



To: Newton City Council

From: Councilor Deborah J. Crossley

Re: Committee of the Whole on new Stretch and opt-in Specialized Energy Code

Date: February 10, 2023

Dear Colleagues,

The City Council will be meeting in a Committee of the Whole to hear a presentation on the new energy codes and discuss adoption of the opt-in Specialized Energy Code. This will be a continuation of the discussion at the December 12th Zoning & Planning Committee meeting.

There will be a 10-12 min. presentation by Ian Finlayson, Deputy Director DOER Energy Efficiency Division on the essence of these codes, and when the various elements of the Stretch and Specialized codes became – or will become effective.

The task for Council is to first determine whether to adopt this code, and if so, when to make it effective.

Attached to this memo are the following items:

- 1) **One Page Memo** Relating new MA Energy Codes, Ten Communities & BERDO, by Sustainability Director Berwick
- 2) **FAQ** re Stretch & Specialized Codes: by Sustainability Director Ann Berwick & Ian Finlayson, Deputy Director, Energy Efficiency Division, DOER
- 3) **Residential** Stretch & Specialized code Summary by Co-Director of Sustainability Berwick
- 4) **Commercial** Stretch & Specialized code Summary by Co-Director of Sustainability Berwick
- 5) **City buildings** designed to achieve these standards since 2018; Letter of Support by Josh Morse, Commissioner of Public Buildings
- 6) **Ten Communities Act:** More on Requirements, by Sustainability Director Berwick
- 7) **Electric Capacity and Infrastructure:** *Adequacy of the Eversource distribution system and the New England Electric Grid*, Memo by Co-Directors of Sustainability Bill Ferguson and Ann Berwick
- 8) **11/2/2009 Board Order** Adopting the first MA Stretch Code

The code summaries we received first in December 22 are detailed. But for the truly adventurous, Final code language and a summary from DOER can be found at: <https://www.mass.gov/info-details/stretch-energy-code-development-2022>

Sincerely,

Deborah J. Crossley

Zoning & Planning Committee Chair

One-Pager on Stretch/Specialized Energy Codes, Ten Communities Program, BERDO***Stretch/Specialized Energy Codes (Residential and Commercial)***

A new building Stretch Energy Code went into effect in December 2022. As a “Green Community,” Newton is automatically subject to the new Stretch Code. By State law a new Specialized Code also became available for adoption in December 2022. The City Council is in the process of deciding whether to adopt the Specialized Code. The new Stretch Code is more stringent—i.e., more emphasis on energy efficiency and electrification—than the Base Code, and the Specialized Code is more stringent still. Brookline, Watertown, Cambridge, and Somerville have already adopted the Specialized Code.

Ten Communities Program

A number of cities and towns, including Newton, filed Home Rule Petitions with the Legislature over the last few years, seeking authority to require all new construction and substantial renovations to be all or mostly electric. Instead of acting on the Petitions, the Legislature passed a statute that provides the requested authority to the first ten communities that filed the Petitions, which include Newton.

The Department of Energy Resources (DOER) has published its [proposed regulations](#) and [model rule](#) on the Ten Communities Program. Communities that intend to participate must submit a letter of intent to DOER not later than September 1, 2023.

To participate, communities must meet one of three affordable housing requirements specified in the applicable legislation. The City’s Planning Department is optimistic that we will be able to do so ahead of September 1 by achieving the 10% unit threshold in Ch 40B. Participating communities must substantially track DOER’s model rule (which includes electric cooking and large commercial buildings), although limited exemptions are permissible. By statute, medical facilities and laboratories are excluded from the Program.

Relationship of Ten Communities Program to Specialized Codes

DOER “recommends” (DOER doesn’t have statutory authority to require) that the communities that want to participate in the Ten Communities Program adopt *both* the Specialized Code and adhere closely to the Model Rule.

DOER says that the Model Rule “ensures appropriate integration” with the Specialized Code. What DOER means is that the Specialized Code and the Model Rule need to be integrated because the Specialized Code specifies certain compliance pathways that allow the use of fossil fuels, in contrast to the Model Rule. One way to think about this is that the Model Rule provides a variant of the Specialized Code for communities that participate in the Ten Communities Program.

Building Energy Reporting and Disclosure Ordinance (BERDO)

Boston and Cambridge have adopted a BERDO ordinance. BERDO 1 requires that large buildings report their greenhouse gas (GHG) emissions, and BERDO 2 requires reduction in those emissions over a specified glide path extending to 2050. The key differences between BERDO on the one hand and the new building codes and the Ten Communities Program on the other hand are that BERDO affects existing buildings, is phased in over time, and is limited to a smaller number of buildings (i.e., 400 buildings with 205 owners, and 27% of the entire City’s total GHG emissions, including transportation). Comparing BERDO to the Ten Communities Program is comparing apples to oranges. BERDO is also entirely separate from these new energy codes, except that it is far more cost effective to build to higher performance standards initially, rather than to retrofit a building to meet the BERDO standards at a later date.

To: Zoning and Planning Committee, Newton City Council
From: Ann Berwick, Co-Director of Sustainability
Re: Questions from ZAP on Stretch and Specialized Energy Codes
Date: February 9, 2023

What is the City doing to disseminate information regarding Passive House and enforce compliance with Passive House guidelines?

Passive House is one of the authorized green building rating systems for projects subject to the Sustainable Development Design requirements of Newton's Zoning Ordinance (special permit projects >20,000 sf). Throughout the special permit application process, the Climate and Sustainability Team provides information to the project team about both the Passive House standards and available technical support and incentives.

Mass Save offers incentives for the feasibility, design, and construction of Passive House projects, as well as webinars, workshops, and reimbursements for industry professionals to become Passive House accredited professionals. Verification of Passive House compliance is completed by a Passive House rater/verifier before application for a certificate of occupancy.

The State has just promulgated building codes that include Passive House pathways as an option and, in some cases, requires Passive House certification. In light of changes to the codes, statewide organizations such as DOER, Mass Save, and Passive House Massachusetts are preparing for the increased interest in this certification.

What is Phius Zero?

Phius Zero goes beyond the basic Passive House requirements by achieving all of the same requirements and, additionally, netting out energy use on an annual basis with renewable energy. Phius Zero also bans on-site fossil fuel use. See <https://www.phius.org/phius-zero>.

What incentives exist for someone to build to a more efficient building?

[A study commissioned by the DOER](#) has found that across all tested *residential* building types, all-electric HERS 42 projects provide cost savings *during construction and operation* as compared to the baseline of gas HERS 52 homes. Gas HERS 42 projects as compared to gas HERS 52 projects did not lead to as great savings as all-electric HERS 42 projects, and in some cases cost more. The above study includes current rebates and tax credits in its cost comparison calculations, the most sizeable rebates coming from the Mass Save Program.

The same study found slight cost increases (from 0-4%) for most new *commercial* projects to meet the new code, but this analysis did not take into consideration incentives for commercial new construction. There are significant Mass Save incentives for [commercial new construction and major renovations](#).

Projects with 1-4 units are eligible for the [All-Electric Home incentive](#), providing \$15,000-\$40,000, depending on level of efficiency and number of units. Projects with 5+ units are eligible for [Passive House incentives](#), covering 100% of Passive House feasibility study costs, 75% energy modeling costs, and \$3,000 per unit for reaching Passive House certification.

Apart from financial incentives, efficient buildings are more comfortable. Buildings that use electricity rather than fossil fuels are also healthier from a number of perspectives, e.g., no emissions from gas used for cooking. However, individuals with implanted medical devices such as pacemakers should consult with their doctors about the advisability, specifically, of using an induction stove.

Do the subsidies mentioned apply to substantial renovations?

Residential renovations are addressed by the Mass Save [Renovations & Additions incentive](#) and the equipment incentive for [heat pumps](#).

Can the City require more EV chargers than outlined in the codes?

The answer depends on whether the codes themselves have EV charger requirements. If they do not—which had been the case until recently—the City has flexibility to impose its own charger requirements.

Now that the new codes have charger requirements, the answer is straightforward: the City cannot impose charger *requirements* different from what the codes specify.

This is somewhat more complicated in the context of a special permit. Although the City *cannot specifically require* that the number of EV chargers be increased beyond what the codes require, *the number of EV chargers can be considered in the special permit context* as one of the measures included in the project to satisfy the requirements of so-called “criterion 5.”

Section 7.3.3(C)(5) of Newton’s Zoning Ordinance (commonly referred to as “criterion 5”) requires that an application for a special permit “contribute significantly to the efficient use and conservation of natural resources and energy, including through some or all of the following: (a) minimizing operating energy; (b) minimizing the use of fossil fuels; (c) implementing a transportation plan that will minimize carbon footprint.”

Could clarification be provided regarding the residential and commercial definitions used in the code?

My Stretch Code/Specialized Code memos provide the following definitions: “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.”

Here are the questions directed to DOER's Ian Finlayson, with his answers:

- ***What definition is DOER using to calculate square footage? Is the calculation per unit? What does it include, e.g., all potentially conditioned space? Are attached garages included?***

Where the Stretch code and specialized code refer to square footage, for example in additions over 1,000 sf or new homes over 4,000 sf, the calculation of square footage is based on the total conditioned floor area of the unit. For example a 2 story house with a 1,000 sf floor area on each floor would have a conditioned floor area of 2,000 square feet. Attached garages are not included if they are outside of the conditioned envelope, but spaces that are included in the thermal envelope, such as, in many cases, basements, are included. The location of the air barrier is typically used to differentiate these spaces.

- ***What is the increased cost per square foot for development under the updated residential Stretch and Specialized codes, for residential buildings below 4,000 sf and above 4,000 sf and also for multi-family buildings?***

DOER hired national experts to analyze the costs and benefits of the updated stretch code from 2019-2021 and they looked at 12 different building types including several different residential home sizes and types. This information is available on the DOER website at: <https://www.mass.gov/lists/stretch-energy-code-development-support-documentation>

The level of detail in these case studies is significantly more detailed than can be reduced to a general increased cost per square foot, as the costs are different for every building type. So we don't attempt to provide a single cost number. The utility costs and mortgage rates have both changed significantly in the past year, although the bigger change is in utility costs and that serves to improve the cost savings for the improved energy efficiency in the Stretch code.

We invite the City Council and the public to review all of the case studies, they generally show that there are net savings to home buyers or commercial property owners over the expected mortgage period of the building. For residential homebuyers it almost always results in a lower cost of ownership of a new home from day 1 when a home is purchased with a standard 30-year mortgage.

- ***Can mixed-use buildings receive Passive House certification for a portion but not all of the building?***

Yes. This is already existing practice for both multi-family buildings that have additional community or retail spaces and for large commercial buildings with a mix of residential units and office spaces. The code has different compliance paths for different building use types and mixed-use buildings can apply the code compliance approach to a portion of the building as appropriate.

- ***Are long-term care facilities, such as assisted living facilities, considered multifamily housing required to achieve Passive House standards? These often include integrated health care and physical therapy facilities and swimming pools.***

Long term care facilities such as assisted living facilities are considered R-use buildings and as such if they are over 12,000 square feet and 4 stories or above then they would be required to achieve passive house standards for the residential sleeping units. Where these facilities have health care facilities or swimming pools onsite, these can be designed to be outside of the Passivehouse certified spaces as a mixed-use building if that is preferable to the design team.

- ***Will the codes require actual Passive House certification?***

Short answer: Yes.

Longer answer: The language in the stretch code on the Passive House pathway (which is also referenced in the Specialized code) details out the documentation required for compliance with the Passive house pathway. The requirements for documentation allow a certificate of occupancy to be issued prior to a building completing the Passive house certification process. This is intentional so that any delay in the certification process would not impact the code approval process. However, the documentation requirements also make clear that the full certification documentation must be provided to the code official having jurisdiction prior to a certificate of occupancy being issued, so the intent is that these buildings will be certified in due course.

- ***Is it correct to say that the only significant difference between the July 2024 version of the residential Stretch code as compared to the residential Specialized code is for homes larger than 4,000 sf that use any fossil fuels?***

No. The July 2024 version of the Stretch code and the Specialized code are similar for all electric buildings, but they are quite different for any buildings that are new mixed-fuel buildings. The Specialized code has requirements that impact mixed fuel homes of all sizes, and notably requires multi-family buildings over 12,000 sf and 4 stories or more to use the Passive house certification pathway. The Specialized code also has additional requirements for wiring for future electrification and solar installations on commercial buildings with any fossil fuel or biomass usage onsite.

- ***How would you describe the difference between the July 2024 version of the commercial Stretch code and the commercial Specialized code?***

The major differences between the July 2024 commercial stretch code and the commercial Specialized code are the following additional requirements in the Specialized code:

- a) **Mixed-fuel buildings** (not all-electric) will need to be pre-wired for future electrification and have appropriate electric service when first built.

- b) **Mixed-fuel buildings** in the Specialized code will be required to have on-site solar PV systems installed if they have sufficient unshaded roof area to make a solar PV system feasible. The solar system can be installed either on the roof or elsewhere on the site – for example with a parking canopy based solar array.
In the Stretch code these buildings need to have solar-ready roofs, but not to install solar systems.
- c) **Mixed-fuel buildings using gas or propane** have to meet higher efficiency requirements for space or water heating than in the Stretch code.
- d) **Multi-family buildings over 12,000 sq feet** than fall under the commercial code chapters have to follow the Passive house code compliance pathway in the Specialized code whereas under the Stretch code after July 2024 they would be able to choose between three pathways: Passive House, HERS rating (42 or 45 per unit) or the TEDI pathway.

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 RESIDENTIAL LOW-RISE BUILDINGS
Date: December 8, 2022

COMPARISON OF UPDATED STRETCH CODE AND SPECIALIZED CODE FOR RESIDENTIAL LOW-RISE BUILDINGS

INTRODUCTION

In 2009, Newton was the first municipality to adopt the Massachusetts Stretch Code. Today Newton is one of 299 “Green Communities,” all of which will automatically be subject to the updated Stretch Code beginning Jan 1, 2023 (but note the phase-in period in the table below), without a City Council vote. The current Stretch Code is incorporated into the updated Base Code and is no longer a stretch.

Both the residential and the commercial Specialized Codes do require a City Council vote for adoption.

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

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 Code take effect beginning on the January 1 or July 1 that is at least six months after the City Council vote.

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.

UPDATED RESIDENTIAL STRETCH CODE AND RESIDENTIAL SPECIALIZED CODE

The provisions for residential buildings are much less complicated than those for commercial buildings. The key differences, as shown by the table below, are between smaller and larger homes, and between homes that are all-electric as opposed to those that use some fossil fuels.

Here are the important take-aways regarding both the updated residential Stretch Code and the residential Specialized Code:

1. The updated Stretch Code lowers the maximum allowable Home Energy Rating Score (HERS) ratings as compared to the current Stretch Code. (Again, *lower* HERS numbers reflect *greater* energy efficiency.)
2. For all-electric homes of any size, the Specialized Code is the same as the updated Stretch Code (as of July 1, 2024).
3. For homes smaller than 4,000 sf that use fossil fuels, the Specialized Code is only slightly more stringent than the updated Stretch Code.
4. For homes larger than 4,000 sf that use fossil fuels, the Specialized Code is significantly more stringent than the updated Stretch Code.
5. Homes over 4,000 sf have the choice of being either all-electric or HERS 0 with pre-wiring for an all-electric future and with onsite solar sufficient to offset fossil fuels and electric loads, or as much as the site roof will allow. DOER adds that because of this requirement the use of fossil fuels will add significant cost.
6. The HERS numbers for larger alterations, additions, or changes of use are the same as the HERS numbers for the updated Stretch Code *prior to* July 1, 2024, while smaller changes continue to follow the Base Code.
7. The updated Stretch Code and Specialized Code both require that one space per home be pre-wired for EV charging (the same as the proposed updated Base Code).

See table on next page.

The table below compares the updated Stretch Code, Specialized Code, and current Stretch Code for residential buildings.

For the sake of simplicity, the table does not include the requirements for alterations, additions, or changes of use, or for wiring for electric vehicle (EV) charging.

New Low-Rise Residential Construction—Updated Stretch Code and Specialized Stretch Code

Building Size	On-site fuel type	Updated Stretch Code January 1, 2023	Updated stretch code July 1, 2024	Specialized Code	Renewable generation Updated Stretch Code	Renewable Generation Specialized Code	Current stretch code (same as updated Base Code)
Up to 4,000 sf	All-electric	HERS 55	HERS 45 or Passive House	HERS 45 or Passive House	Panels optional/solar-ready required	Panels optional/solar-ready required	HERS 60
Up to 4,000 sf	Fossil fuels	52	HERS 42 or Passive House	HERS 42 or Passive House plus pre-wiring (and sufficient service and space)	Panels optional/solar-ready required	Solar PV if HERS pathway (except shaded sites; Passive House required to be solar-ready)	HERS 55
>4,000 sf	All-electric	HERS 55	HERS 45 or Passive House	HERS 45 or Passive House	Panels optional/solar-ready required	Panels optional/solar-ready required	HERS 60
>4,000 sf	Fossil fuels	HERS 52	HERS 42 or Passive House	HERS 0 or Plus Zero plus pre-wiring (and sufficient service and space)	Panels optional/solar-ready required	Solar PV if HERS pathway, or other renewables	HERS 55

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



Ruthanne Fuller
Mayor

PUBLIC BUILDINGS DEPARTMENT

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January 26th, 2023

The Massachusetts Specialized Opt-In Energy Code, MSOEC, is essentially a pathway towards meeting our climate goals through converting, or at least enabling the future conversion of, buildings to all-electric heating. The building energy efficiency requirements of the MSOEC mirror the requirements of the latest energy stretch code, so the impacts are minimal. The MSOEC requires that for major renovations or new construction projects that you either convert to a fully electric building, with exceptions for back-up generators and onsite vehicle refueling systems or ensure that you size and install an electrical system that will support the future conversion to a fully electric building.

All major school and municipal building projects have fully complied with the MSOEC since 2018. We have been designing and constructing fully electric facilities with high efficiency heat pump technology for many years now. The Newton Early Childhood Program, NECP, and Oak Hill addition projects are fully electric. We converted the Auburndale Community Library to be full electric. The Lincoln-Eliot, Newton Center for Active Living, NewCAL, Countryside, Franklin, and Horace Mann addition projects are all being designed to be fully electric.

The cost to design and construct our projects to be fully-electric is now less than what it would cost to design and construct a new natural-gas-fired condensing hot water distribution system with rooftop dx-cooled air handling units. When this is coupled with using the principles of passive house design to create a tight and efficient building envelope, the utility costs are less for a fully electric building than one that uses natural gas. The maintenance, repair, and future replacement costs are no more expensive in a fully electric building.

The industry is changing. Costs for the fully electric equipment are coming down as they become increasingly mainstream all over the world. The fossil-fuel industry is also changing. Geopolitical pressures, wars, declining inventories, government regulations to protect the planet, and so many other factors are creating tremendous uncertainty in the fossil-fuel markets. Projecting inflation decades out for a finite resource is nearly impossible. The conversion to fully electric buildings is an essential step for our planet, and for the future of our bank accounts. Fossil-fuel heating equipment will begin to be phased out as the demand drops. Repair parts for fossil-fuel equipment will become harder to find. As demand drops the fossil-fuel industry will start to fracture. The refinement and distribution systems for the various fossil fuels will break down. All of these will result in rapid spikes in fossil fuel prices. Meanwhile, electric generation will continue to become more renewable. The increasing electric demand has, and will continue to, result in investments in expanded electrical generation and distribution infrastructure. This will result in electricity becoming a more stable, financially predictable, energy source.

The MSOEC basically says either convert your building to fully electric now as part of your major construction project, or at a minimum make sure you lay the groundwork to ensure you can convert down the road. This is a case where the code is really looking out for the best interests of everyone.

Lastly, every building code, stretch code, or energy code revision that has come out has been well behind where my department is. The only reason we even reference the current code from an energy and efficiency perspective is so that we can show how much better we are doing than what the code requires. Energy and efficiency codes should be achievable bars. However, the bar is something you should reach up for, not simply step over.

Regards,

Josh Morse

To: Newton City Council
Cc: Mayor Fuller, Jonathan Yeo, Barney Heath, Josh Morse, Jen Caira, Jonah Temple, John Sisson, John Lojek, Anthony Ciccariello
From: Ann Berwick
Date: January 30, 2023

This memo is intended to explain (1) some of the details of the Ten Communities Program, and (2) the relationship between the Ten Communities Program and the Specialized Code (i.e., the more stringent, opt-in version of the Stretch Code).

Ten Communities Program

A number of cities and towns filed Home Rule Petitions with the Legislature over the last few years, seeking authority to require all new construction and substantial renovations to be all or mostly electric. Rather than acting on the Petitions, the Legislature passed a statute that provides the requested authority to the first ten communities that filed such Petitions. Newton is one of the first ten.

The Department of Energy Resources (DOER) has now published its [proposed regulations](#) and [model rule](#) on the Ten Communities Program. Communities that intend to participate must submit a letter of intent to DOER not later than September 1, 2023.

Notwithstanding being one of the first ten, Newton has to address the following issues in order to qualify to participate:

- **The City must meet the affordable housing requirements** specified in the applicable legislation. The City's Planning Department is optimistic that we will be able to do so well ahead of September 1, most likely by meeting the 10% housing affordability requirement under Chapter 40B of the Massachusetts General Laws.
- **If a Community determines that adoption of a local ordinance that differs from the Model Rule is necessary, the Community has to describe the differences and the rationale for the differences.** Newton's Home Rule Petition and DOER's Model Rule are indeed different.
 - The most significant difference is that Newton's Home Rule Petition covers only residential buildings and small non-residential buildings (i.e., less than 20,000 square feet, any portion of which is used for commercial, retail, office, professional, educational, or other non-residential purpose). By contrast, the Model Rule includes commercial buildings over 20,000 square feet. **It will certainly be impermissible to exclude large commercial buildings.**

- Additionally, Newton's Home Rule Petition allows the use of natural gas for cooking, which is not allowed by the Model Rule. On a webinar on January 26, DOER indicated that it **will not allow** communities to participate in the Program if they allow natural gas stoves in new construction or substantial renovations.

There are two other respects in which Newton's Home Rule Petition differs from DOER's Model Rule, but I think those are less problematic.

The first of these is that DOER's regulations do allow communities to propose exemptions, but they do not specify what exemptions may be acceptable. Newton's Home Rule Petition provides for a variety of exemptions, including freestanding outdoor heating and cooking appliances that are not connected to the building's natural gas or propane infrastructure, and back-up power. Newton's Home Rule Petition also exempts certain centralized domestic hot water systems in larger buildings.

I don't know for sure, but I doubt Newton's proposed exemptions will be a barrier to our participation in the Program.

The other difference between Newton's Home Rule Petition and the Model Rule is that, pursuant to the applicable State legislation, the Model Rule requires that communities include exemptions from fossil fuel free requirements for both laboratories and medical facilities. In that regard, the Newton Home Rule Petition exempts only Newton-Wellesley Hospital. Since the laboratories/medical facilities provisions are requirements of State legislation, the ordinance that Newton adopts will have to adopt these provisions.

Relationship between the Ten Communities Program and the Specialized Code

DOER "recommends" (DOER doesn't have statutory authority to impose this as a requirement) that the communities that want to participate in the Ten Communities Program adopt *both* the Specialized Code and the Model Rule. DOER says that the Model Rule "ensures appropriate integration" with the Specialized Code.

This makes sense for a number of reasons, including that the Specialized Code and the Model Rule need to be integrated because the Specialized Code specifies certain compliance pathways that allow the use of fossil fuels, in contrast to the Model Rule. One way to think about this is that the Model Rule provides a variant of the Specialized Code for communities that participate in the Ten Communities Program.

I am attaching a letter from Public Buildings Commissioner Josh Morse on the Specialized Code, addressing how, since 2018, new City buildings are designed to meet higher standards of construction and will meet the requirements of the Specialized Code."

In summary, my recommendation is that Newton adopt the Specialized Code and the Model Rule, with the exemptions specified in our Home Rule Petition.

What this means is that Newton's Ordinance:

- *will have to include large commercial buildings;*
- *will have to eliminate gas cooking as an option;*
- *will include the exemptions in Newton's Home Rule Petition, e.g., outdoor cooking and heating, back-up power, anticipating that they will meet with DOER's approval;*
- *will include the statutorily required exemptions for laboratories and medical facilities.*

It also means that Newton will have to adopt the Specialized Code as DOER "recommends."

To: Mayor Fuller, Jonathan Yeo, Liora Silkes, Jennifer Steel, Ellen Menounos, Joshua Morse, Ellen Ishkanian
From: Bill Ferguson, Ann Berwick
Re: Adequacy of the Eversource distribution system and the New England electric grid
Date: November 16, 2022

Bill and I have been expressing confidence in the adequacy of the Eversource distribution system and the New England electric grid. We thought you might like to know our reasoning in that regard.

Both Eversource and the Federal Energy Regulatory Commission (FERC) have raised concerns that in the event of an unusually cold winter New England might not have adequate energy supplies. The Independent System Operator-New England (ISO-New England), which manages New England's electric grid, says both that it expects the coming winter (2022-2023) to be mild, and that it believes the region is safe in the short term (two years), but that the longer term requires offshore wind. The National Oceanic and Atmospheric Administration (NOAA) echoes ISO's forecast for this winter's temperatures in New England (<https://www.noaa.gov/news-release/us-winter-outlook-warmer-drier-south-with-ongoing-la-nina>).

Here's why offshore wind must—and will—be developed, and why additional electrification will not threaten regional power supplies.

A few basics:

- Eversource manages the *electric distribution system* in Newton. Eversource does not generate electricity. ISO-New England, overseen on the federal level by FERC, manages the region's *power supply* and transmission.
- Eversource officials have assured the City that the distribution system is adequate, reporting in two meetings called by the City to discuss system capacity in Newton that all three substations serving Newton have “adequate headroom,” although it is possible that the system may need local upgrades for customers with large new electrical demand. At these meetings, City officials have apprised Eversource of its commitment to electrification (i.e., the 4 Our Future campaign, and potentially BERDO and an electrification ordinance). Eversource will be including these City initiatives in its annual revision of its 10-year plan. Eversource is also initiating projects to upgrade two underground transmission cables to Newton Highlands. Therefore, it is chiefly the regional power supply, not the local delivery system capacity, that is in question.
- Meeting Newton's and the State's greenhouse gas (GHG) emissions reduction goals requires electrification because the electric grid can be made cleaner (by using renewables like solar and wind power), but heating fuels and gasoline cannot. But electrification of heating (we'll stick with heating, rather than with cooking and transportation) is beneficial only if it is generated at least in part with renewable power—the more the better—and only if the heating technology used is efficient.

- Even now, with the current electric grid mix (about 17% renewables, including hydro), using an electrically powered air-source heat pump to provide heating (and cooling) results in less than half the GHG emissions of an efficient boiler powered by natural gas. In 2050, thanks to the expected increase of solar- and wind-generated power, electric heating is projected to reduce GHG emissions by 98 percent compared with gas heating.
- New England is a summer-peaking region, meaning that we use the most electricity in the summer. But, counter-intuitively, the region is much more strapped for energy in the winter. That's because there is competition for natural gas in the winter, which is used both for electricity generation *and* for heating.
- Even in New England, solar is a great resource, but offshore wind can supply much more power than solar. In New England, solar has a "capacity factor" of about 15% (because it's not sunny during the night or on overcast days), while offshore wind has a capacity factor of about 45% (because it's really windy off the New England coast). "Capacity factor" is a measure of how often a facility is operating at maximum power.
- ISO-NE, the manager of the New England electric grid, says that over the next two years there is no power supply problem unless there is an extreme cold snap (which neither the ISO nor NOAA currently forecasts). The ISO reports that over the longer term there will be a shortage *only if* there is not substantial offshore wind generation.
- Massachusetts law requires the electric utilities to procure 5,600 megawatts of offshore wind by 2027 (the equivalent of about nine medium-size coal plants). The 800 megawatt Vineyard Wind project is already moving forward, having secured financing before the spike in inflation, recent increases in steel prices, and the war in Ukraine.
- Offshore wind is the only large low- or no-carbon resource available in New England. The import of large quantities of Canadian hydro is highly unlikely. Siting nuclear power plants in New England is a non-starter.

Here's how that all adds up:

New England must develop its offshore wind resource within the next few years in order for the region's power supply to remain secure. This is a necessity for the capacity of the electric grid, although offshore wind is also necessary in order to enable Massachusetts and other New England states to meet their climate goals.

The warning raised by Eversource and FERC that New England's power supply could be inadequate this winter in the event of unusually cold weather have raised concerns in some quarters that additional electrification will only further threaten power supplies. This is not true for a number of reasons. Electrification will relieve the pressure on the winter natural gas supply, as electricity rather than natural gas is increasingly used for heating. In any event, for better or worse, widespread electrification will happen only gradually (likely in a limited number of communities, and likely only for new construction and major renovations). Moreover, the new building codes being promulgated by Massachusetts require buildings to be constructed to much higher efficiency standards as compared to current codes—meaning the use of less power (and energy and costs savings for consumers).

Meanwhile, there has been publicity over the last few weeks about the fact that two major offshore wind developers have sought to renegotiate their contracts with Massachusetts and Connecticut because of rising costs due to inflation, the war in Ukraine, supply chain issues, etc. The utilities have refused to discuss reopening the contracts, and the State Department of Public Utilities has taken their side. However, just this week the developers have agreed to move forward with the windfarm development, notwithstanding the financing challenges that caused them to try to reopen the contracts.


CITY OF NEWTON
IN BOARD OF ALDERMEN

November 2, 2009

ORDERED:

That, in accordance with the recommendation of the Zoning and Planning Committee through its Chairman Brian E. Yates, the City of Newton hereby adopts 780 CMR Appendix 120AA, known as the Massachusetts Stretch Energy Code, to take effect in the City of Newton as of January 2010, as required by state regulation.

Under Suspension of Rules
Readings Waived and Approved
23 yeas 0 nays 1 absent (Alderman Gentile)


(SGD) DAVID A. OLSON
City Clerk


(SGD) DAVID B. COHEN
Mayor

RECEIVED

NOV 05 2009

MAYOR'S OFFICE