customers in 1-unit properties and up to $2,700 for customers in 2-4-unit properties, not to exceed actual costs.
5+ Unit Properties (MUDs)	
Support for utility-side infrastructure	100% of actual costs (with the right of the Company to deny program support to high-cost projects)
Support for customer-side infrastructure	Up to 100% (with the right of the Company to approve support up to 150% of the average cost per port on a case-by-case basis)

Five or More Unit Offerings (MUDs)

Q. Please describe the MUD Make-Ready offering.

A. The Company proposes a make-ready offering to serve MUDs with 5-or-more residential units. The program will be a revised and significantly expanded version of the Phase I Program for this segment. The program will provide support in line with the Public and Workplace offering. As in the Phase I program, Eversource will install the "utility-side Infrastructure," and contract with third-party electrical contractors to install behind-the-meter "customer-side Infrastructure." Specifically, the EV infrastructure that Eversource is installing includes the following: (1) distribution primary lateral service feed; (2) necessary transformer and transformer pad; (3) new service meter; (4) new service panel; and (5) associated conduit and conductor necessary to connect each piece of equipment.

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[78] The Company estimates 100% of customers who obtain a Charger Rebate to also obtain a Charging Readiness Rebate. If a customer receives an Equity Group rebate, they are not eligible for neither the Charger Rebate nor the Charging Readiness Rebate.

While the process of installation will remain the same for all customers, in contrast to the Phase I program, upon completion of installation, the customer will retain ownership of the "customer side infrastructure".

To enable larger port deployments per site, the Company will increase the standard use case as described in the Public & Workplace program offering to support up to 20 L2 ports at MUD customer locations.

The MUD offering will cover 100% of the costs for utility-side make-ready work with the Company retaining the right to review and deny program support for high-cost projects.

The MUD offering will cover up to 100% of average costs per port for customer-side make-ready work, but not more than actual costs, with the ability for the Company to approve up to 150% of the average cost per port on a case-by-case basis.

The program will also provide financial support for qualified EVSE and EVSE installation and activation costs, budgeted at $4,000 per L2 port for MUDs located in EJCs and $2,000

per L2 port for all other MUDs, but not more than actual costs. These financial support levels reflect an $8,000 dual-port station purchase and installation cost benchmark ($4,000 per port) and the program funding 100% of the cost per port for sites in EJCs and 50% of the cost per port for all other MUDs. Actual rebates offered may vary over time as the station price benchmark changes and based upon the availability of third-party funding and customer interest in program. The Company will offer these rebate levels on all qualified EVSE installed at MUDs and does not propose any site-level caps on program funding at

this time. Customers choosing qualified networked EVSE may also request support for networking costs. The Networking Stipend will cover up to $120 per port per year for fouryears. Combined, the program's financial support is estimated to cover 85% of average infrastructure and EVSE installation costs and likely 100% for EJC sites.

Q. Please describe the EV Ready Site Plan offering.

A. To help larger MUDs gain comfort with installing EVSE, reduce costs, and plan for future EVSE growth, the program will offer financial support for EV Ready Site Plans. EV Ready Site plans will create a plan for the infrastructure, EVSE, and charging management practices required to provide at least one EVSE per parking spot per housing unit located on the property (or 100% of resident parking spaces if there are fewer parking spaces than housing units). EV Ready Site Plans will be created by qualified charging station installers or electricians and will adhere to a set of minimum requirements regarding their contents and the cost-saving approaches considered, including a description of the property, number of units, number parking spots, type of parking (e.g., shared or assigned), and existing electric service type and remaining capacity; approaches to managing on-site EV

loads to

minimize infrastructure costs, sometimes referred to as EV Energy Management Systems;

types of EVSE considered and why they are appropriate for that site, and recommendations

regarding phased implementation approaches (e.g., "install infrastructure for these 20

parking spaces first"). Interested MUD properties with twenty or more housing units are

eligible to do an EV Ready Site Plan. The Company expects to contribute up to **$6,000 per**

EV Ready Site Plan and has budgeted for 200 plans over four years.

Q. How will the EV Ready Site Plans support the MUD Make-Ready offering?

A. The EV Ready Site Plans will have three primary benefits. First, they will generate interest in the program for larger properties. By having a plan in place, decision makers can become comfortable with the investments and changes required (i.e., parking management, costs and pricing of station use, etc.) which will spur interest in the make-ready program.

. Second, the site plans will allow the Company to authorize greater investments in make-ready infrastructure For MUDs with EV Ready Site Plans, the program will allow infrastructure work to support additional EV ready parking spots (beyond any parking spots installing EVSE) in accordance with their plan. In practice, this will typically mean installing additional conduit, **sizing the service or electric panel differently toanticipate future load growth**, and potentially supporting on-site EV-related energy management systems, such as power-sharing EVSE. The Company estimates the make-ready costs for these incremental ports enabled to be lower due to the economies of scale of larger make-ready projects, offsetting the net costs of offering EV Ready Site Plans.[79]

Third, the Company expects site plans to help potentially reduce utility-side infrastructure costs through the use of EV energy management systems, such as power sharing between EVSE or devices that support power sharing between EVSE and the rest of the property.

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[79] *Estimating EV charging infrastructure costs across major U.S. metropolitan areas*, International Council on Clean Transportation, August 2019, Table 3, at 3. https://theicct.org/publications/charging-cost-US.

This is particularly important for MUDs as the long-term expectation for EVSE growth is high and on-site load constraints will be prevalent.

Q. How did the Company size the MUD offerings?

A. The MUD offerings are sized to support up to 2,200 L2 ports enabled at approximately 110 sites over four years Support for MUDs will follow the design of the Public and Workplace Segment described earlier and build upon the lessons learned from the Phase I Program. In summary, MUDs will receive financial support to cover 100% utility-side costs, up to 100% of average customer-side make-ready costs, 100% of typical EVSE costs for sites in EJCs and 50% of EVSE costs for all other MUDs, and the Networking Stipends where requested.

Cloverleaf Affordable Housing Project

Energy Scorecard in response to Truro Energy Committee 7/27/2020 Recommendations

as of 12/2/2020

Energy Committee Recommendations	Planning	Execution	Comments/Observations re Developer
1A. Provide an Energy Efficiency and Sustainable Design plan with the Town Building Permit application.	Good	TBD	To Be Determined (TBD). Has enlisted passive house consultation for overall design.
1B. Provide a rooftop solar energy system cost-benefit analysis with the Town Building Permit application.	Very Good	TBD	Reports that solar will be part of initial design.
1C. Perform a sensitivity analysis using a gable roofs design.	Very Good	TBD	Reports gable roofs to be used for smaller units and flat roof for main bldg to accommodate solar panels.
2. Install internal electric conduits and design roofs for solar energy system development.	Very Good	TBD	Reports that solar will be part of initial design.
3. Provide independent unit metering to incentivize tenant energy conservation. Meter solar production independently.	Good	TBD	TBD. Reports this feature as under consideration.
4. Pursue a fossil-fuel-free project via HVAC electric "mini-splits" for each individual unit.	Excellent	TBD	Pursuing grants to utilize HVAC mini-splits.
5. Pursue a fossil-fuel-free project via electric heat pump water heaters.	Fair	TBD	Evaluating but still considering propane.
6. Provide an electric vehicle (EV) charging system design with the Town Building Permit application. Pursue installing UG infrastructure for charging no less than ten vehicles.	Good	TBD	Reports a plan to provide several EV stations. Interface with utility not yet made.
7. Participate in Truro's Green Community energy usage tracking program.	Good	TBD	Is amenable to participation.
OVERALL TO DATE	Is investing favorable efforts into the recommendations which can lead to auspicious goals in final implementation.		

MtCO2e

https://www.massenergyinsight.net/reports/view/4265310

FY	2020	base 2021	2030	2040	2050	Notes
Target from 2021			-50%	-75%	-100%	
DPW	46	43	22	11	0	
Library	33	37	19	9	0	
Public Safety	67	66	33	17	0	
School	88	126	63	32	0	
Town Hall	45	47	24	12	0	
Community Center	36	29	15	7	0	
Vehicles	295	270	135	68	0	To be segmented more
All Other						Streetlights, small bldgs, etc.
TOTAL	**610**	**618**	**309**	**155**	**0**	