Opt-In Specialized Energy Code

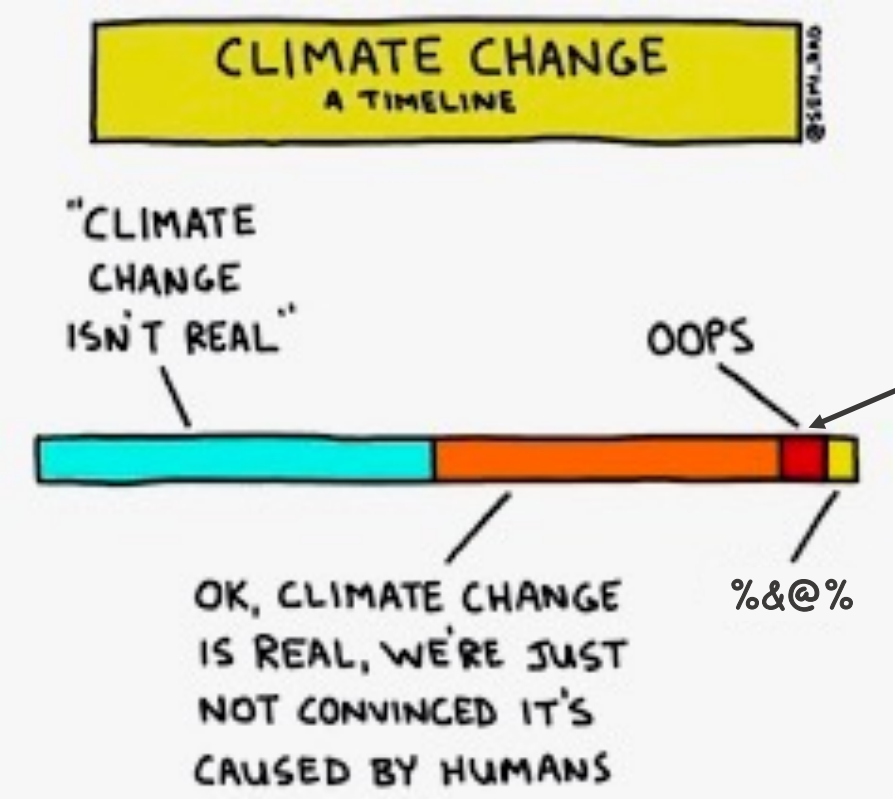
Presentation for League of Women Voters of Needham / Green Needham Webinar

Town of Needham Climate Action Planning Committee

SUSTAINABLE NEEDHAM
A CLEAN FUTURE TOGETHER

Agenda

- **Why** the Climate Action Planning Committee has recommended that the Town adopt the Opt-in Specialized Energy Code
- **What** is the Opt-in Specialized Energy Code
- **FAQs** about the Opt-in Specialized Energy Code

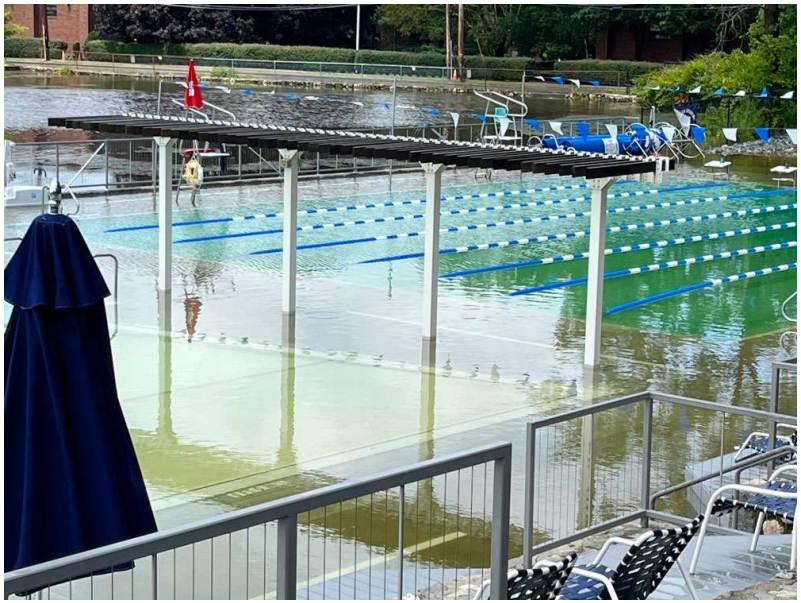


Meanwhile… Scientists have known this for decades

Greater than 99% consensus on human caused climate change in the peer-reviewed scientific literature

-Mark Lyons, *et al 2021, Environmental Research Letters* **16** 114005
Review a dataset of 88,126 climate-related papers published between 2012 and 2020

Climate Change has arrived in Needham



Aftermath of the August 8, 2023 rainstorms

Photo Credits: Needham Observer. https://needhamobserver.com/under-water/

With each additional 1° (F) of temperature, the atmosphere's capacity to hold water vapor increases by 4%

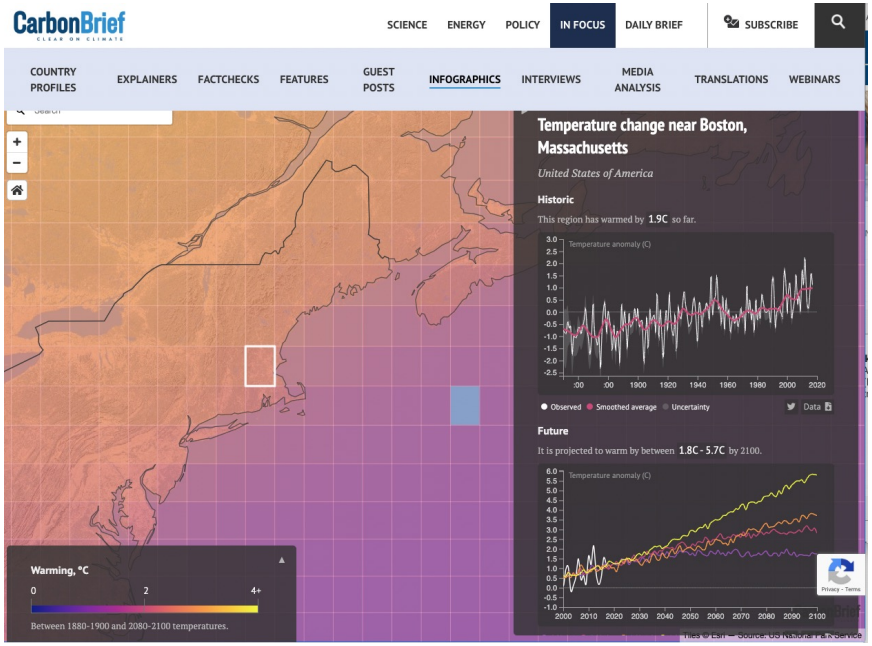
Source: K. Trenberth, "Changes in Precipitation with Climate Change," *Climate Research,* March 2011

Climate Change has arrived in Needham

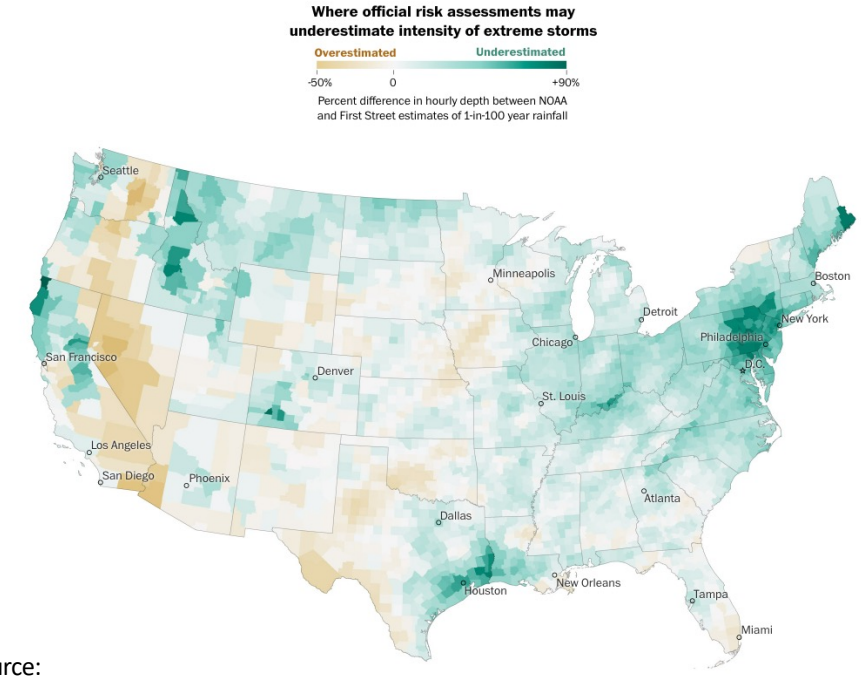
Needham has warmed by 3.4 degrees F since the pre-industrial era.

16% more water in the atmosphere

Local extreme rainfall events are underestimated by official models by ~50%

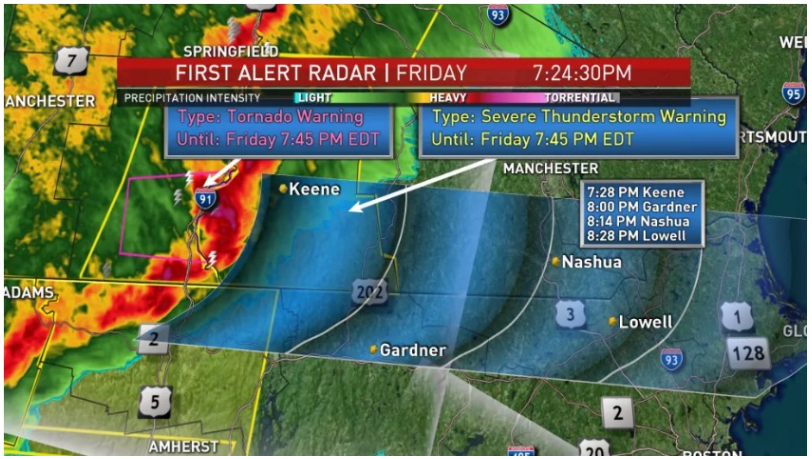


Sources:
Map: https://www.carbonbrief.org/mapped-how-every-part-of-the-world-has-warmed-and-could-continue-to-warm/
Data from: https://berkeleyearth.org/data/



Source:
Map from https://www.washingtonpost.com/climate-environment/2023/06/26/rain-flooding-us-risk-climate-change/
Data from: https://www.sciencedirect.com/science/article/pii/S2214581822002890

In addition to flooding, droughts and wind events are also becoming more common.



What We Can Expect In Needham

Intense Storms

Heat Waves

Drought

Flooding

Climate Hazards

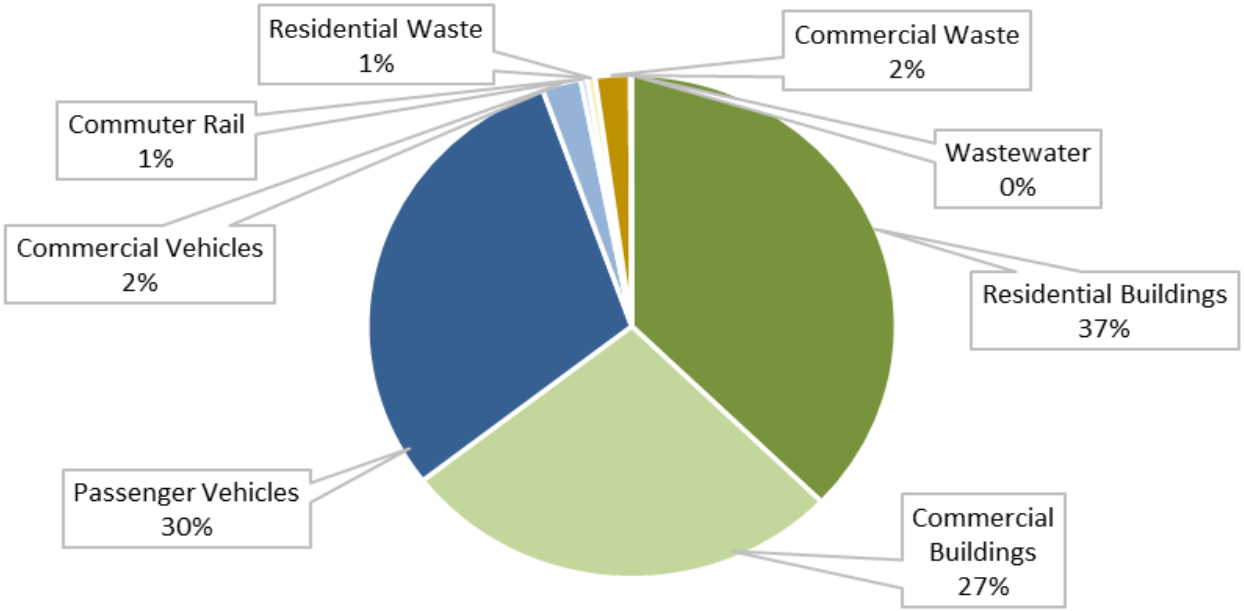
Why We're Taking Action

- To ensure Needham reduces its contribution to climate change
- To save money and resources
- To preserve the Town's history, culture, and quality of life
- To prepare for the current and coming impacts of climate change
- To comply with Massachusetts state law

We can mitigate the worst impacts of climate change,

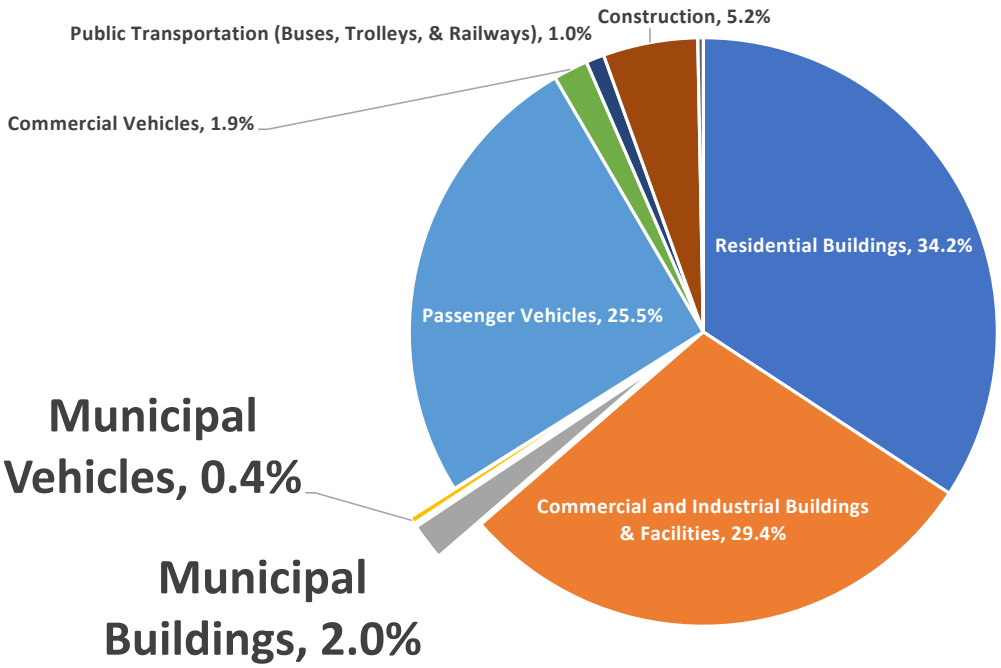
but we have to act TODAY.

Buildings account for about 64% of Needham's greenhouse gas emissions



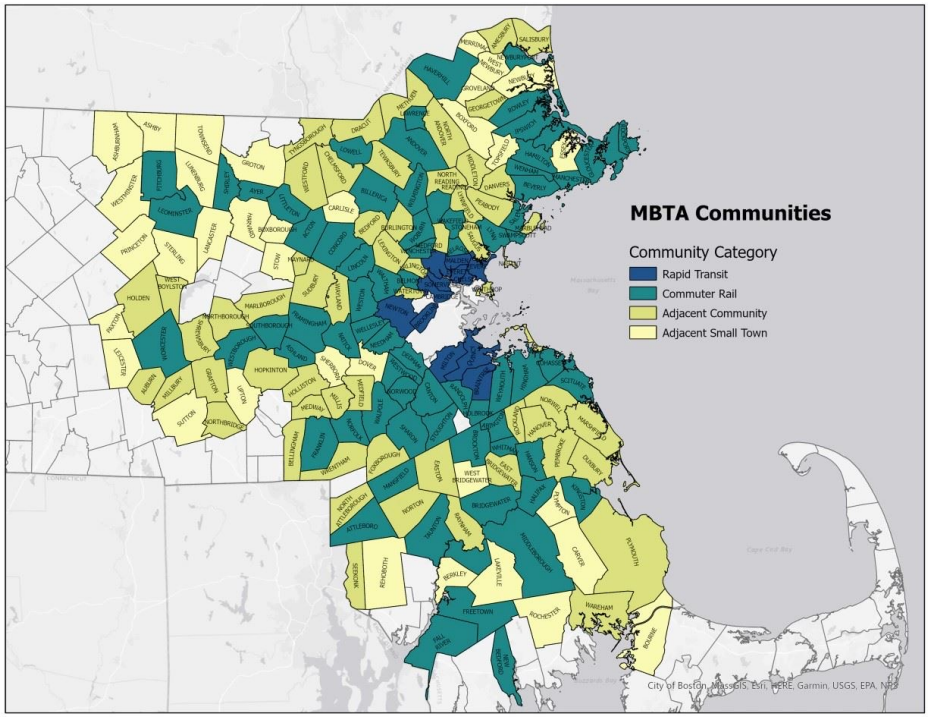
Achieving Net Zero will require efficiency upgrades and electrification of heating in all residential and commercial buildings by 2050.

Town of Needham's share of greenhouse gas emissions is only ~2.5%



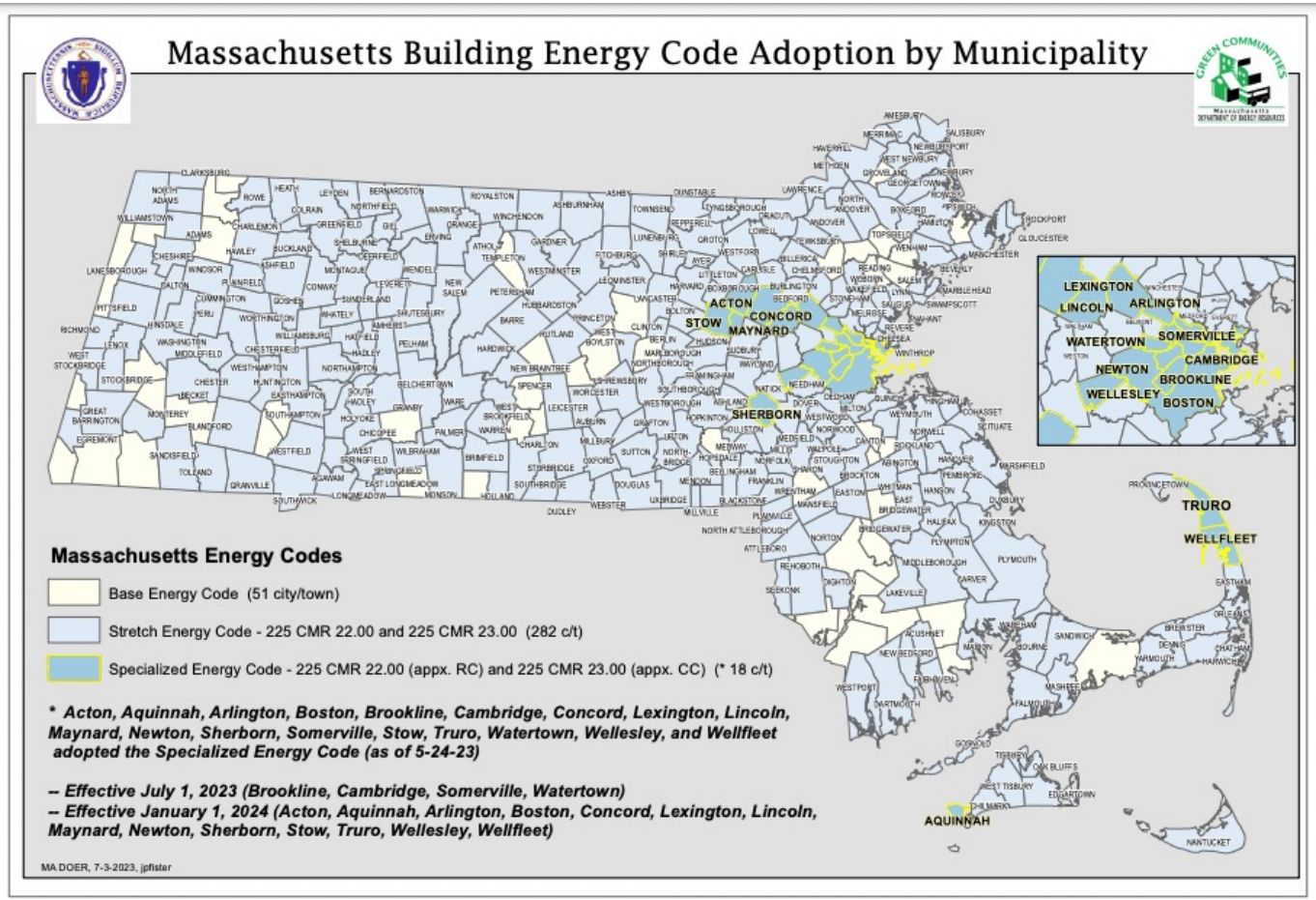
Municipal Projects on the Horizon

MBTA Communities Act



Stretch Energy Code History

2009	• Green Communities Act creates an optional Stretch Energy Code which sets efficiency requirements about 20% to 35% above the Base Energy Code • Every three years, the Base Energy Code is increased to match the Stretch Energy Code
2019	• Needham adopts Stretch Energy Code at Annual Town Meeting
2021	• Climate Act 2021 mandates a new energy code tier be developed to provide a pathway for buildings to be made net zero over time • Fall Special Town Meeting votes to approve a resolution declaring a climate and ecological emergency
2022	• DOER releases updates to the Stretch Energy Code and introduces the new Opt-In Specialized Energy Code for new construction
2023	• Updated Stretch Code went into effect for Needham on Jan 1, 2023 • CAPC recommends that the Town adopt the Opt-In Specialized Energy Code



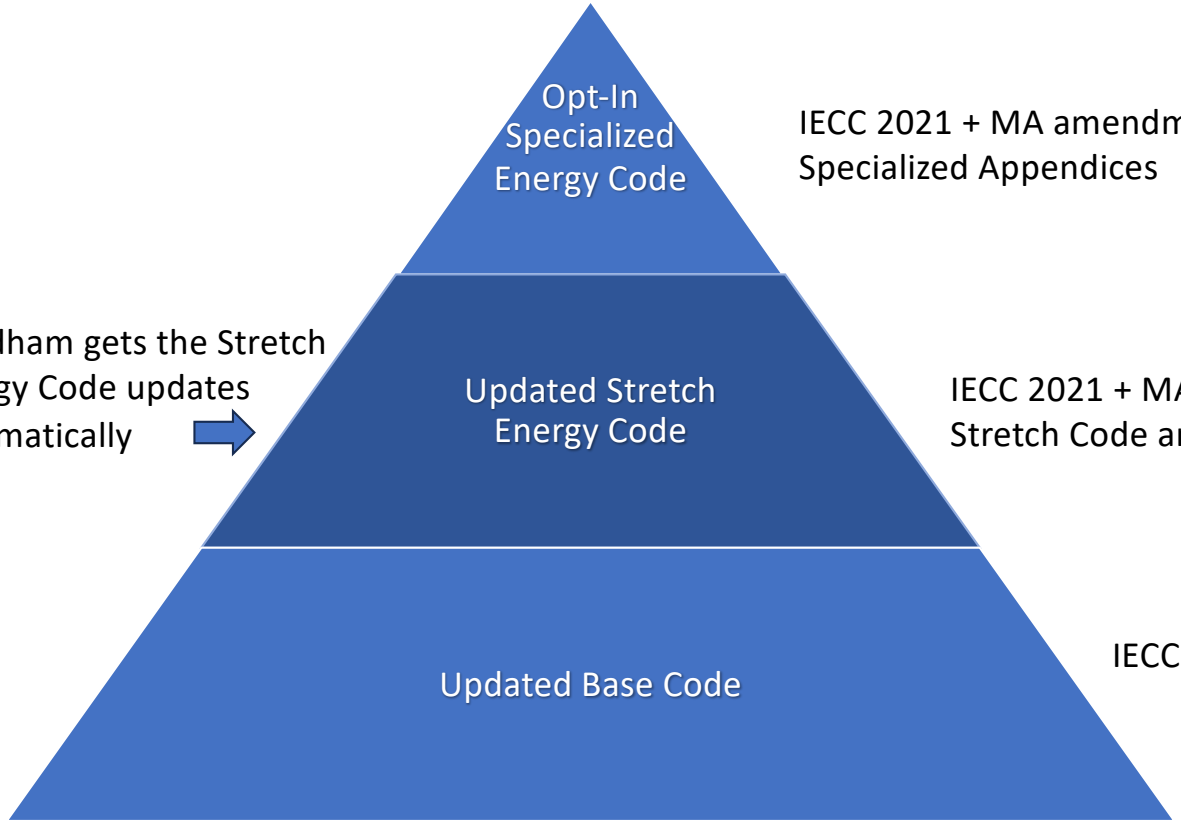
24 Communities representing 23% of the Massachusetts population have adopted the Opt-in Specialized Code

* Acton, Aquinnah, Amherst, Arlington, Boston, Brookline, Cambridge, Carlisle, Chelmsford, Concord, Lexington, Lincoln, Maynard, Newton, Northampton, Sherborn, Somerville, Stow, Truro, Watertown, Wellesley, Worcester, and Wellfleet have adopted the Specialized Energy Code already.

Massachusetts DOER
Climate Leaders Communities certification program

- Offers Towns that achieve certification state funded grants to advance clean energy and climate goals
- Builds upon Green Communities program
- Focused on Greenhouse Gas Emission reductions, in alignment with the state's 2022 Climate Law and the Clean Energy and Climate Plan
- Requires municipalities to:
  - Adopt the Specialized Energy Code
  - Adopt a Zero Emissions First municipal fleet vehicle policy
  - Commit to eliminate on-site fossil fuel in municipal buildings and fleets by 2050

Energy codes “build” on each other



IECC 2021 + MA amendments + Stretch Code amendments + Specialized Appendices

Needham gets the Stretch Energy Code updates automatically

IECC 2021 + MA amendments + Stretch Code amendments

IECC + MA amendments

Opt-in Specialized Energy Code Highlights

1. No additional requirements for additions, alterations, or renovations
2. No additional requirements for all-electric construction (except #4)
3. Any new residential or commercial construction *using fossil fuel combustion systems (*except #4) will need to:
   - Pre-wire for electric conversion (consumer protection)
   - Install a minimum amount of solar to offset some fossil fuel emissions
   - Homes >4000 s.f. must offset *all* of the home's energy use with solar
4. All multi-family >12,000 s.f. will need to meet Passive House
   - Already being done in affordable housing
   - Significantly lowers lifecycle costs and is eligible for MassSave incentives

Opt-In Specialized Energy Code vs. Stretch Energy Code Comparison: New Residential Construction

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	HERS 45* or Passive House pathways	HERS 45* or Passive House pathways	Full	Full	1 parking space	Optional	Optional
Mixed-Fuels	HERS 42* or Passive House pathways	HERS 42* or Passive House pathways	Optional	**Pre-wired is required**	1 parking space	Optional	**Solar PV required in some cases**

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	HERS 45* or Passive House pathways	HERS 45* or Passive House pathways	Full	Full	1 parking space	Optional	Optional
Mixed-Fuels	HERS 42* or Passive House pathways	**HERS 0 or Phius ZERO**	Optional	**Pre-wired is required**	1 parking space	Optional	**Solar PV required in some cases**

Opt-In Specialized Energy Code vs. Stretch Energy Code Comparison: New Commercial Construction

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	TEDI or Passive House pathways	TEDI or Passive House pathways	Full	Full	20% of parking spaces for residential/ business use, 10% for other uses	Optional	Optional
Mixed-Fuels	TEDI or Passive House pathways	TEDI or Passive House pathways	Optional	**Pre-wired is required**	20% of parking spaces for residential/ business use, 10% for other uses	Optional	**On-Site Solar PV required in some cases**

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	TEDI, 10% than 2019 ASHRAE Appendix G or Passive House	TEDI, 10% than 2019 ASHRAE Appendix G or Passive House	Full	Full	20% of parking spaces for residential/ business use, 10% for other uses	Optional	Optional
Mixed-Fuels	TEDI, 10% than 2019 ASHRAE Appendix G or Passive House	TEDI, 10% than 2019 ASHRAE Appendix G or Passive House	Optional	**Pre-wired is required**	20% of parking spaces for residential/ business use, 10% for other uses	Optional	**On-siteSolar PV required in some cases**

Opt-In Specialized Energy Code vs. Stretch Energy Code Comparison: New Commercial Construction

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	TEDI, HERS 45* or Passive House pathways	Passive House pathways or HERS 0	Full	Full	20% of parking spaces	Optional	Optional
Mixed-Fuels	TEDI, HERS 42* or Passive House pathways	Passive House pathways or HERS 0	Optional	**Pre-wired is required**	20% of parking spaces	Optional	Optional

	Minimum Efficiency		Electrification			Renewable Generation	
Fuel Type of Dwelling	**Stretch Code**	**Opt-In Specialized Code**	**Stretch Code**	**Opt-In Specialized Code**	**Minimum EV Wiring**	**Stretch Code**	**Opt-In Specialized Code**
All-Electric	Prescriptive pathways plus Stretch Code amendments	Prescriptive pathways plus Stretch Code amendments	Full	Full	20% of parking spaces for residential/ business use, 10% for other uses	Optional	Optional
Mixed-Fuels	Prescriptive pathways plus Stretch Code amendments	Prescriptive pathways plus Stretch Code amendments	Optional	**Pre-wired is required**	20% of parking spaces for residential/ business use, 10% for other uses	Optional	**Solar PV required in some cases**

Does the Opt-In Specialized Energy Code require schools/ municipal buildings to be built to a higher level of efficiency?

- Not if they're all electric.
- The Opt-In Specialized Energy Code efficiency ratings are identical to those for the Updated Stretch Code if the building is all electric.
- Building all-electric today eliminates need for future costly retrofits.
- Fossil fuel is allowed in school or office buildings BUT…
  - School would have to be pre-wired for all electric
  - Solar PV may be required on site

MSBA may also provide higher compensation rate for all-electric schools built under the Specialized Code

Fuel Type of Dwelling	Minimum Efficiency		Electrification		Minimum EV Wiring	Renewable Generation	
	Stretch Code	Opt-In Specialized Code	Stretch Code	Opt-In Specialized Code		Stretch Code	Opt-In Specialized Code
All-Electric	TEDI or Passive House pathways	TEDI or Passive House pathways	Full	Full	20% of parking spaces for residential/ business use, 10% for other uses	Optional	Optional
Mixed-Fuels	TEDI or Passive House pathways	TEDI or Passive House pathways	Optional	**Pre-wired is required**	20% of parking spaces for residential/ business use, 10% for other uses	Optional	**On-Site Solar PV required in some cases**

Does the Opt-In Specialized Energy Code have any impact on renovations?

- No.

  The Opt-In Specialized Energy Code applies only to new construction and not to existing structures.

- Additions and renovations, depending on size, are regulated by the Updated Stretch Code and Base Code.

- Emery Grover renovation would still have been covered by the Stretch Code even if the Opt-in Specialized Code were adopted.

Won't the electric grid be overwhelmed by building electrification?

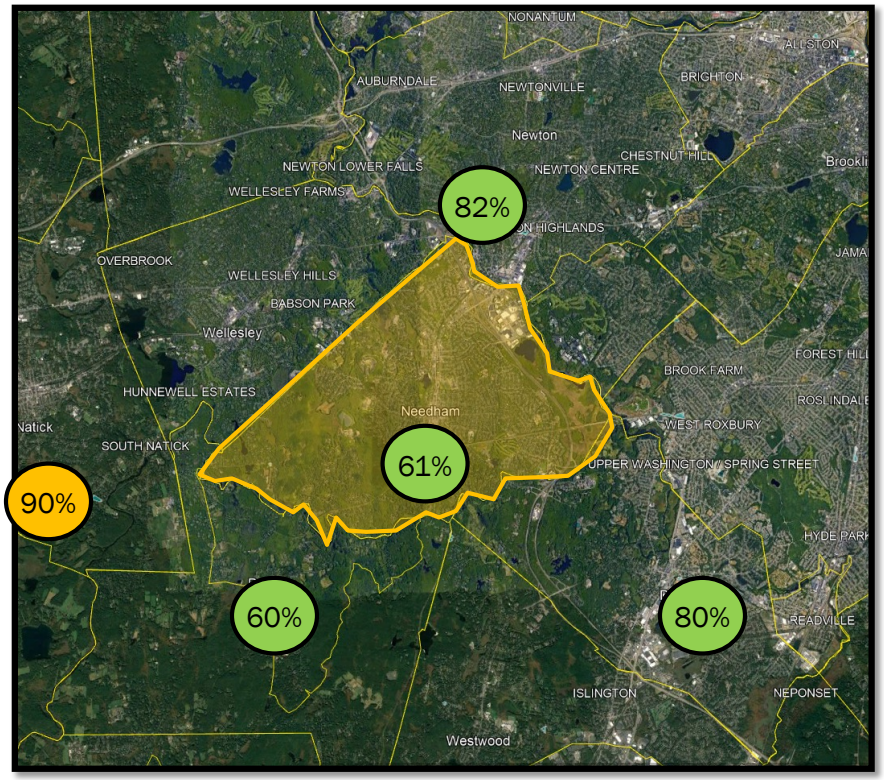
- Eversource says no.

  At the April 2023 Climate Action Planning Committee meeting, Eversource presented that Needham has sufficient capacity to support *full electrification by 2050*, with no significant upgrades to transmission lines or nearby sub-station required.
  - Eversource continuously forecasts demand and updates 5-year plans for major upgrades as needed.
  - At local street level, transformers (the "cans" on the telephone poles) may occasionally need to be upgraded (as with PSAB EV chargers).

- Today, the electric grid is operating at 20% below the all-time system electric peak in 2006, due to energy efficiency measures.
  - By 2035, building electrification will cause the grid to switch from summer peaking to winter peaking. This will not require a lot of transmission upgrades in the next 10 years.
  - By 2050, New England capacity is planned to double from 25 to 50GW; an additional 10 GW is planned to be available by 2035.
  - The electric grid is mandated to get greener by 2 to 3% per year.

Town of Needham Substation Supply Overview
2032 Substation Headroom

- Principal Substation expected to be at 61% of rating by 2032
  - Headroom is for substation transformers during N-1 - 90/10 weather condition
  - Based on historical growth and current projections for large new business customers
  - New large projects, such as the Riverside Development, has a significant impact on future headroom
- Substation headroom during normal conditions is typically larger
- Planning Department starts to look closer at new supply alternatives when substation is expected to exceed 90% of N-1 rating



DOER
Massachusetts Department of Energy Resources

SUSTAINABLE EEDHAM
CLEAN FUTURE TOGETHER

Increased Incentives for builders & developers

- All-electric homes are generally cheaper to build
  Heat Pump(s) replaces both Central A/C + Furnace(s)

- Mass Save: 1-4 unit all-electric homes
  $15,000 for HERS 45 single-family
  $25,000 for HERS 35 / Passive House single-family
- Mass Save: multi-family Passivehouse
  $3,000 per unit plus design study funding

- Federal IRA:
  $2,500 or $5,000/home from 45L tax credit: (aligned with HERS)
  up to $6/sqft from 179D tax credit for commercial & multi-family

https://www.masssave.com/saving/residential-rebates/all-electric-home
https://www.masssave.com/saving/residential-rebates/passive-house-incentives

Questions?

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