



Why should Wellesley adopt the Opt-in Energy Code?

Presentation to Wellesley Housing Task Force

February 8, 2023



Town of Wellesley

Climate Action Plan

February 2022

- Introduction
- Greenhouse gas emissions goals
 - Reducing GHGs in buildings
- Article 36
 - Spring 2023 Annual Town Meeting
- Opt-in Energy Code
 - What is it?
 - Fiscal, environmental, health benefits

Why adopt the Opt-in Code?

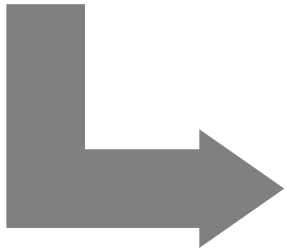
- Necessary for meeting GHG emissions goals
- Helps us stop digging the fossil fuel “hole”
 - New construction only
- All-electric generally cheaper to build
- Helps avoid costly future retrofits
- Promotes
 - Healthier, more comfortable indoor environments
 - Greater resilience (especially with Passive House)

Wellesley GHG emissions reduction goals set by Town Meeting in 2021



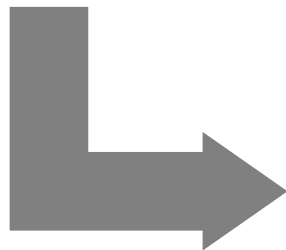
50%

- Reduction by **2030**
 - Compared to 2007 levels



75%

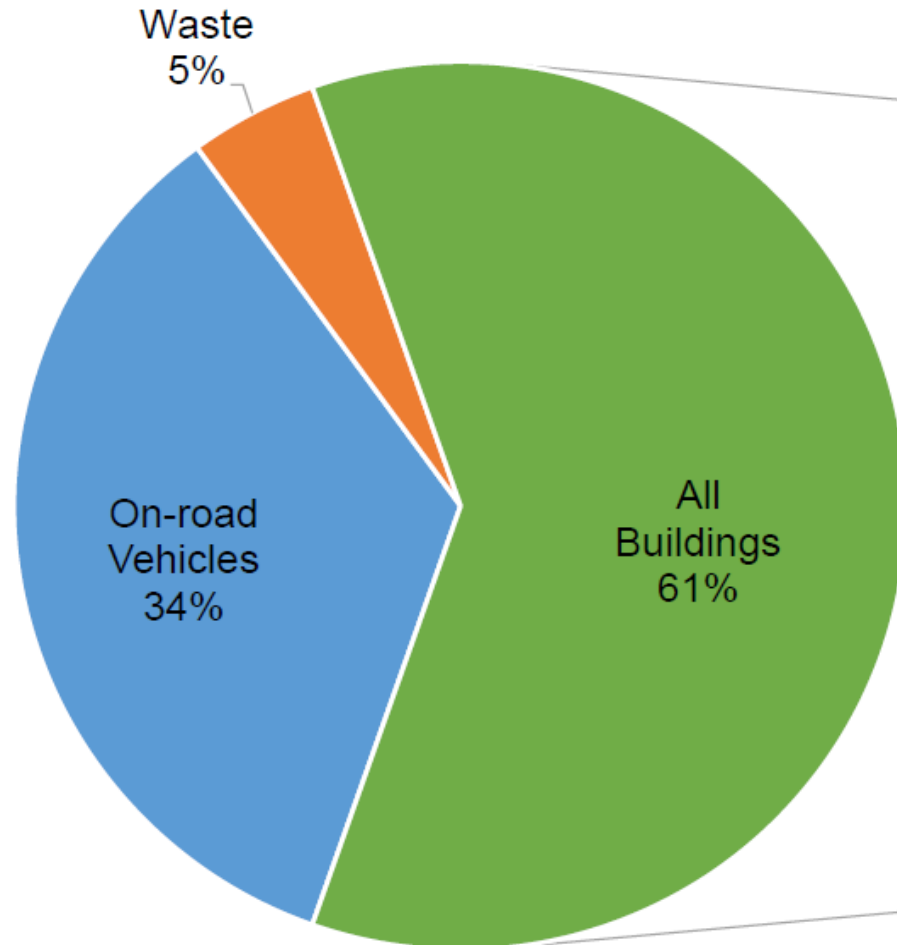
- Reduction by **2040**
 - Compared to 2007 levels



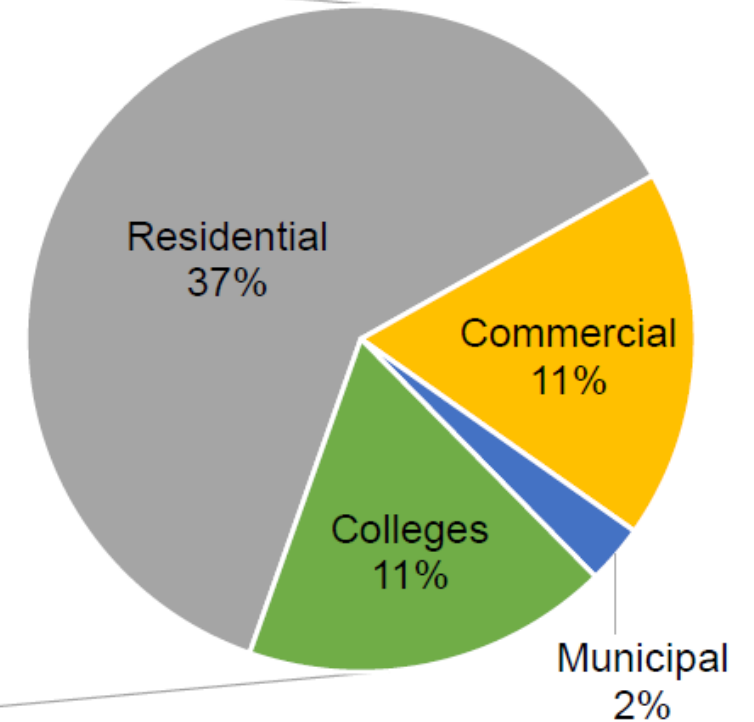
Net Zero

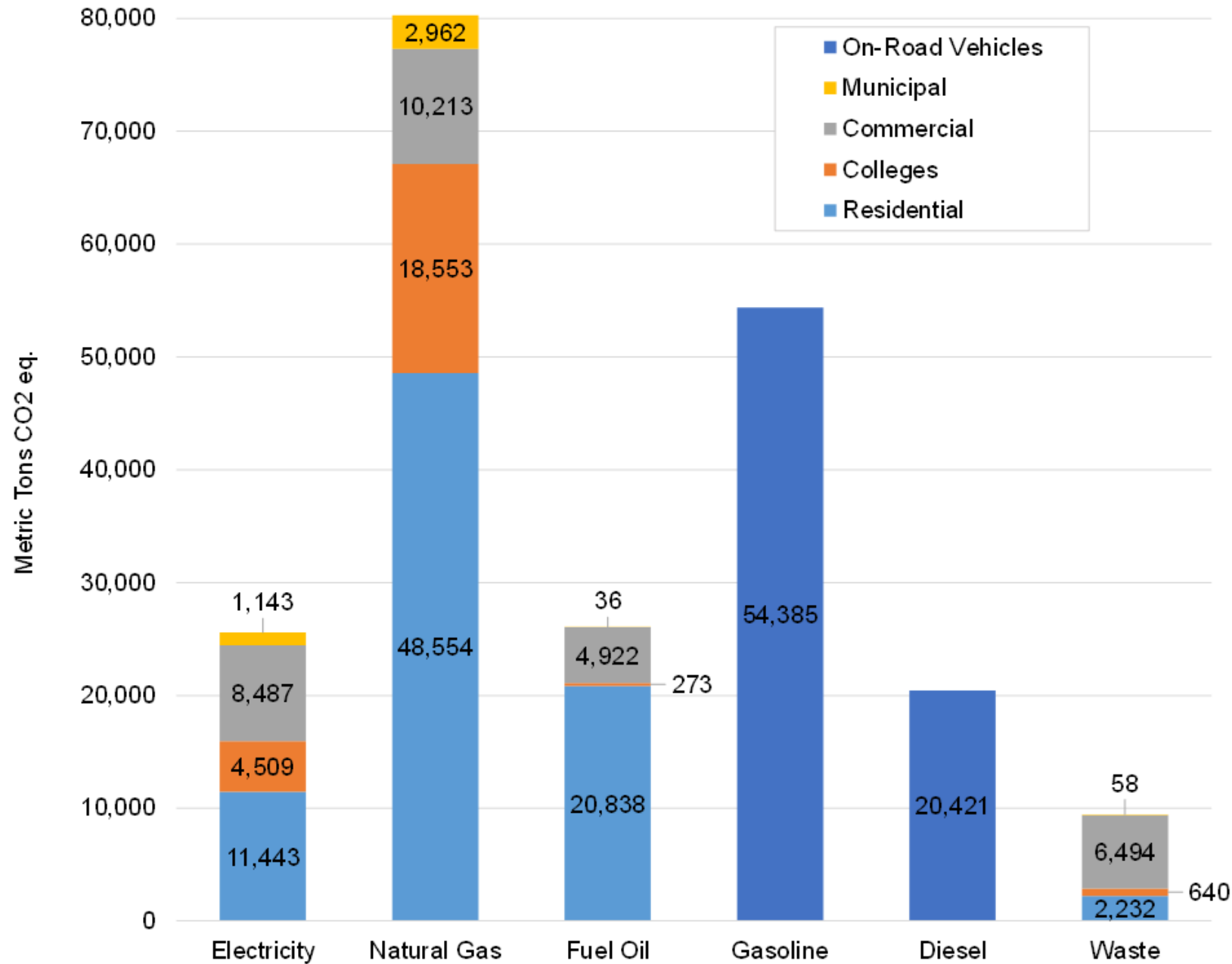
- Reduction by **2050**

Our largest sources of emissions: Buildings and transportation



**Building Emissions
by Sector**





Buildings:
our largest
emissions
source



Steps to Net Zero Buildings by 2050

- 1) Minimize energy use/increase energy efficiency
- 2) Electrify
- 3) Power with renewables



Building Energy Code

Annual Town Meeting 2023 Article 36

Co-sponsored by Select Board and Climate Action Committee



- **ARTICLE 36.** To see if the Town will vote to adopt the Municipal Opt-in Specialized Code, so called, by accepting the provisions of 225 CMR 22, Appendix RC and 225 CMR 23, Appendix CC, with such acceptance to take effect on January 1, 2024; or to take any other action in relation thereto.

(Climate Action Committee/Select Board)

- **MOTION:** That the Town hereby adopts the Municipal Opt-In Specialized Code, effective January 1, 2024, as set forth in the provisions of 225 CMR 22, Appendix RC and 225 CMR 23, Appendix CC.

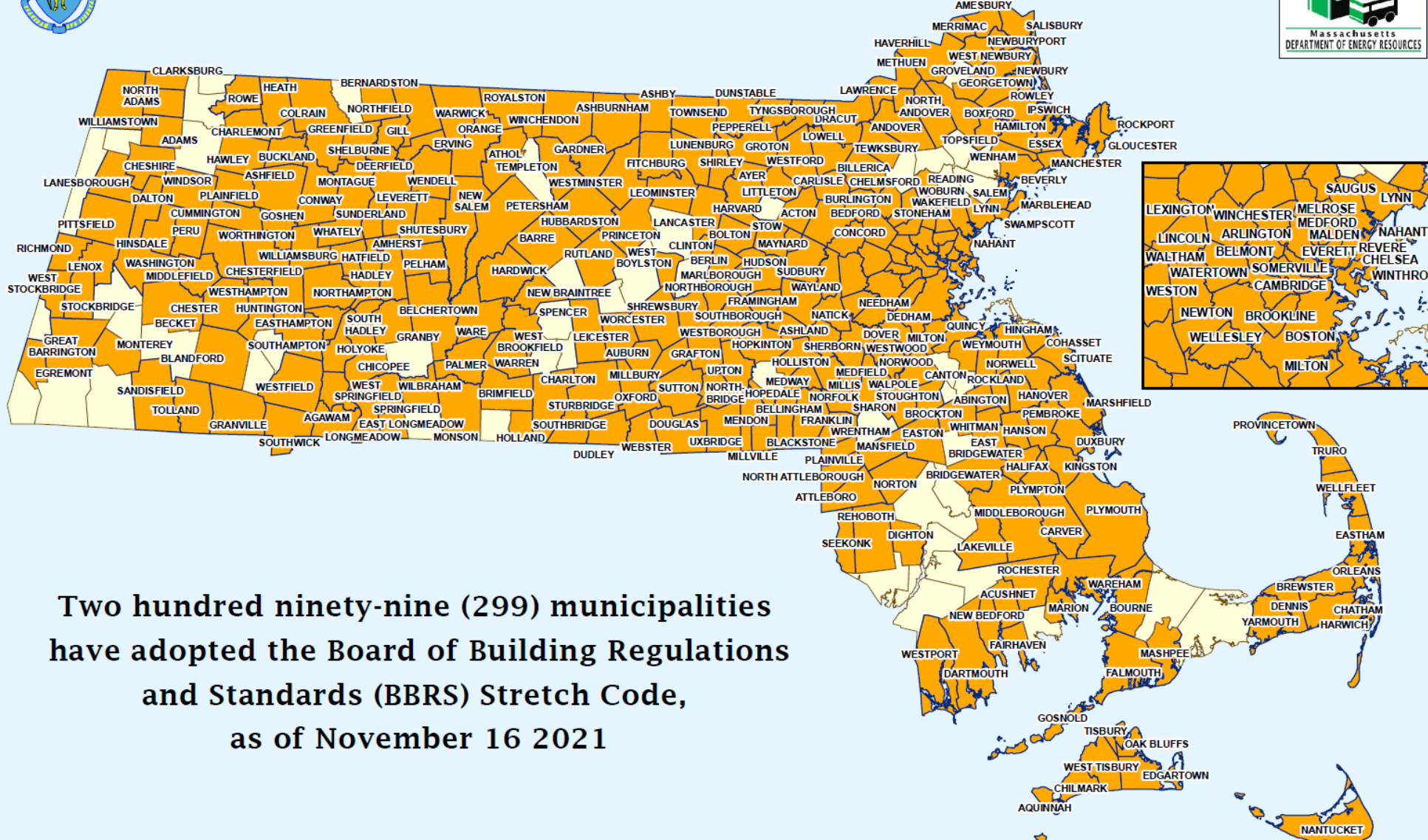
Stretch Code: Continuous Improvement in Building Efficiency



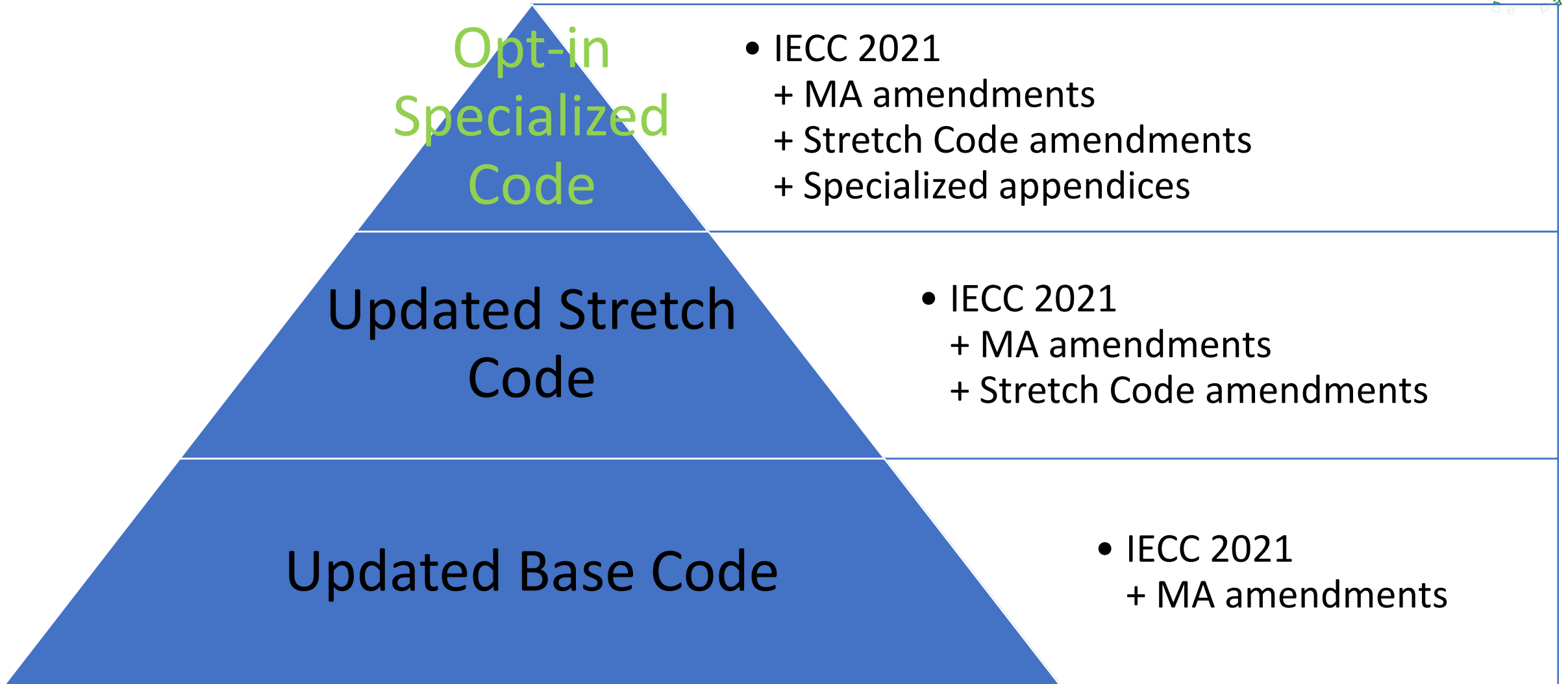
- 2009
 - Stretch Code created
 - 20-35% greater efficiency over Base Code
- 2011
 - Wellesley adopts Stretch Code
- 2021
 - Climate Act 2021
 - DOER established as Stretch Code authority
- 2022-3
 - Updated energy codes issued by DOER
 - ATM article co-sponsored by Select Board, Climate Action Committee



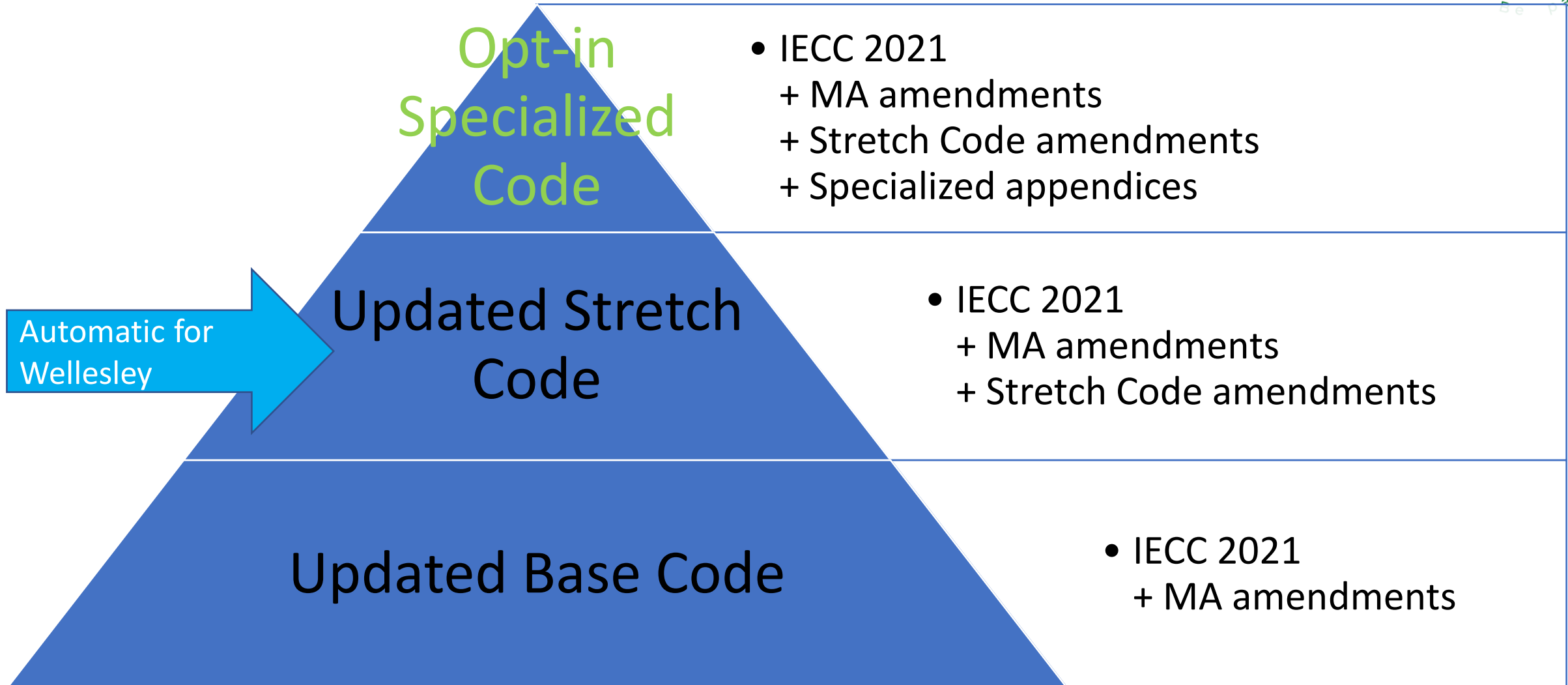
Stretch Code Adoption, by Community



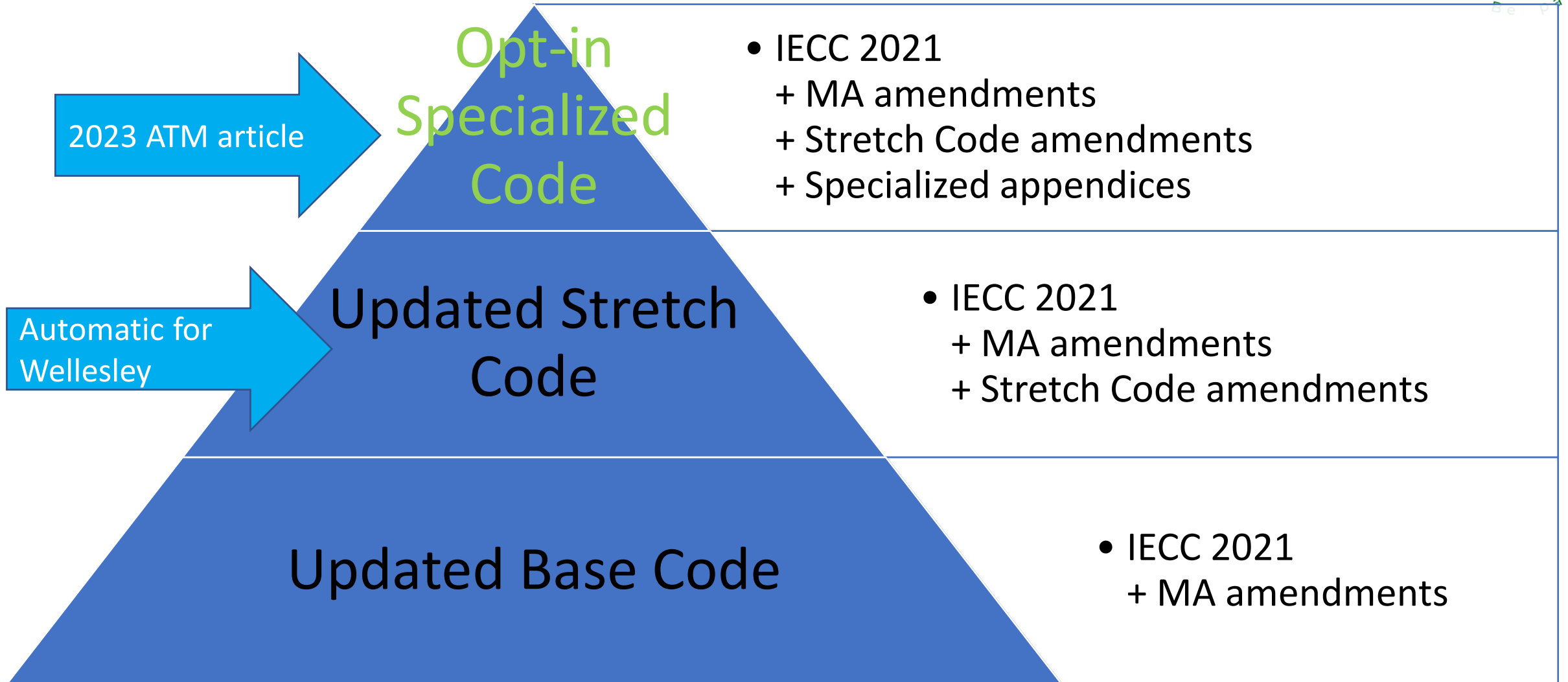
Codes that “build” on each other



Updated Stretch Code automatically applies



Opt-in Code: 2023 ATM article





Details on the Opt-in Specialized Code

- Applies ONLY to NEW construction
 - Not renovations or additions
- Consistent with emissions reduction goals
 - For the State of Massachusetts
 - And the Town of Wellesley
- Adds requirements (depending on project)
 - Electric pre-wiring
 - Solar
- Provides multiple compliance options for builders



Updated Stretch vs Opt-in Specialized: RESIDENTIAL

Comparison of updated Stretch and Municipal Opt-in Specialized Energy Codes for New Low-rise Residential Buildings¹

Building Size	Fuel Type	Minimum Efficiency		Electrification		Minimum EV Wiring	Renewable Generation	
		<i>Stretch Code</i>	<i>Specialized Opt-in Code</i>	<i>Stretch Code</i>	<i>Specialized Opt-in Code</i>		<i>Stretch Code</i>	<i>Specialized Opt-in Code</i>
Dwelling units up to 4,000 sf	All-electric	HERS 45 ² or Passive House pathways	HERS 45 or Passive House pathways	Full	Full	1 parking space	Optional	Optional
Dwelling units up to 4,000 sf	Mixed-fuels	HERS 42 ² or Passive House pathways	HERS 42 or Passive House pathways	Optional	Pre-wiring required	1 parking space	Optional	Solar PV: ≥4 kW for single family and ≥0.75 W/sf for multi-family (except shaded sites and Passive House certified buildings)
Dwelling units >4,000 sf	All-electric	HERS 45 ² or Passive House pathways	HERS 45 or Passive House pathways	Full	Full	1 parking space	Optional	Optional
Dwelling units >4,000 sf	Mixed-fuels	HERS 42 ² or Passive House pathways	HERS 0 or Phius ZERO	Optional	Pre-wiring required	1 parking space	Optional	Solar PV or other renewables to meet the Zero energy building definition



Updated Stretch vs Opt-in Specialized: COMMERCIAL

Comparison of updated Stretch and Municipal Opt-in Specialized Energy Codes for New Commercial Buildings¹

Building Type	Fuel Type	Minimum Efficiency Pathway		Electrification		Minimum EV Wiring	Renewable Generation	
		Stretch Code	Specialized Opt-in Code	Stretch Code	Specialized Opt-in Code		Stretch Code	Specialized Opt-in Code
Offices and Schools >20,000 sf	All Electric	Thermal Energy Demand Intensity (TEDI) or Passive House pathways	Thermal Energy Demand Intensity (TEDI) or Passive House pathways	Full	Full	20% of parking spaces for residential and business uses, 10% for other uses	Optional	Optional
Offices and Schools >20,000 sf	Mixed-fuels	TEDI or Passive House pathways	TEDI or Passive House pathways	Optional ⁵	Pre-wiring required	20% of parking spaces for residential and business uses, 10% for other uses	Optional	On-site solar PV: Minimum of 1.5W/sf for each sq foot of the 3 largest floors <u>or</u> 75% of Potential Solar Zone Area
High Ventilation (Hospitals, Labs, etc.)	All Electric	TEDI, 10% better than 2019 ASHRAE Appendix G, or Passive House pathways	TEDI, 10% better than 2019 ASHRAE Appendix G, or Passive House pathways	Full	Full	20% of parking spaces for residential and business uses, 10% for other uses	Optional	Optional
High Ventilation (Hospitals, Labs, etc.)	Mixed-fuels	TEDI, 10% better than 2019 ASHRAE Appendix G ⁴ , or Passive House pathways	TEDI, 10% better than 2019 ASHRAE Appendix G ⁴ , or Passive House pathways	Optional ^{4,5}	Pre-wiring required	20% of parking spaces for residential and business uses, 10% for other uses	Optional	On-site solar PV: Minimum of 1.5W/sf for each sq foot of the 3 largest floors <u>or</u> 75% of Potential Solar Zone Area
Multi-family >12,000 sf	All Electric	TEDI, HERS 45 ² , Passive House pathways, or (until July 1, 2024) 10% better than ASHRAE Appendix G	Passive House pathways or HERS 0 ³	Full	Full	20% of parking spaces	Optional	Optional
Multi-family >12,000 sf	Mixed-fuels	TEDI, HERS 42 ² , Passive House pathways, or (until July 1, 2024) 10% better than ASHRAE Appendix G	Passive House pathways or HERS 0 ³	Optional ⁵	Pre-wiring required	20% of parking spaces	Optional	Optional with Passive House
Small Commercial (<20,000 sf, except multi-family)	All Electric	Prescriptive pathway plus Stretch Code amendments	Prescriptive pathway plus Stretch Code amendments	Full	Full	20% of parking spaces for residential and business uses, 10% for other uses	Optional	Optional
Small Commercial (<20,000 sf, except multi-family)	Mixed-fuels	Prescriptive pathway plus Stretch Code amendments	Prescriptive pathway plus Stretch Code amendments	Optional ⁵	Pre-wiring required	20% of parking spaces for residential and business uses, 10% for other uses	Optional	On-site solar PV: Minimum of 1.5W/sf for each sq foot of the 3 largest floors <u>or</u> 75% of Potential Solar Zone Area



Towns with known Opt-in plans

Arlington

Belmont

Boston

Lexington

Northhampton

Wellesley

Stowe

Sherborn

Cambridge*

Somerville*

Watertown*

Brookline*

Home rule petition municipalities



Brookline

Arlington

Cambridge

Lexington

Concord

Acton

Newton

Lincoln

Aquinnah

Boston – wait list

Salem – wait list

Somerville – wait list

Northampton – wait list

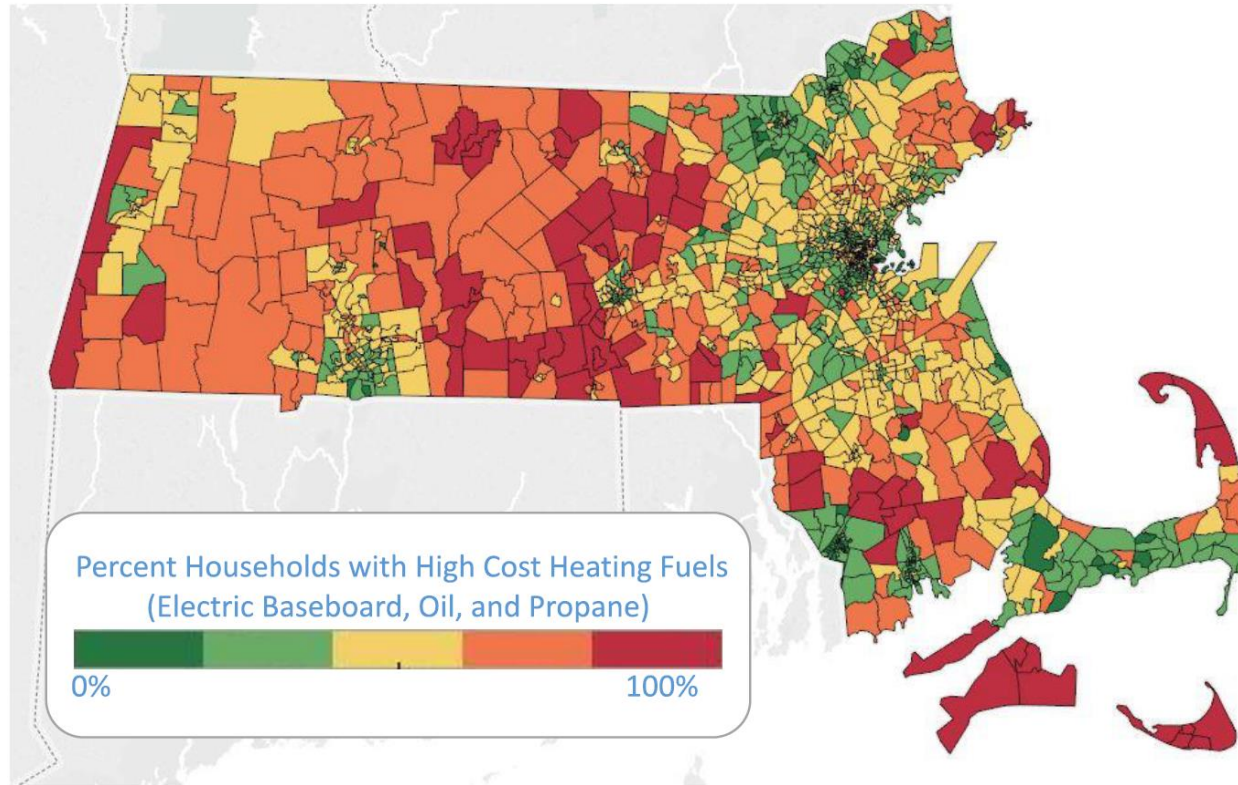


The USQ development at 10 Prospect St. is under construction in Union Square, Somerville. (Jesse Costa/WBUR)

Opt-in Code Buildings = cost effective

- Compared to conventional
 - Similar construction costs
 - Lower operating costs
 - Especially in municipal light plant towns
- All-electric
- Net zero and net zero ready
- Passive House

Energy Burden is an Important Factor for Low Income Households



$$\text{Energy Burden} = \frac{\text{Cost of Energy}}{\text{Household Income}}$$

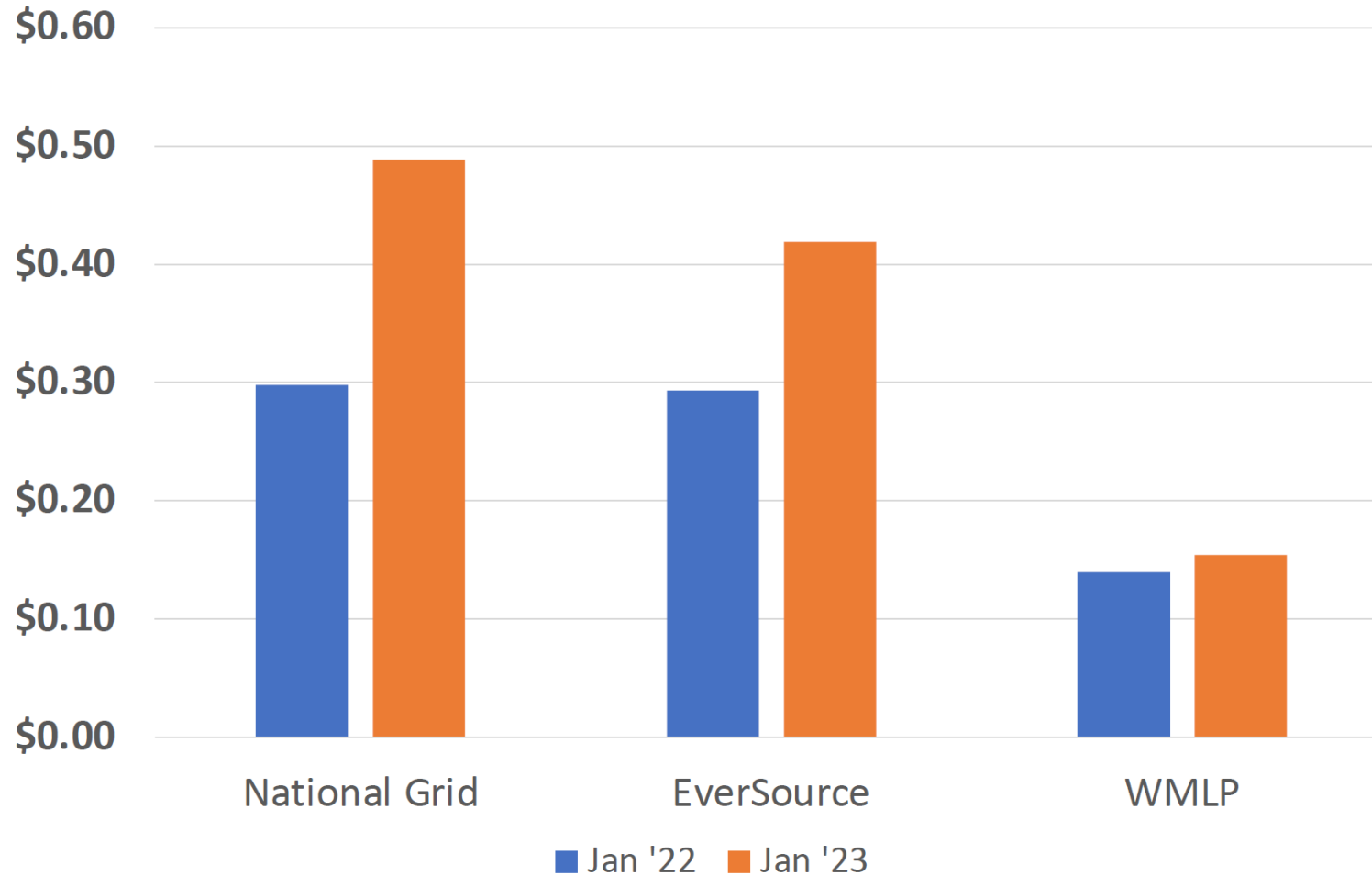
Income Demographic	Energy Burden (National)
Higher-income	2.3%
Median-income	3.5%
Low-income	7.2%

ACEEE Report: Lifting the High Energy Burden in America's Largest Cities

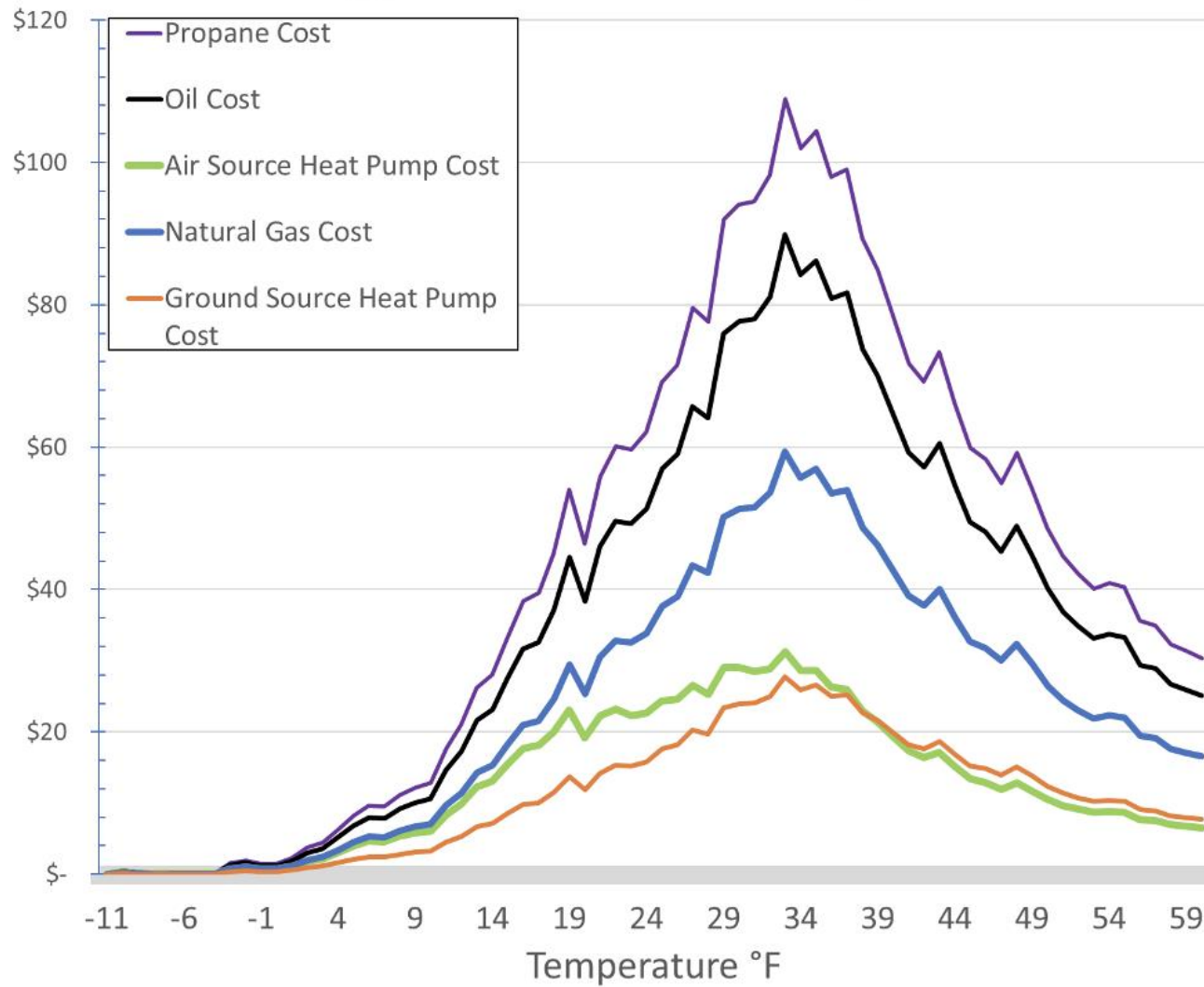
Hank Keating
Passive House MA

Comparison of WMLP and IOU rates

(\$/kWh)



Energy Cost Related to Temperature

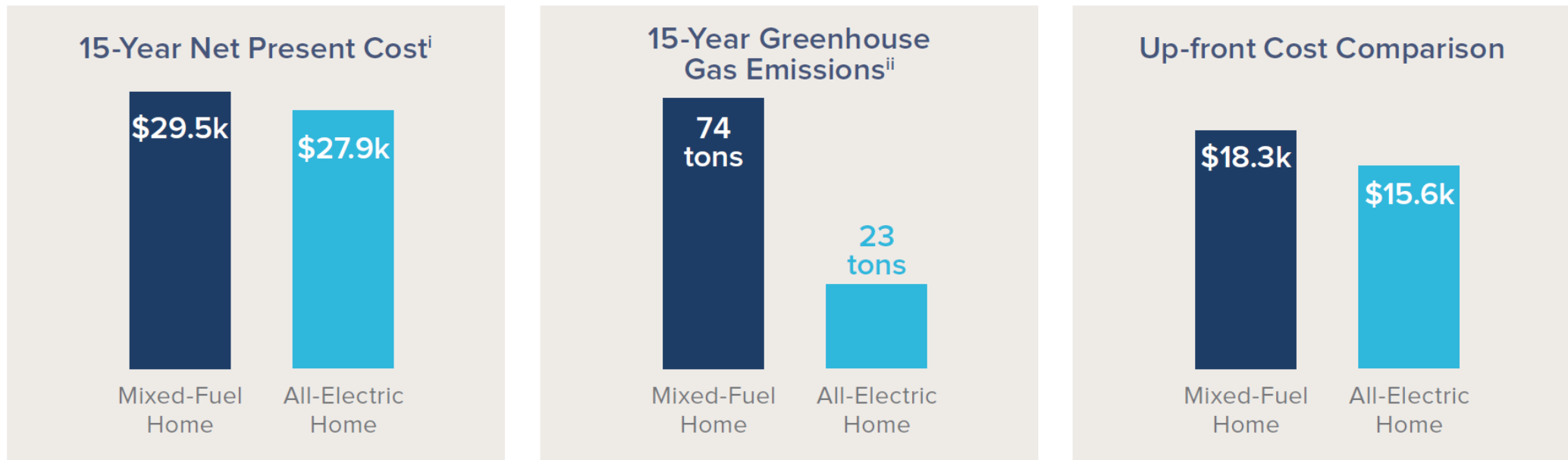


Heat Pumps
reduce costs in
Wellesley

All-electric buildings: costs and GHGs

(RMI 2020)

RMI analyzed the costs of a new all-electric home versus a new mixed-fuel home that relies on gas for cooking, space heating, and water heating. **In Boston, the all-electric home saves nearly \$1,600 in costs and 51 tons of CO₂ emissions over a 15-year period.**



Savings are larger with MLP electricity rates

All-electric buildings = healthier

- Natural gas in MA homes contains at least 21 hazardous air pollutants, including benzene, toluene, ethylbenzene, xylene, and hexane.
- Highest concentrations found in winter.
- Leaks up to 10 times naturally occurring levels may be undetectable, equating to a methane concentration of about 20 parts per million.

(Mechanowicz, 2022, Environmental Science and Technology)



Net Zero and Net Zero Ready



- Exceeds **16.5 million square feet in MA**
 - Growing at an exponential rate
- **Affordable Housing = 78%** of residential NZ and NZ Ready sq. ft.
 - Up from 54% in March 2021
- 4 million sq. ft. reported cost data
 - **85% of reporters had <1% construction cost premium**
- 135% increase to 313 companies working to make net zero buildings the standard in MA.

(Retrofit, Built Environment Plus 2022)

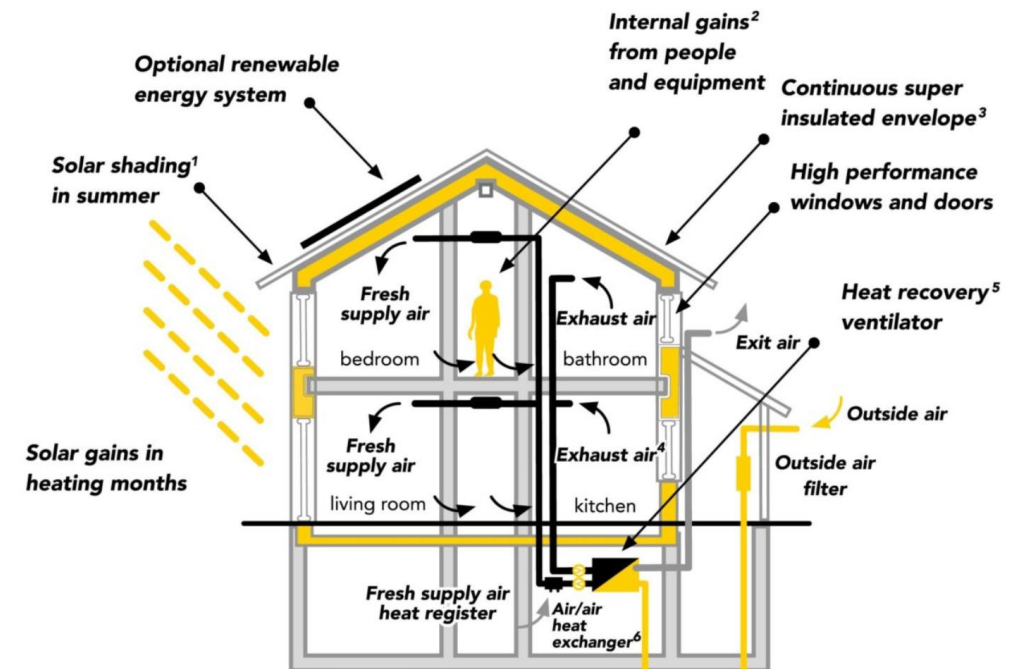
Passive House design principles



- Airtight building envelope
- Continuous insulation without thermal bridging
- High-performance windows (double or triple-paned)
- Optimization of solar gain
- Balanced heat- and moisture-recovery ventilation
- Minimal space conditioning system

SEPTEMBER 30, 2020

Passive House Design and Affordable Housing



Passive House benefits

- Best path to net zero and net positive
- Comfort
- Indoor air quality
- Resilience
- “Future proofing”
- Financially feasible

How Affordable Housing is Driving Passive House Design

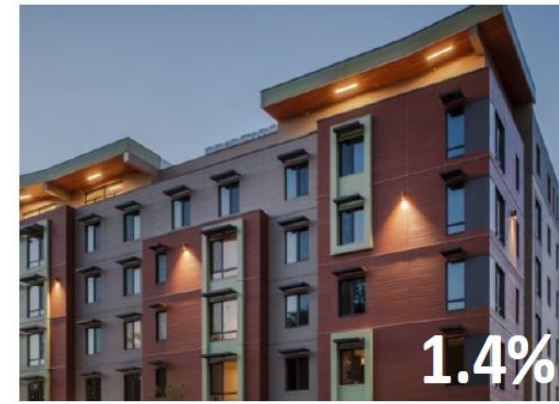
A grassroots effort started by Philadelphia-based design firm Onion Flat to incentivize building performance is catching on nationwide.

By COURTNEY HUMPHRIES



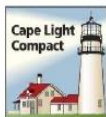
Sam Oberter

Design Challenge: Project Incremental Cost



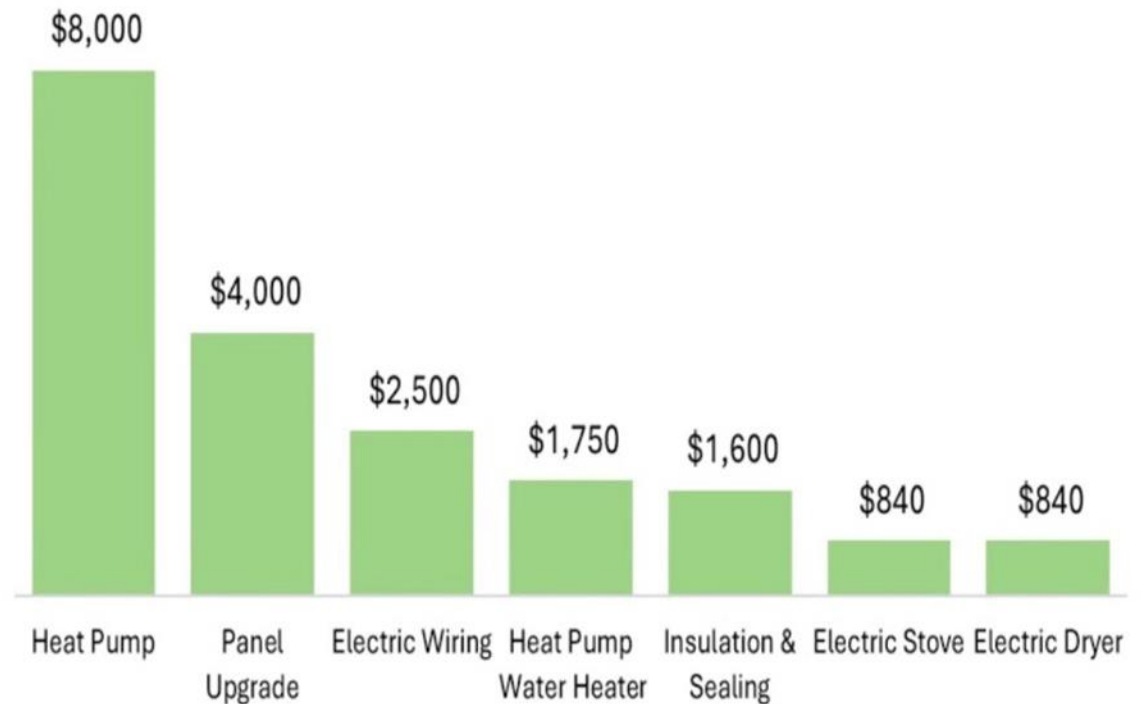
MassCEC
Passive
House
Design
Challenge

WE ARE MASS SAVE®:



Incentives

- Tax credits
 - New multi-family Energy Star
 - \$500-\$2,500 per unit
 - New multi-family Zero Net Energy
 - \$1,000-\$5,000 per unit
 - Solar 30% + 10% OR + 20%
- IRA rebates – HEERHA
 - For multi-family
 - Where 50% below 150% AMI



Source: [Atlas Building Hub](#)



Support from MAPC

- At this time, we encourage the cities and towns in our region and across the Commonwealth to adopt the new Specialized Code as soon as possible...Deployed in complement to other strong local and state building decarbonization policies, from climate-smart zoning to building performance standards, the Specialized Code will be an important new tool in our climate toolbox that can make a real difference in a community today and for decades to come.”

Julie Curti, Director for Clean Energy, MAPC.

Why adopt the Opt-in Code?

- Necessary for meeting GHG emissions goals
- Helps us stop digging the fossil fuel “hole”
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- Helps avoid costly future retrofits
- Promotes
 - Healthier, more comfortable indoor environments
 - Greater resilience (especially with Passive House)



Opt-in Code Outreach

- Select Board
- Advisory Committee
- Housing Task Force
- Website resources
- One-on-one conversations with building professionals
- March 1 (tentative) webinar for building professionals
- March 8 (tentative) webinar for TMMs, public, and departments/boards
- Meetings with and email outreach to TMMs
- League of Women Voters event
- ATM 2023



Thank you!

Discussion, questions

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