The Opt-in Code:
What it Could Mean for New Buildings in Wellesley

March 8, 2023

7 p.m.

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.

Agenda

- Meeting protocol
- Intro to Wellesley climate goals and the Opt-in Code
- Deep dive - What makes the Opt-in Code special?
- Passive House and multi-family projects
- High performance buildings
- Q&A

Meeting Protocol

The meeting is being recorded

- Recording and slides will be shared after the webinar

Comments in the chat are welcome

- We will try to answer your question during live Q&A
- We will follow up on outstanding chat questions after the meeting
- Kindly refrain from engaging in chat dialogue during the webinar

To ask a question during designated Q & A period, please

- Raise your hand
- Type a question in the chat

Please remain muted

- Unless called on to ask a question

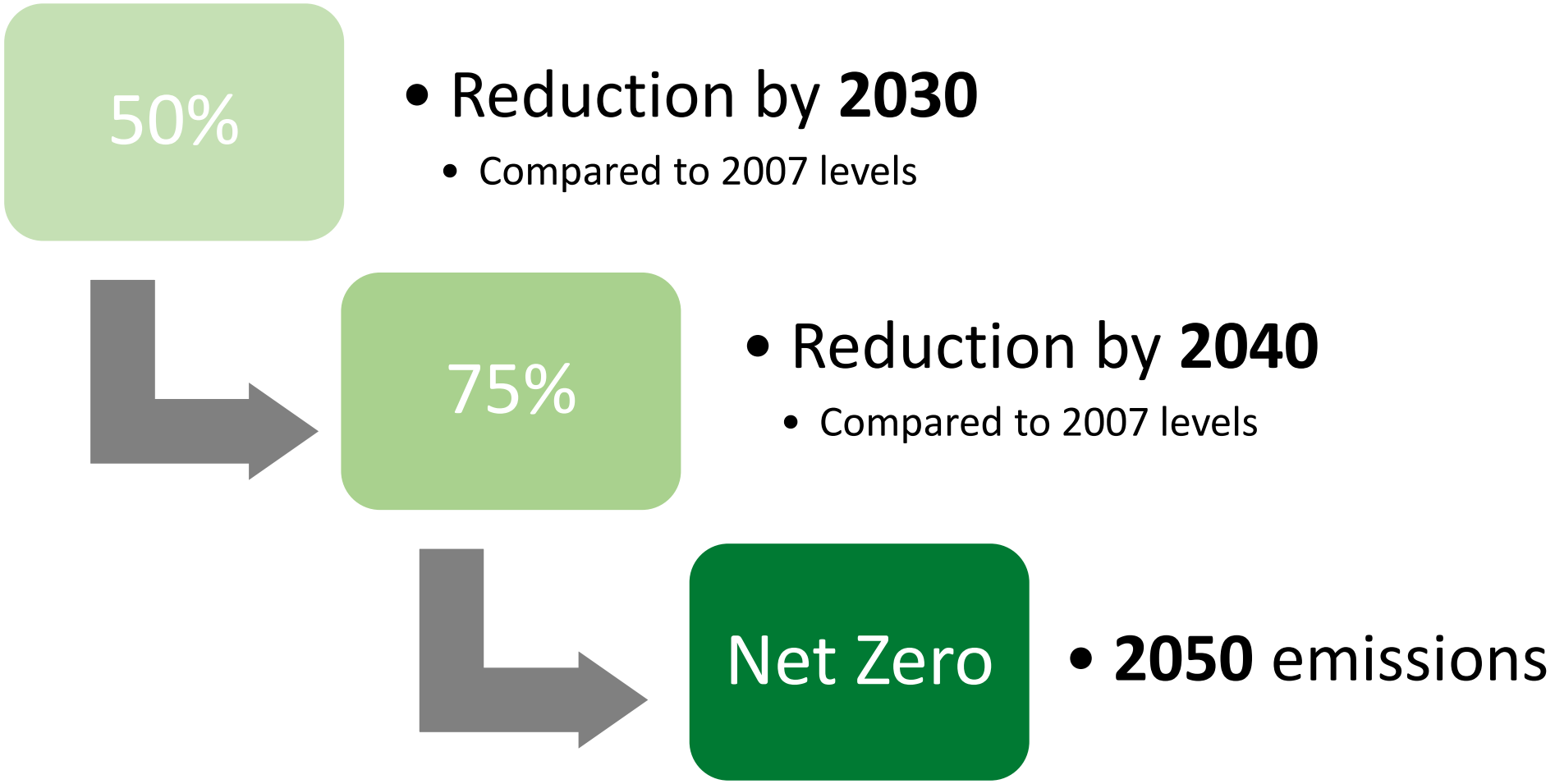
Thank you to our guest panelists

- Tom Catalano, AIA, Principal of Catalano Architects
- Mark Doughty, Principal of Thoughtforms
- Nick Falkoff, Principal of Auburndale Builders
- Allen Hebert, Operations Manager of Wellesley Facilities Management Department
- Hank Keating, AIA, President of Passive House Massachusetts
- Ellen Watts, FAIA, President-elect of AIA MA, BSA, LEED AP

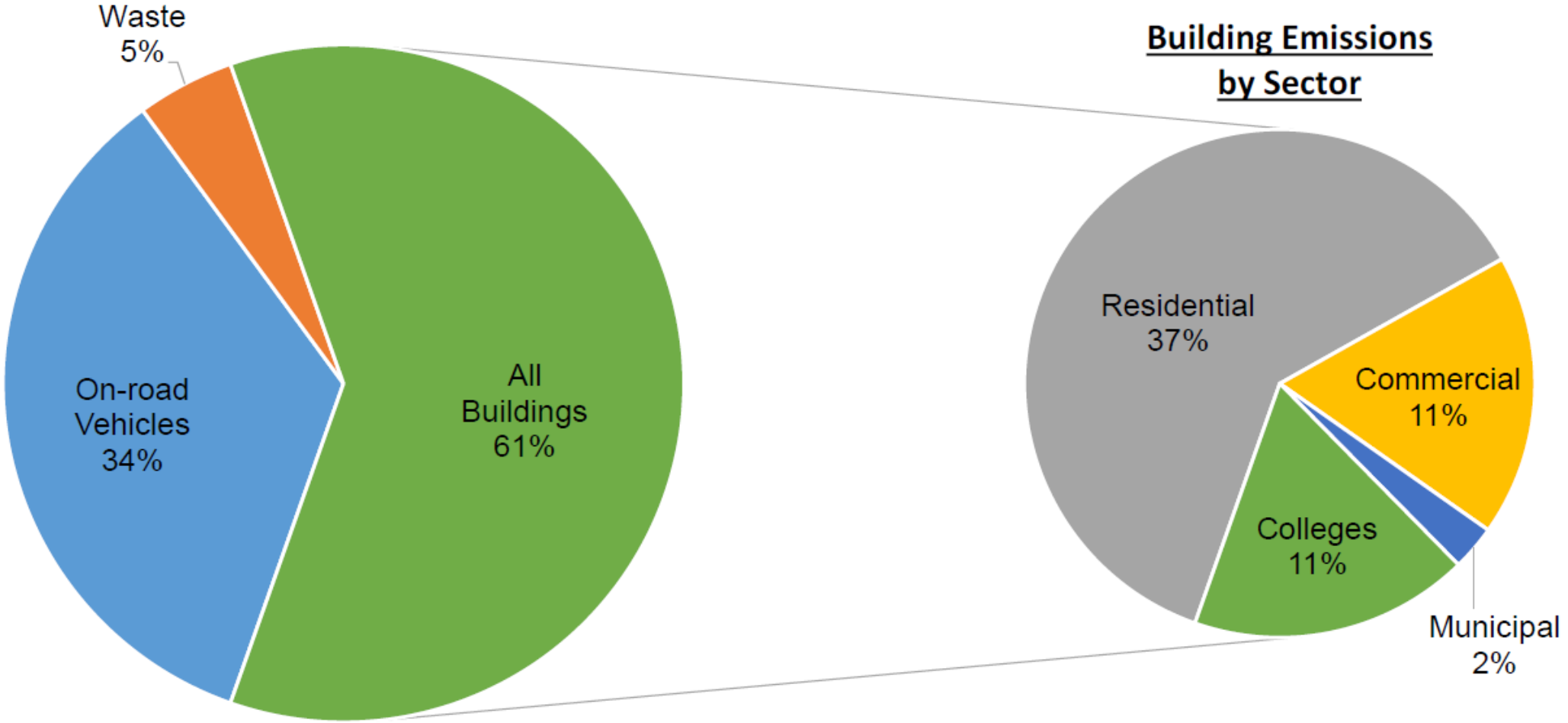
Opt-in Code Outreach

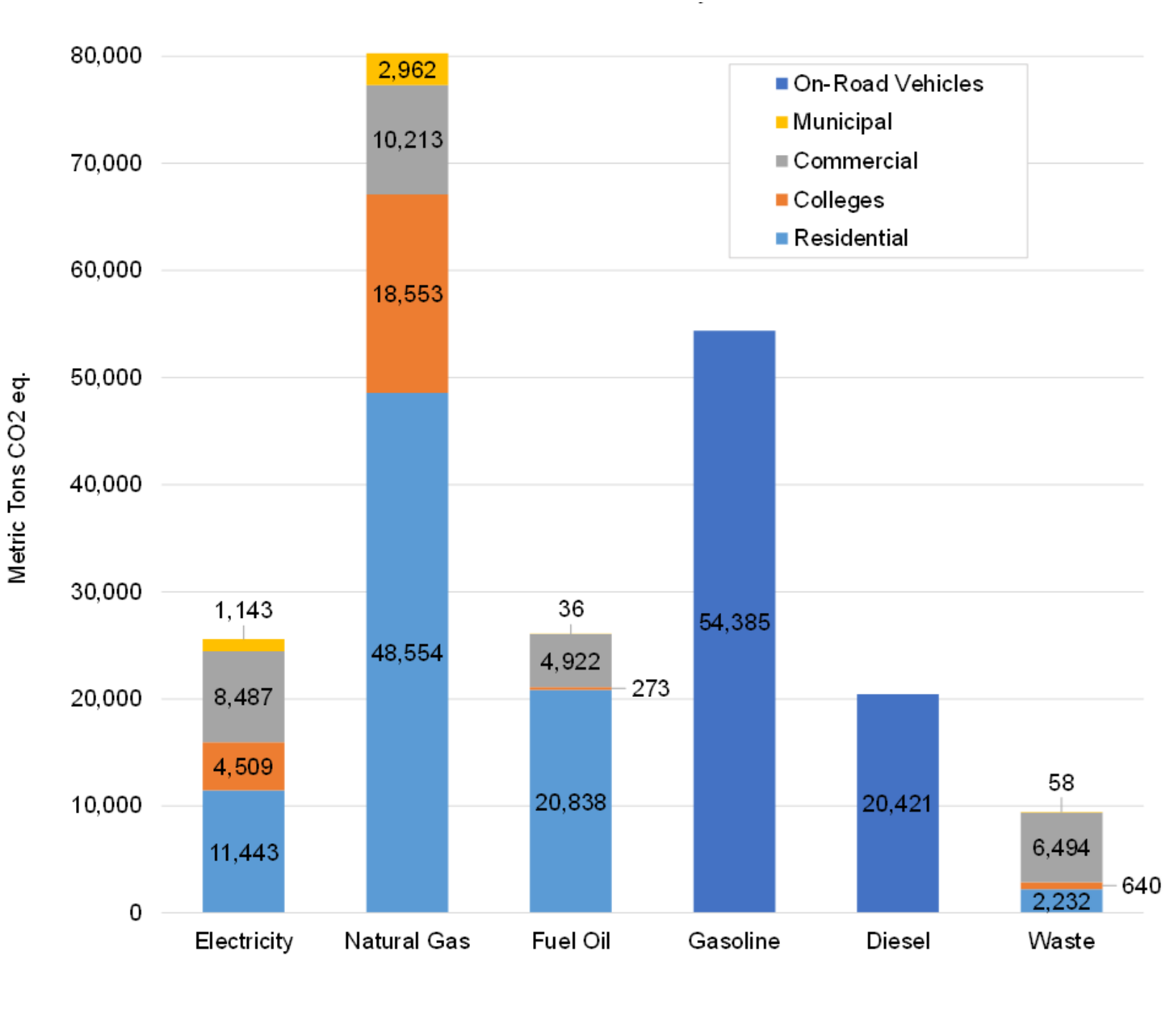
- Select Board
- Advisory Committee
- Housing Task Force
- Website resources
- One-on-one conversations with building professionals
- March 6 webinar for building professionals
- March 8 webinar for TMMs, public, and departments/boards
- Meetings with and email outreach to TMMs
- League of Women Voters event
- Wellesley Annual Town Meeting – March 27, 2023

Wellesley GHG emissions reduction goals set by Town Meeting in 2021



Our largest sources of emissions: Buildings and transportation (2021)





Wellesley Climate Action
Be part of it!

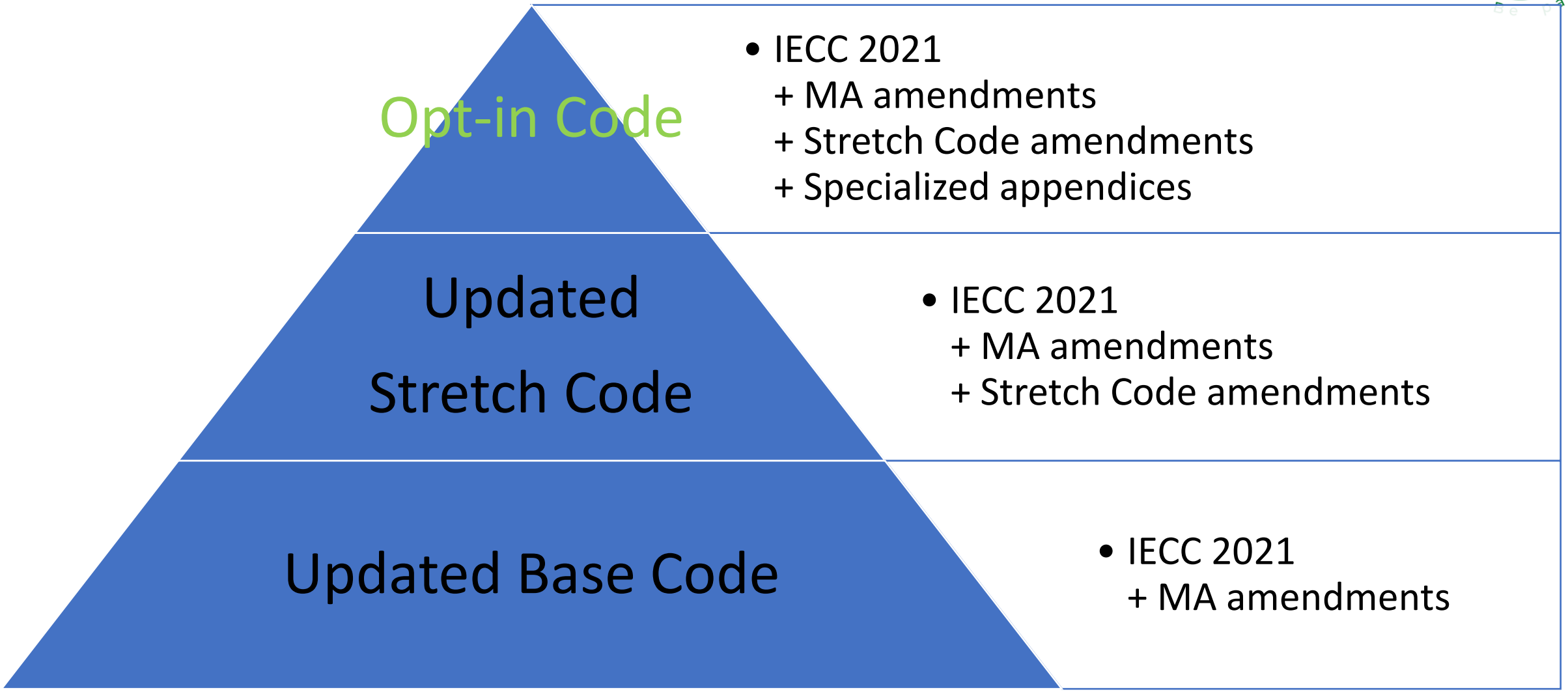
Natural gas = largest emissions source (2021)

Steps to Net Zero Buildings by 2050

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

Building Energy Code

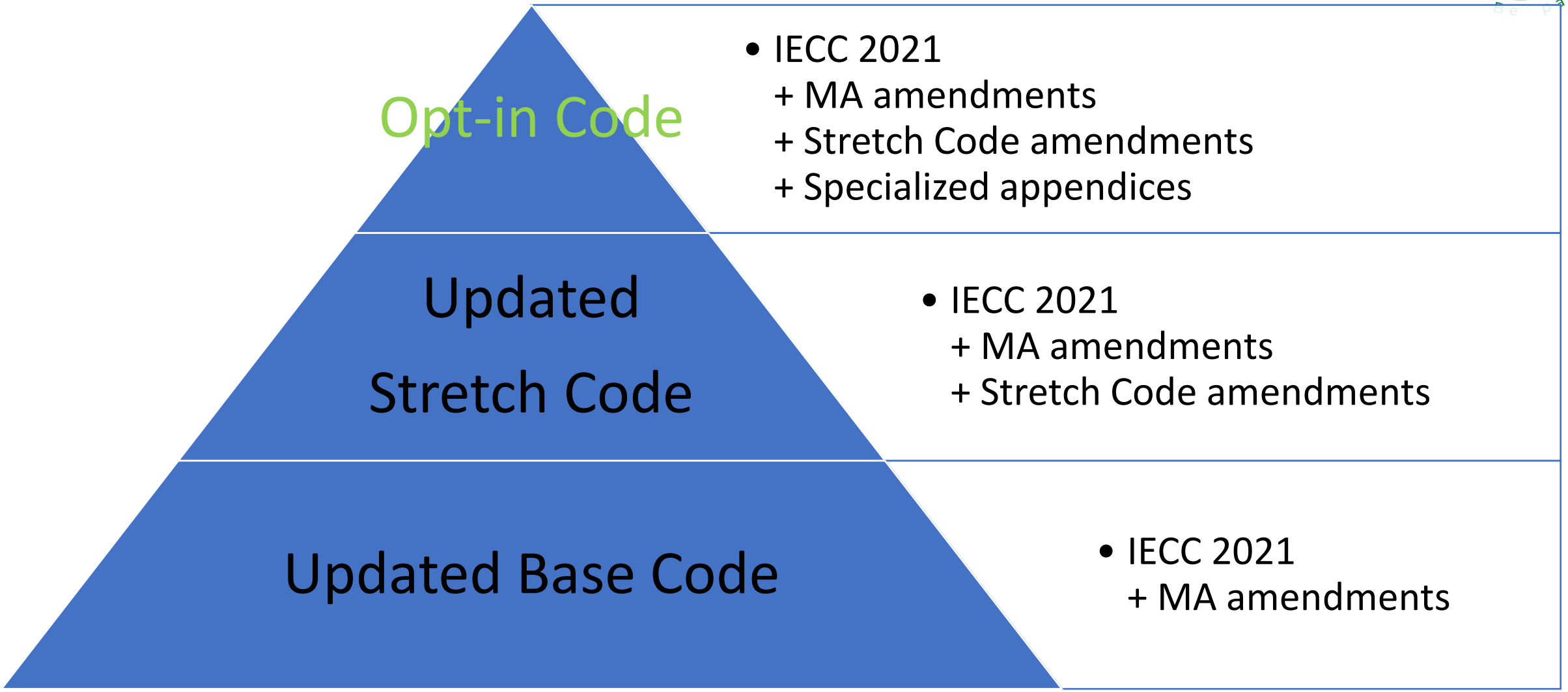
Energy codes “build” on each other



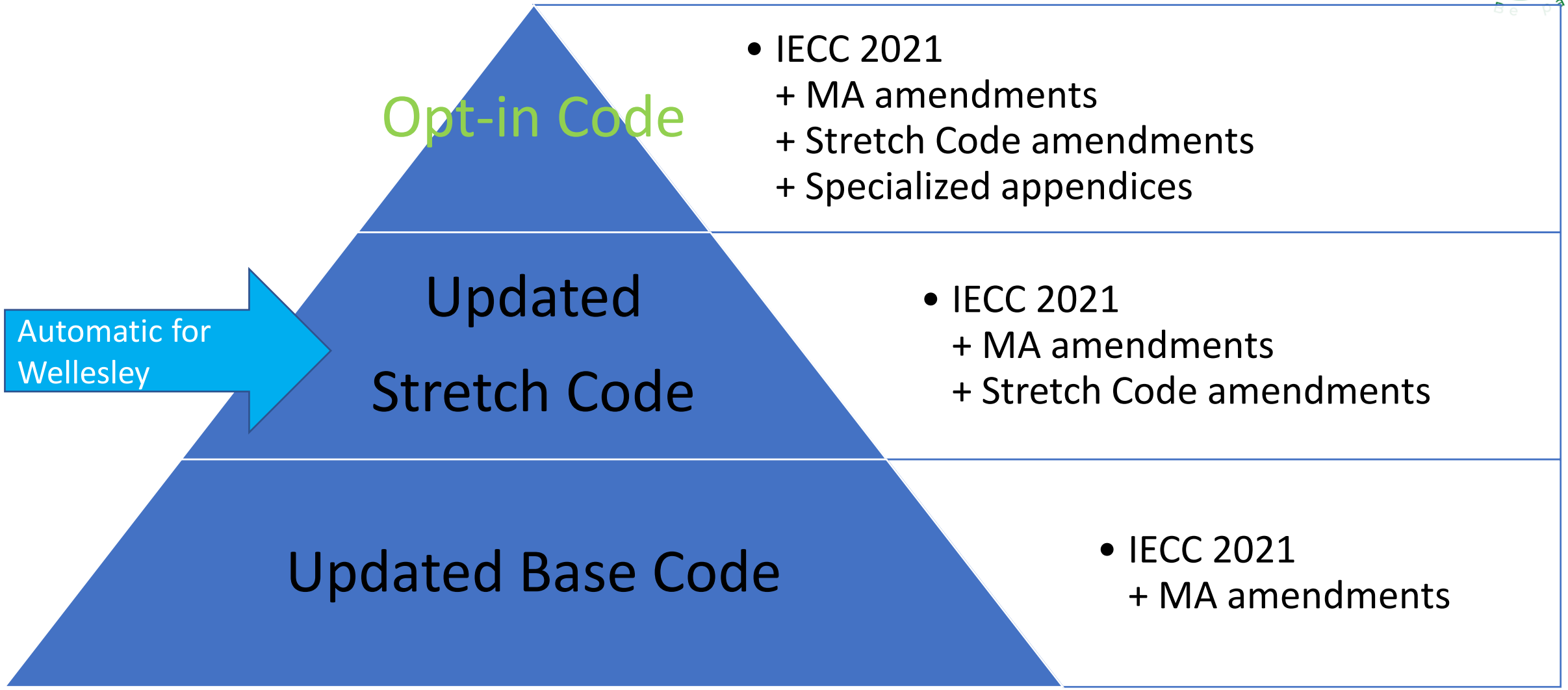
Stretch Code:
Continuous Improvement in Building Efficiency

- 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
  - Straw proposals
  - Updated energy codes issued by DOER
  - ATM article co-sponsored by Select Board, Climate Action Committee

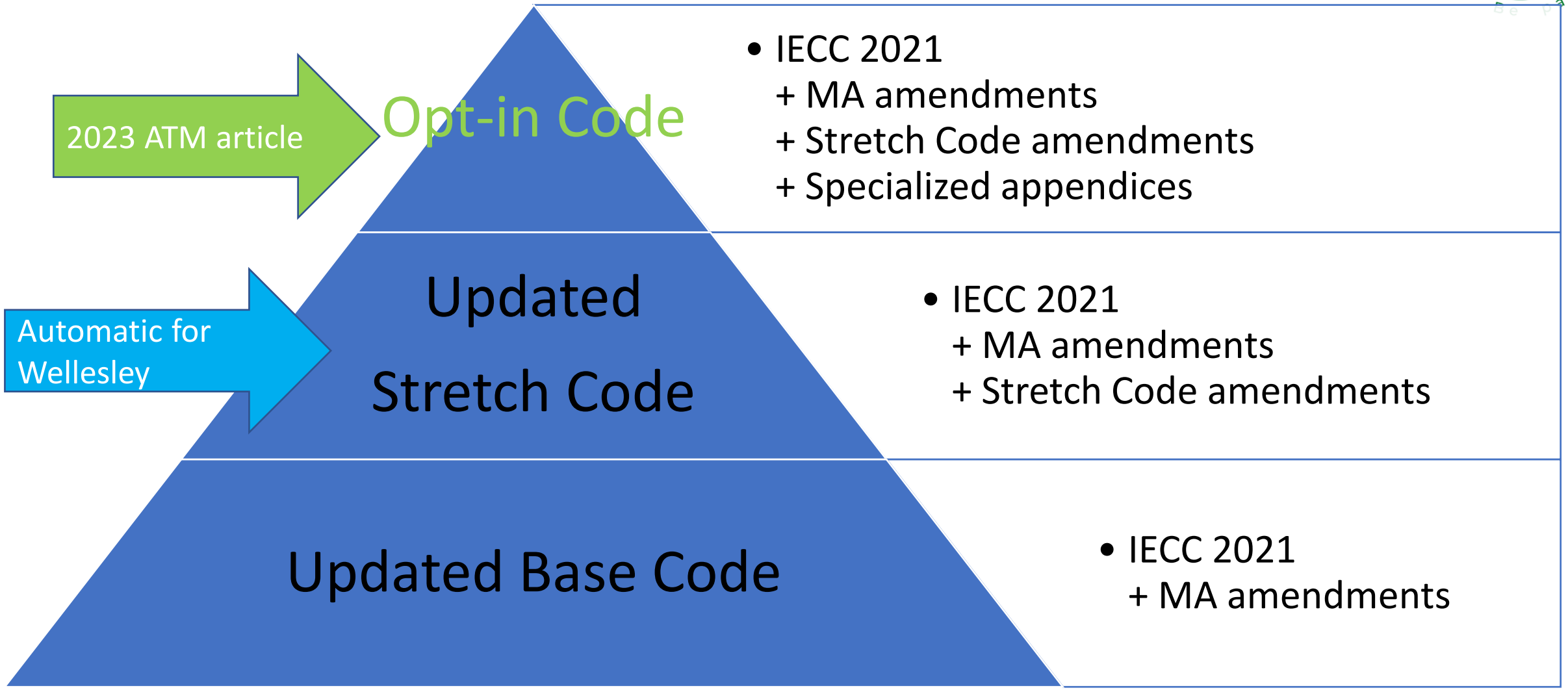
Codes that “build” on each other



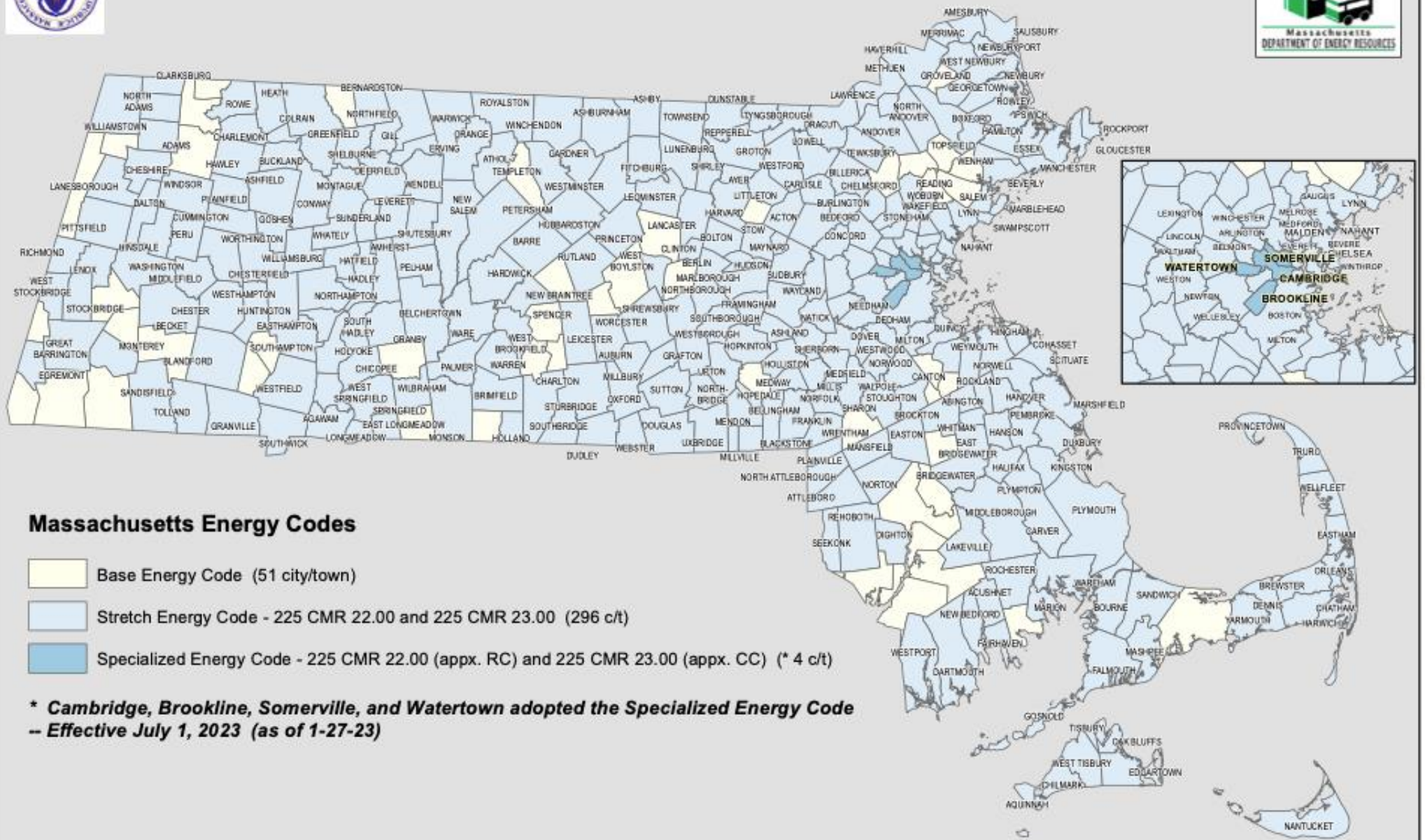
Updated Stretch Code automatically applies



Opt-in Code: 2023 ATM article



Massachusetts Building Energy Code Adoption by Municipality



Massachusetts Energy Codes

- Base Energy Code (51 city/town)
- Stretch Energy Code - 225 CMR 22.00 and 225 CMR 23.00 (296 c/t)
- Specialized Energy Code - 225 CMR 22.00 (appx. RC) and 225 CMR 23.00 (appx. CC) (* 4 c/t)

**** Cambridge, Brookline, Somerville, and Watertown adopted the Specialized Energy Code -- Effective July 1, 2023 (as of 1-27-23)***

MA DOER, 2-2-2023, jpfister

Fossil Fuel Free Demonstration Project

Municipal Vote

Fossil Fuel Free "Pilot"

2023 ATM article

Opt-in Code

- IECC 2021
  + MA amendments
  + Stretch Code amendments
  + Specialized appendices

Automatic for Wellesley

Updated Stretch Code

- IECC 2021
  + MA amendments
  + Stretch Code amendments

Updated Base Code

- IECC 2021
  + MA amendments

Communities interested in the pilot

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)

Details on the Opt-in 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
  - Passive House (for large single and multi-family)
  - Earlier start date for greater energy efficiency

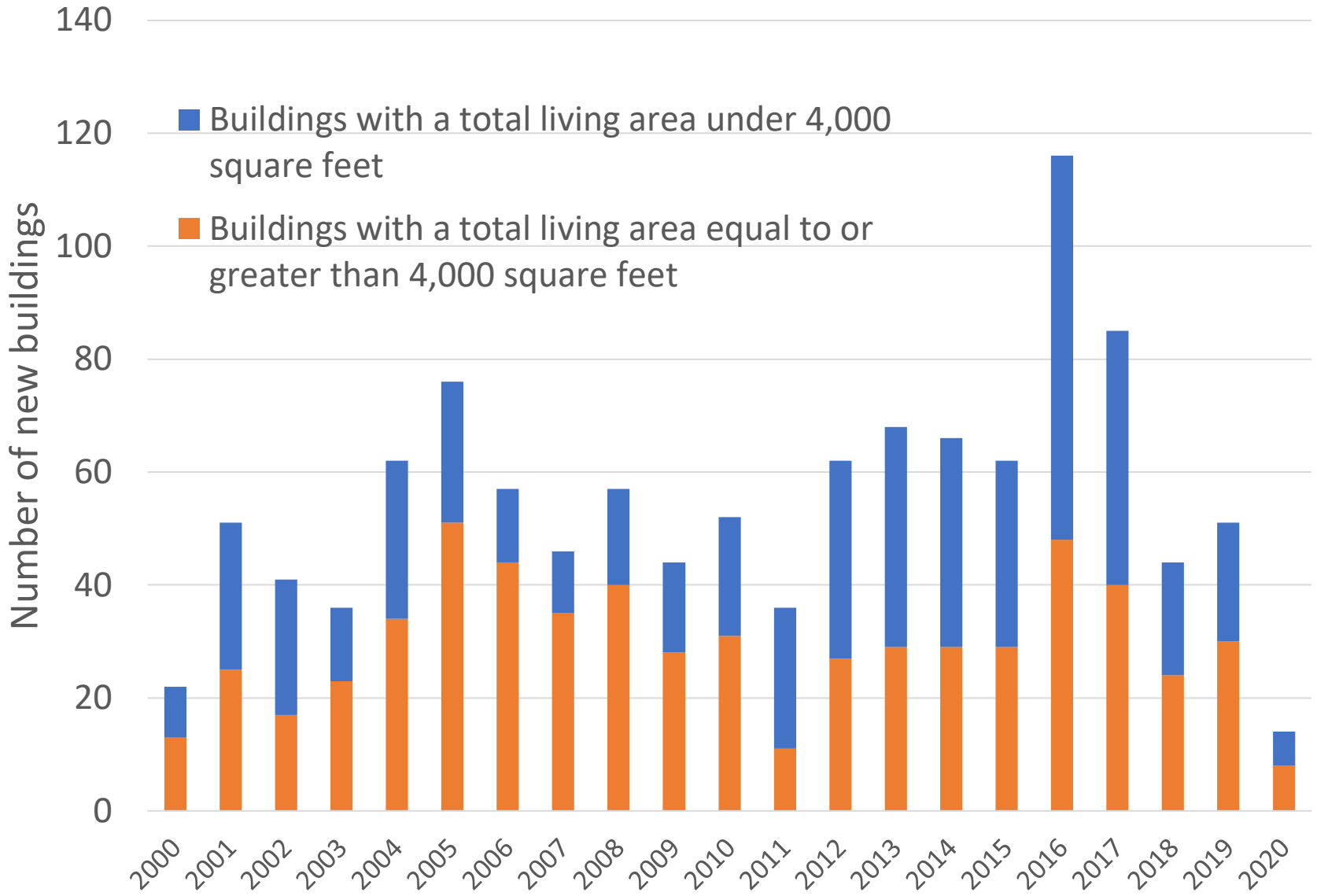
RESIDENTIAL
Low Rise & Multi-family

Ian Finlayson, DOER

Opt-in vs Stretch code - Residential Low-Rise

Energy Source(s)	Home Size	Stretch Code (July 2024)	Opt-in Code (Jan 2024)
All Electric New Homes	Any size home	HERS 45 or Passive House	
Mixed-Fuel New Homes	Under 4,000 sq. ft.	HERS 42	**+Solar PV (min 4kw) + wiring for electrification**
		Passive House	**+ wiring for electrification**
	4,000 sq. ft. and over	HERS 42 Passive House	**+ Solar PV (to net-zero) (HERS 0 or Phius ZERO) + wiring for electrification**
Home additions & alterations	Any	Same as Stretch code	
Historic or existing homes	Any	Energy Code not applicable	

Ian Finlayson, DOER



2018-2020:
55-59% of new low-rise residential construction
≥ 4,000 sq. ft.

Opt-in vs Stretch code – Multi-family

Building Type	Fuel Type	Stretch code (July 2024)	Opt-in Code (Jan 2024)
New Multi-family (4+ stories & over 12,000 sf)	All Electric	HERS 45 or TEDI or Passive House	**Passive House**
	Mixed Fuel	HERS 42 or TEDI or Passive House	**Passive House + wiring for electrification**

Ian Finlayson, DOER

Opt-in Code - Commercial

Ian Finlayson, DOER

Opt-in vs Stretch code – Commercial

Building Type	Fuel Type	Stretch code (July 2024)	Opt-in Code (Jan 2024)
Schools, Offices, Municipal buildings	All Electric	TEDI or Passive House	
	Mixed Fuel	TEDI or Passive House	TEDI **+ Solar PV** or Passive House **+ wiring for electrification**
Other Commercial (over 20,000 sf)	All Electric	ASHRAE or TEDI or Passive House	
	Mixed Fuel	ASHRAE or TEDI or Passive House	ASHRAE **+ Solar** or TEDI **+ Solar** or Passive House **+ wiring for electrification**

Ian Finlayson, DOER

Incentives

- Federal, State, and Local rebates and tax credits for:
  - Weatherization
  - Electrification
  - Energy efficiency
  - Solar

Why adopt the Opt-in Code?

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

Opt-In Energy Code Summary

1 Pre-Wiring

Buildings using fossil fuels must pre-wire for future electrification.

2 Solar PV

Buildings using fossil fuels must install a certain amount of rooftop solar PV.

3 Exemplary Performance for Large Homes

If using fossil fuels, single-family homes > 4,000 SF must be certified Zero Energy (HERS 0 or Phius ZERO).

4 Exemplary Performance for Large Multi-Family Buildings

Multi-Family buildings >12,000 SF must use the Passive House pathway.

5 Potential Jump on Lower HERS Ratings

HERS 42 (All-Electric) / HERS 45 (Mixed Fuel) required upon effective date of adoption (rather than July 1, 2024).

Frequently Asked Questions

1 Does the Opt-In Energy Code apply to existing structures?

No. Improvements to existing structures, depending on size, are regulated by the Updated Stretch Code and Base Code.

2 Will the Opt-In-Energy Code discourage the creation of affordable housing?

No. Incentives will continue to encourage affordable housing while the Opt-In Specialized Code delivers benefits for residents.

3 Is it possible to install a gas cooktop?

Yes. This is permitted under the Mixed Fuel pathways.

4 Why adopt the Opt-In Energy Code?

The #1 reason is that it requires pre-wiring, avoiding costly retrofits down the road and expediting electrification.

5 Why does the Opt-In Energy Code permit fossil fuels?

It preserves market choice at a time when utility pricing is highly volatile and utility costs vary 300% among MA communities. “Net zero” definitions vary widely.

Resources

NEEP FAQ & Comparative Tables

https://neep.org/ma-updated-stretch-code-municipal-opt-specialized-code-faq
https://neep.org/resources

BSA Critical Stretch Code Series

https://www.architects.org/events/558258/2023/01/20/doer-critical-stretch-code-series

DOER Summary Documents

https://www.mass.gov/doc/summary-document-explaining-stretch-energy-code-and-specialized-opt-in-code-language/download

Community Presentations

https://www.wellesleyma.gov/317/Advisory-Committee
Hit PLAY at 1:29

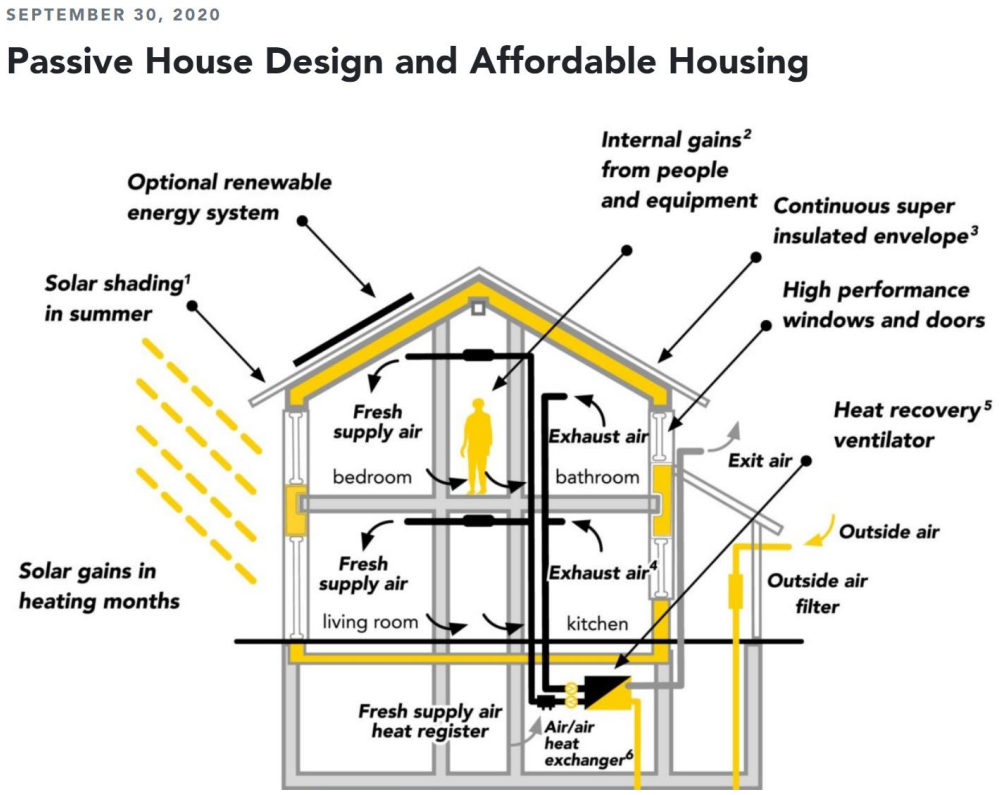
Comparison Chart

	UPDATED STRETCH CODE		MUNICIPAL OPT-IN STRETCH CODE	
RESIDENTIAL LOW-RISE				
R406.5 Maximum Energy Rating Index (HERS Index) [1]	Fossil Fuel	HERS 42	<4000 sf - Mixed Fuel*	HERS 42
	Solar		<4000 sf - All-Electric	HERS 45
	All-Electric	HERS 45	>4000 sf - Mixed Fuel*	HERS 0
	Solar & All-Electric		>4000 sf - All-Electric	HERS 45
R405 - Passive House Building Certification Pathway [2]	Passive House	PHIUS CORE, PHIUS ZERO, or PHI	All Building Sizes	PHIUS CORE, PHIUS ZERO, or PHI
R403.6.1 Mechanical Ventilation [2]	ERV/HRV for Ventilation		ERV/HRV for Ventilation	
R404.4 - EV Ready Parking Spaces [2]	1 EV Ready Space		1 EV Ready Space	
EXISTING BUILDINGS				
R503.1.5 Alterations [1]	Fossil Fuel	HERS 52	Fossil Fuel	HERS 52
	Solar	HERS 55	Solar	HERS 55
	All-Electric		All-Electric	
	Solar & All-Electric	HERS 58	Solar & All-Electric	HERS 58
MULTI-FAMILY				
R406 Maximum Energy Rating Index (HERS Index) [1]	Fossil Fuel	HERS 42	None	
	Solar			
	All-Electric	HERS 45		
	Solar & All-Electric			
R405 - Passive House Building Certification Pathway [2]	Passive House	PHIUS CORE, PHIUS ZERO, or PHI	>12,000 sf Mixed Fuel	PHIUS CORE or PHI
			>12,000 sf All Electric	
R403.6.1 Mechanical Ventilation [2]	ERV/HRV for Ventilation		ERV/HRV for Ventilation	
R404.4 - EV Ready Parking Spaces [2]	20% of Spaces EV Ready		20% of Spaces EV Ready	

1. Impacts buildings permitted on or after July 1, 2024 for Updated Stretch Code
2. Impacts buildings permitted on or after January 1, 2023 for Updated Stretch Code
* Municipal Opt-In Stretch Code requirements only take effect after adoption, with a recommended 6 month waiting period

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



Passive House benefits

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

Passive House examples

- A Passive House can be any building type – home, office, school, etc.

Waverly School, Beverly

Single-Family Home, Cambridge

Winthrop Center, Boston

Design Challenge: Project Incremental Cost

MassCEC Passive House Design Challenge

Passive House incremental cost findings

- Average incremental cost: 2%
- Typical cost increases:
  - Ventilation upgrades to supply fresh air to living and bedrooms
  - Window & door upgrades
  - Thermal bridging breaks and air sealing
  - Additional testing and verification
- Typical cost savings:
  - Significantly reduced heating and cooling equipment capacity
- Best practices for reducing incremental cost:
  - Experience and training for design and construction team
  - Simple massing and roofs are less expensive.

•The American Council for an Energy-Efficient Economy (ACEEE) published a paper by MassCEC and ICF "Scaling Up Passive House Multifamily: The Massachusetts Story."

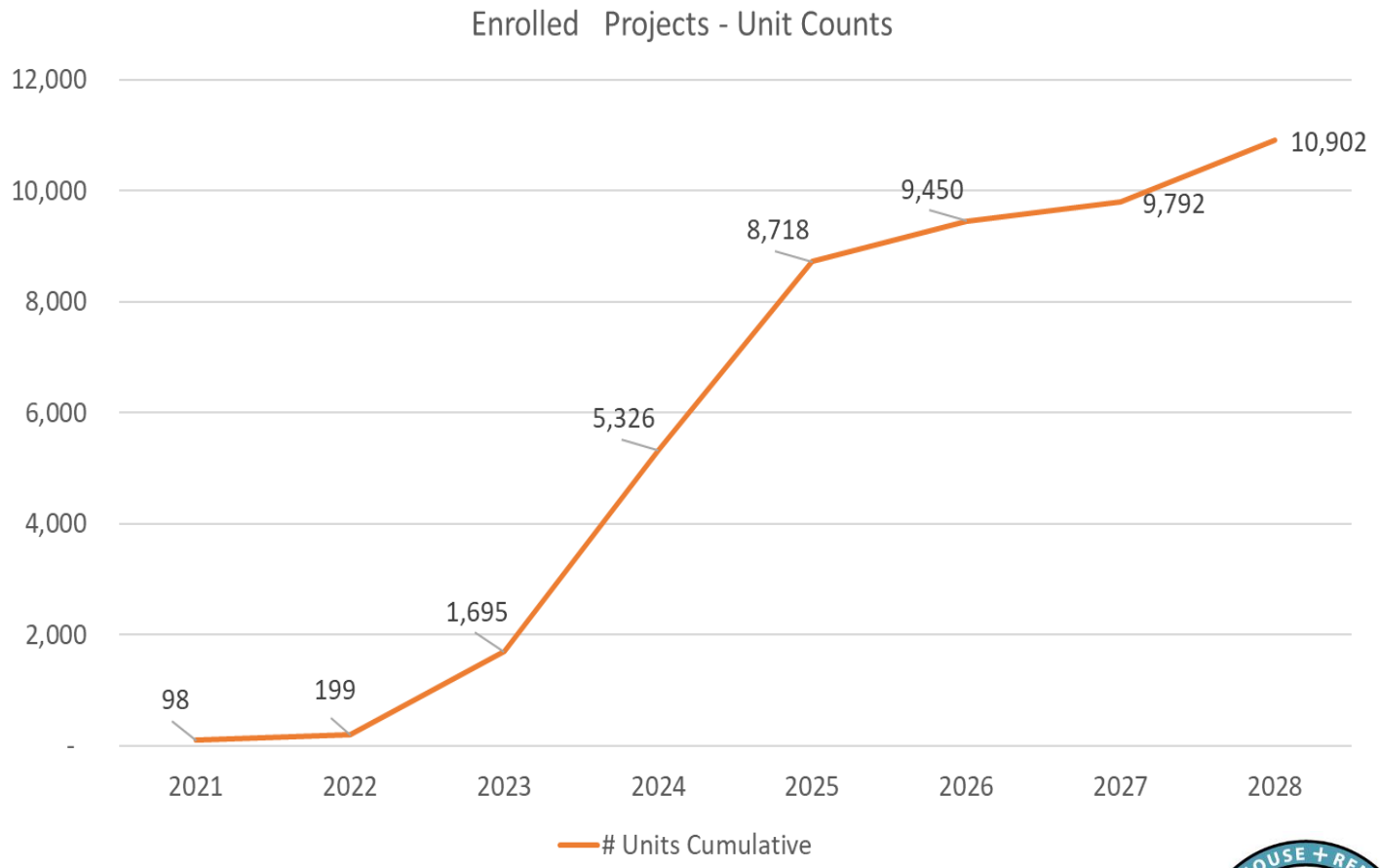
Design Challenge Projects

Table 3. Design Challenge Projects and Characteristics

Project	Location	Site Type	Construction Type	Units	Gross Square Feet
Finch Cambridge	Cambridge	In-Fill	Podium	98	111,450
Old Colony 9th & Mercer	Boston	In-Fill	Podium	55	51,272
North Commons	Northampton	Suburban	Wood frame	53	55,538
Harbor Village	Gloucester	In-Fill	Podium	30	33,186
Depot Village	Hanson	Suburban	Wood frame	48	104,981
Mattapan Station (mixed use)	Boston	In-Fill	Podium	135	178,875
Holbrook Senior Housing	Holbrook	Suburban	Wood frame	72	53,675
Bartlett Station Lot D / Kenzi	Boston	In-Fill	Podium	50	45,031

Mass Save Passive House Incentive Program

- As of December 2022, there are 152 multifamily buildings with over 10,000 units registered in this program
- About 40% of these are designated as Low-Income projects



High-Performance/All-Electric – Benefits

Favorable economics

- Upfront cost premium: 1%-3% *
- Operating cost savings: 60% to 100+% reduction in utility costs **
- Re-sale premium: relative to average or mixed-fuel homes
- Potential for additional incentives

Healthier – cleaner air

- Fewer allergens and molds in the air due to stable humidity and temperature and mechanical ventilation/filtering
- Absence of combustion gases inside the building, particularly in the kitchen

More comfortable and safer

- Fewer drafts because homes are carefully air-sealed
- Avoid dry sinuses/skin in winter because warm, moist air is not leaking out in winter
- Comfortable in summer because solar gain reduced with high-performance windows
- No open flames or hot cooktops due to induction

Only observable difference to an occupant is the lack of a gas cooktop or gas fireplace

** Based on studies by Mass CEC, Rocky Mountain Institute, and internal analyses on Thoughtforms' projects*
*** Based on observations of Thoughtforms' homes built to low or negative HERS ratings*

thoughtforms
build to endure

High-Performance/All-Electric – Common Misperceptions

Common Misperception	Source of Misperception	Data/Experience
• High-performance costs more	• Old data, media/misinformation	• Cost parity or benefit
• Electric homes are uncomfortable	• Old homes with electric baseboard, forced hot-air were uncomfortable	• Current technology improves comfort/health
• Electric homes are expensive to operate	• Electric resistance heat and hot water *are* inefficient/expensive	• High-performance homes use less energy & heat pumps are efficient
• All-electric technology is unproven	• Lack of familiarity, late US adoption	• Technology is well-established
• "Real cooks" avoid induction cooktops	• "Real cooks" avoid electric coil cooktops, marketing/media	• Many professional cooks *prefer* induction (look for yourself!)
• The grid can't support all-electric – risk of power interruption	• California, timing mis-match ("if everything was electric today…")	• The grid is transitioning in parallel with buildings
• HP/AE homes are ugly…		

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High-Performance and/or All-Electric… Can You Tell?

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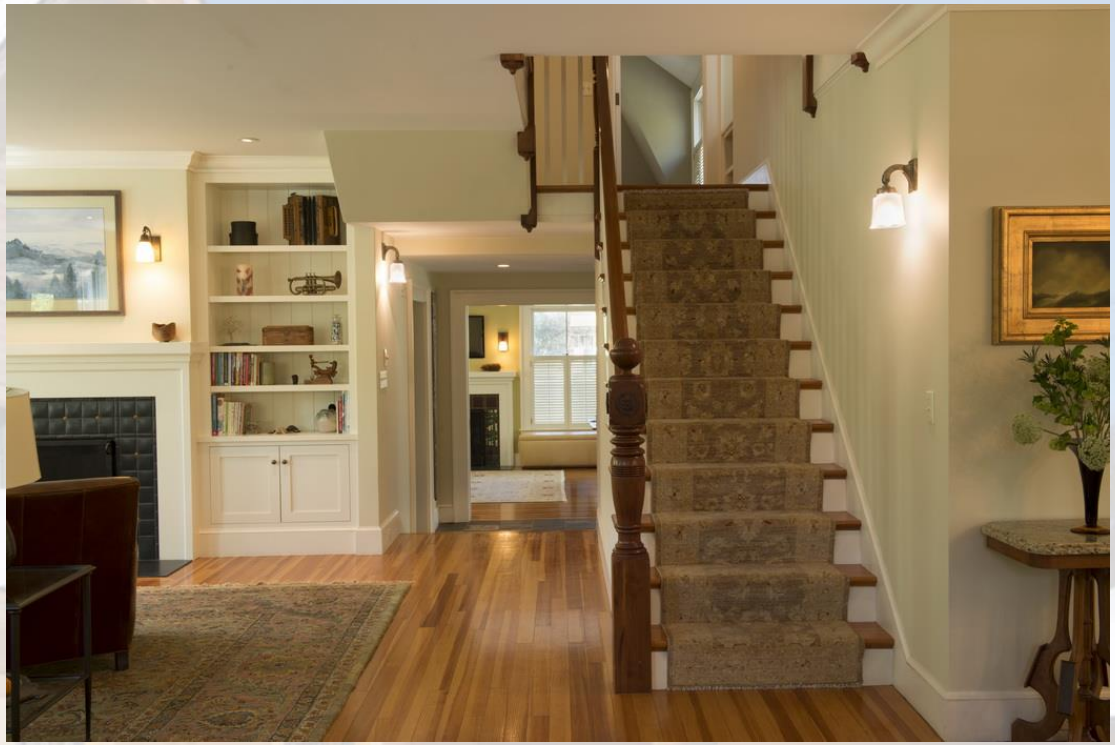

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High-Performance and/or All-Electric… Can You Tell?

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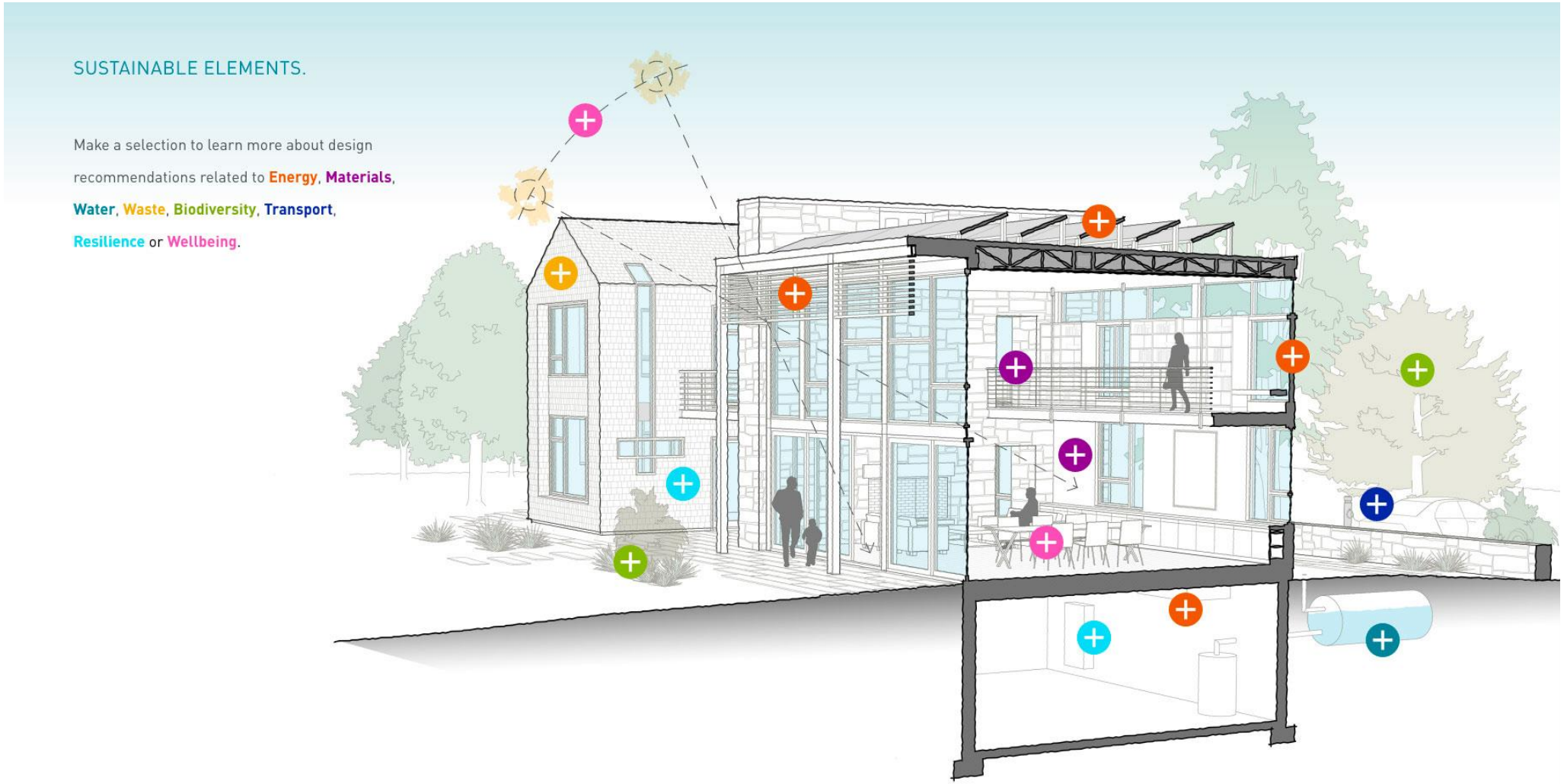

Upcoming CA Sustainability Webpage

Weston, MA

Dover, MA

Osterville, MA

Wellesley, MA

Questions?

Thank you!

Marybeth Martello
Sustainability Director
mmartello@wellesleyma.gov
https://wellesleyma.gov/ClimateAction