

To: Deb Crossley, Chair, Zoning and Planning Committee; members of Zoning and Planning Committee
From: Ann Berwick, Co-Director of Sustainability
Cc: Mayor Fuller; Jonathan Yeo, COO; Bill Ferguson, Co-Director of Sustainability
Re: COMPARISON OF UPDATED STRETCH CODE AND SPECIALIZED CODE FOR COMMERCIAL BUILDINGS
Date: December 8, 2022

Recognizing that it's dangerous to try to provide a summary of the updated commercial Stretch Code and commercial Specialized Code, given their complexity, here's an attempt....

SUMMARY

Updated Commercial Stretch Code

The updated Stretch Code specifies four categories of buildings, with various compliance pathways available to different categories. The Passive House pathway is available as an option for all building types.

The updated Stretch Code significantly reduces the demand for heating and cooling relative to the current Stretch Code, by way of a focus on both energy efficiency requirements, and also full or partial electrification depending on the compliance pathway chosen.

Unlike the current Stretch Code, the updated Stretch Code applies to building additions, alterations, and changes of use or occupancy, and not just to new construction. However, the updated Stretch Code continues to allow building additions that are less than 20,000 sf to follow the Base Code. The updated Stretch Code eliminates an existing exception in the Base Code, which allows exterior walls that have any amount of insulation to remain non-code compliant.

Commercial Specialized Code

The Specialized Code maintains the same energy efficiency requirements as the updated Stretch Code for all building categories except multi-family buildings.

Multi-family buildings must follow updated Stretch Code requirements, be electrification-ready, and must follow the Passive House compliance pathway.

Buildings other than multi-family buildings have the choice of three compliance pathways: all-electric, mixed fuel, or zero energy. All-electric buildings must rely only on electric equipment, all of which must meet minimum efficiency standards. Mixed-fuel buildings must include minimum efficiency requirements for space and water heating, solar PV if there is on-site solar potential, and arrangements for future electrification. Zero Energy Buildings require net zero

energy on an annual basis. Zero energy may be demonstrated only with on-site renewable generation where feasible.

INTRODUCTION

The commercial Stretch Code and commercial Specialized Code apply to all buildings including all mixed use and residential buildings, except for detached one- and two-family dwellings and attached single-family dwellings, such as townhouses. The Specialized Code requirements are in addition to those of the updated Stretch Code.

Both the residential and the commercial Specialized Codes require a City Council vote for adoption. For Green Communities like Newton, the updated residential and commercial Stretch Codes do not.

The Specialized Stretch Code for both residential and commercial buildings must be available for adoption by December 24, 2022. To run concurrently with effective dates of all other building code amendments, DOER recommends that the requirements of the Specialized Codes take effect beginning on the January 1 or July 1 that is at least six months after the City Council vote.

All non-residential commercial buildings are subject to the updated Stretch Code as of July 1, 2023. Depending on their compliance pathway (e.g., Home Energy Rating System (HERS), Passive House), multi-family commercial buildings are subject to the updated Stretch Code as of July 1, 2023 or July 1, 2024.

To understand the energy codes, it is important to understand the Home Energy Rating Score, or HERS. Based on a score of 1-100, the more energy-efficient home is one that has the lower score. That is, all other things being equal, the one with a lower score will use less energy than one with a higher score. The new codes require lower HERS scores.

These codes are extraordinarily complicated, in part because they deal with such a wide variety of building types, many of which are not relevant to Newton, e.g., airports, large manufacturing facilities. For Newton, the commercial code is largely applicable to public facilities, office buildings, multi-family buildings, retail buildings, restaurants, labs, and hospitals. Those categories account for more than enough complexity.

UPDATED COMMERCIAL STRETCH CODE

Demand for heating and cooling is much reduced relative to the current Stretch Code, partly by way of energy efficiency requirements. These requirements, as well as electrification requirements, include (but are not limited to):

- Strengthened requirements relative to air leakage, thermal bridges, economizers, and ventilation energy requirements.

- Full or partial electrification of space heating, depending on the compliance pathway (see below) chosen;
- Full electrification of space heating for highly glazed buildings.

Building Categories and Compliance Pathways

The updated Stretch Code specifies four categories of buildings. The available compliance pathways include (but are not limited to) a new Thermal Energy Demand Intensity (TEDI)¹ pathway, HERS, and Passive House. The availability of each pathway differs with building category.

These are the building categories:

1. Offices, residential, schools over 20,000 sf, and certain types of adjacent buildings (must use TEDI or Passive House);
2. High-ventilation buildings such as labs and hospitals, multi-family buildings;
3. Small commercial buildings (any small building use except multi-family);
4. Multi-family buildings.

Passive House certification is available as an option for all building types.

Mixed-use buildings can use a combination of code pathways as appropriate for different portions of the building, or choose a whole-building approach using the TEDI or Passive House pathway.

EV Charging

The updated Stretch Code requires EV wiring for 20% of new business and residential spaces, and 10% for all other uses.

Alterations/Changes of Use or Occupancy/Additions

Unlike the current Stretch Code, the updated Stretch Code applies to building additions, alterations, and changes of use or occupancy, not just to new construction. However, the updated Stretch Code continues to allow building additions that are less than 20,000 sf to

¹ Heating TEDI: Total annual energy delivered to the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)
Cooling TEDI: Total annual energy removed from the building for space conditioning and conditioning of ventilation air, normalized by area (kBtu/sf-yr)

The updated Stretch Code sets forth specific TEDI limits by building type.

follow the Base Code. Additions greater than 20,000 sf are required to meet Stretch Code requirements for the applicable building category and size.

Although the updated Stretch Code applies to commercial building alterations and buildings that undergo a change of use or occupancy, it allows for a 10% reduced envelope requirement compared to new construction.

The updated Stretch Code eliminates an existing exception in the Base Code, which allows exterior walls that have any amount of insulation to remain non-code compliant. The updated Stretch Code requires that any altered walls be brought up to Stretch Code standards, although historic buildings remain exempt from this requirement.

COMMERCIAL SPECIALIZED CODE

Energy Efficiency Requirements

The Specialized Code maintains the same energy efficiency requirements as the updated Stretch Code for all building categories except multi-family buildings.

Multi-family buildings must follow the Passive House compliance pathway, plus updated Stretch Code requirements, and must also be electrification-ready. Passive House standards are phased in with reference to building size and date of permit application:

- As of January 2023, Passive House standards are required for buildings five stories or less, if over 12,000 sf. Taller buildings may choose other compliance options, including TEDI or HERS.
- As of January 2024, Passive House is required for multi-family buildings over 12,000 sf.

All-Electric Buildings

This is the simplest compliance pathway under the Specialized Code, with energy efficiency requirements the same as under the Stretch Code, and electric equipment all of which meets minimum efficiency standards. Back-up power generation is permissible.

Mixed-Fuel Buildings

This pathway establishes minimum requirements for new buildings with any fossil fuel use. The Specialized Stretch Code requires emissions mitigation (efficiency the same as the Stretch Code), including minimum efficiency requirements for space and water heating appliances, solar PV if there is on-site solar potential, and arrangements for future electrification. Although it is not absolutely clear, it appears that large water heaters, commercial restaurant cooking, and commercial drying equipment used for manufacturing and process loads are excepted.

Zero Energy Buildings

This is the most stringent of the three pathways in that it requires net zero energy on an annual basis. Zero energy may be demonstrated only with on-site renewable generation, except for the energy required for back-up power and EV charging, and all buildings must meet minimum energy efficiency requirements prior to the use of renewable offsets.

The option to show compliance using HERS 0 or Phius ZERO certification (among other things, Phius ZERO prohibits any use of fossil fuels on-site), also referenced in the residential Specialized Code, is available under the Zero Energy pathway for multi-family residential buildings.

Wellesley's table

Wellesley Climate Action and the Town's Sustainability Director created the table below, comparing the commercial Stretch and Specialized Codes. I'm including it in the hope that some will find this additional approach helpful.

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 Dem and 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 ⁹	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 ≥ 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 ¹ , or Passive House pathways	TEDI, 10% better than 2019 ASHRAE Appendix G ¹ , or Passive House pathways	Optional ¹⁰	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 ≥ 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 ⁸	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 ⁸	Optional ¹¹	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 ⁷	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 ≥ 75% of Potential Solar Zone Area