

Energy Committee update to Select Board

January 23, 2023

Two proposed warrant articles:

- Adoption of new Opt-In Specialized Energy Code
- Authorization of longer-term leases for electric vehicles

# Opt-in Specialized Stretch Code:

## Climate Act of 2021

- Established DOER as Stretch Code authority
- Called for Opt-in Net Zero Stretch Code

# Three Energy Code Pathways for 2023

## **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

# Specialized Code

The Specialized Code ensures new construction is consistent with a net zero Massachusetts economy in 2050.

# Updated Stretch vs. Specialized: RESIDENTIAL

**Comparison of updated Stretch and Municipal Opt-in Specialized Energy Codes for New Low-rise Residential Buildings (1)**

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* 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* 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* 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* 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. Specialized: COMMERCIAL

Comparison of updated Stretch and Municipal Opt-in Specialized Energy Codes for New Commercial Buildings (1)

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 <sup>o</sup>	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 or 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 <sup>†</sup> , or Passive House pathways	TEDI, 10% better than 2019 ASHRAE Appendix G <sup>†</sup> , or Passive House pathways	Optional <sup>†o</sup>	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 or 75% of Potential Solar Zone Area
Multi-family >12,000 sf	All Electric	TEDI, HERS 45*, Passive House pathways, or (until July 1, 2024) 10% better than ASHRAE Appendix G	Passive House pathways or HERS 0 <sup>s</sup>	Full	Full	20% of parking spaces	Optional	Optional
Multi-family >12,000 sf	Mixed-fuels	TEDI, HERS 42*, Passive House pathways, or (until July 1, 2024) 10% better than ASHRAE Appendix G	Passive House pathways or HERS 0 <sup>s</sup>	Optional <sup>o</sup>	Pre-wiring required	20% of parking spaces	Optional	Optional
Small Commercial (<20,000 sf, except multi-family)	All Electric	Prescriptive pathway plus Stretch Code amendments	Prescriptive 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 plus Stretch Code amendments	Optional <sup>o</sup>	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 or 75% of Potential Solar Zone Area

Authorization of longer-term leases for electric vehicles



# EVs increasingly come in all shapes and sizes

Ford EV Van



Case Electric Backhoe



# Why an EV Term Warrant Article is Needed

1. State Law limits *all municipal contracts* to 3-year terms, unless a longer term is authorized by Town Meeting (MGL 30B, section 12)
2. In particular for heavy equipment and school buses with large upfront costs (charger, grid connection), amortizing costs over 10 years allows EVs to compete financially with diesel and gas alternatives
3. Gives Town contract flexibility
4. Lays the groundwork for future consideration of EVs in town vehicle RFPs

# Why Belmont's Fleet Should Go EV

1. Healthier and Quieter
2. Financially Competitive; Federal and State grants
3. Less Maintenance and Operating costs
4. Belmont's Climate Roadmap

# Proposed ATM 2023 EV Term Warrant Article

**NOW, THEREFORE, BE IT RESOLVED**, that the Town of Belmont hereby authorizes Belmont Schools and all other Town departments (each a “Town Department”) to procure electric-powered cars, vans, buses, trucks and all other classes of vehicles (each an “EV”) for municipal uses as follows:

(1) Any EV lease or service contract hereafter entered into by any Town Department may be for a term of up to 10 years (the “10-Year Term”);

provided, that nothing herein shall require any Town Department to procure EVs at any time, nor for any particular term of years; and

provided further, that any Town Department may enter into a shorter term than a 10-Year Term for any EV lease or service contract, if a shorter term is deemed to be in the financial or operating interests of the Town;

(2) The foregoing maximum 10-Year Term authorization shall be deemed hereby granted for any EV lease or service contract entered into by any Town Department from this date forward, unless and until this authorization is revoked by action of a subsequent town meeting.

Or in any way act thereon.

# Appendix



# Example: EV Buses

- **EV Buses = same size & rider capacity** as traditional buses
- **125+ mile range** well beyond Belmont's 4.7 sq miles
- **Full service EV Bus solution** available:
  - Zero upfront capital outlay by town/district
  - Drivers, warranties & complete O&M provided
- **10-year contract price = competitive**: Beverly's 10-year EV Bus lease in 2021 = competitive with Diesel Buses. Will get more competitive over time with increasing adoption.



# Other Districts are Getting EV Buses



- **Beverly** started a 2-EV Bus pilot, now at 5.
  - Targeting a fleet of 30 EV Buses
- **Dracut** getting 10 EV bus fleet (drivers provided by Beacon Mobility)
- **Cambridge** got a pilot EV bus, considering more (Eastern Bus provides the drivers)
- **Acton** starting to procure 40 EV buses
- **Biggest of them all: Montgomery County, MD:**  
Fleet of **326** EV buses

# Public Health Study

School Bus Emissions, Student Health, and Academic Performance

[\*NBER Working Paper No. w25641\*](#)

48 Pages Posted: 13 Mar 2019 Last revised: 23 Jan 2022

## Abstract

Diesel emissions from school buses expose children to high levels of air pollution; retrofitting bus engines can substantially reduce this exposure. Using variation from 2,656 retrofits across Georgia, we estimate effects of emissions reductions on district-level health and academic achievement. We demonstrate positive effects on respiratory health, measured by a statewide test of aerobic capacity. Placebo tests on body mass index show no impact. We also find that retrofitting districts see significant test score gains in English and smaller gains in math. Results suggest that engine retrofits can have meaningful and cost-effective impacts on health and cognitive functioning.

## **Suggested Citation:**

Austin, Wes and Heutel, Garth and Kreisman, Daniel, School Bus Emissions, Student Health, and Academic Performance (March 2019). NBER Working Paper No. w25641,

Available online at SSRN: <https://ssrn.com/abstract=3351840>



# Belmont's CO2 Emissions



