

FREQUENTLY ASKED QUESTIONS

Municipal Opt-in Specialized Energy Code (Specialized Code)

WHAT IS THE STRETCH CODE?

As part of the [Green Communities Act of 2008](#), Massachusetts is required to update its building code every three years to be consistent with the most recent version of the [International Energy Conservation Code \(IECC\)](#). This ensures that new buildings are designed and constructed with energy efficiency in mind.¹ The current Base Energy Code in Massachusetts, effective January 1, 2023, consists of IECC 2021 with additional Massachusetts-specific amendments.

In 2009, Massachusetts became the first state to adopt an above-code appendix to the "base" building energy code: the "Stretch Code." **The Stretch Code**, which emphasizes energy performance, as opposed to prescriptive requirements, **is designed to result in cost-effective construction that is more energy efficient than that built to the "base" energy code**. The Stretch Code is typically updated every few years, with the most recent update becoming effective on January 1, 2023.¹ The Stretch Code consists of IECC 2021 with Massachusetts-specific amendments plus additional Stretch Code amendments.

There are two chapters in the Stretch Code:

- Residential Low-Rise Construction (*DOER Regulation 225 CMR Chapter 22*)
- Commercial (& all other) Construction (*DOER Regulation 225 CMR Chapter 23*)

WHAT IS THE MUNICIPAL OPT-IN SPECIALIZED ENERGY CODE (SPECIALIZED CODE)?

The [Climate Act of 2021](#) required the development of a new Municipal Opt-in Specialized energy code (Specialized Code). The statute requires that **the Specialized Code is formulated to ensure new construction that is consistent with Massachusetts greenhouse gas limits and sub-limits set every five years from 2025 to 2050**.¹ The Specialized Code consists of the IECC 2021 with Massachusetts-specific amendments plus additional Stretch Code and Specialized Code amendments.

Both the Residential Low-Rise and Commercial chapters in the Stretch Code contain a Specialized Code appendix:

- Residential Low-Rise Construction (*DOER Regulation 225 CMR Chapter 22 Appendix RC*)
- Commercial (& all other) Construction (*DOER Regulation 225 CMR Chapter 23 Appendix CC*)

¹ <https://www.mass.gov/info-details/building-energy-code>

CURRENT MA ENERGY CODE OPTIONS SUMMARY

Base Code	Stretch Code	Specialized Code
IECC 2021, Chapter 11	IECC 2021, Chapter 11	IECC 2021, Chapter 11
+	+	+
MA Amendments	MA Amendments	MA Amendments
	+	+
	Stretch Code Amendments	Stretch Code Amendments
		+
		Specialized Code Appendices

WHAT IS THE DIFFERENCE BETWEEN THE STRETCH CODE AND THE SPECIALIZED CODE?

For Residential Low-Rise:

Existing Buildings

There is no difference. This includes additions, alterations, and changes of use.

New Construction

The Specialized Code requires the following above and beyond the Stretch Code:

- Mixed-Fuel homes 4,000 SF or under must:
 - be pre-wired for electrification; and
 - install on-site solar PV when following the Stretch Code HERS pathway, with an exemption for shaded sites.
- Mixed-Fuel homes over 4,000 SF must:
 - achieve HERS 0 or Pplus ZERO requirements; and
 - be pre-wired for electrification; and
 - install on-site solar PV or other renewables to achieve the Zero energy building definition.

For Commercial:

Existing Buildings

There is no difference. This includes additions, alterations, and changes of use.

New Construction

The Specialized Code requires the following above and beyond the Stretch Code:

- Mixed-Fuel buildings must:
 - be pre-wired for electrification; and
 - install on-site solar PV of a minimum of 1.5W/sf for each square foot of the 3 largest floors or for 75% of the Potential Solar Zone

- meet minimum HVAC equipment and service water heating efficiencies
- All multi-family buildings over 12,000 sf must achieve precertification to Passive House standards. Buildings up to 5 stories must immediately comply and buildings with 6 or more stories must comply beginning January 2024.

HOW DO THE 2023 MA ENERGY CODE UPDATES AFFECT TRURO?

Truro enrolled in the Green Communities program in 2011, which required adoption of the Stretch Code, and updates to the Stretch Code do not require additional bylaw votes. The latest Stretch Code is already applicable in Truro² and is applicable to low-rise residential and commercial new construction as well as existing building alterations, additions, and change of use with square footage thresholds.

The Specialized Code is a new option for Truro to choose to adopt via a vote by Town meeting. The Specialized Code is applicable to low-rise residential and commercial new construction.

At Town Meeting 2022, Article 53 passed, which required a Carbon Net Zero standard for new construction to be developed and delivered for approval to Town Meeting 2023. The Specialized Code is the only mechanism for Truro to comply with Article 53 currently.

HAVE OTHER TOWNS ADOPTED THE SPECIALIZED ENERGY CODE?

300 towns have adopted the Stretch Code over the years. The Specialized Energy Code just became available at the beginning of this year, and already 7 towns have adopted it. Many towns have it on their upcoming town meeting warrants.

WHAT BUILDING TYPES DOES THE RESIDENTIAL LOW-RISE CHAPTER APPLY TO?

Single family, two-family, townhouses, and buildings three stories or less in height above grade with the following occupancies: apartment/multifamily buildings, hotels/motels, lodging/rooming house, vacation timeshares, dormitories, fraternities/sororities, covenants/monasteries.

Optional: multi-family buildings less than 12,000 sf of total conditioned floor area of any height may follow the residential low-rise or commercial chapter.

WHAT BUILDING TYPES DOES THE COMMERCIAL CHAPTER APPLY TO?

Assembly, business, educational, institutional, mercantile, factory and industrial, storage, high hazard, utility and miscellaneous, and buildings four stories or more in height above grade with

² <https://www.mass.gov/doc/summary-document-explaining-stretch-energy-code-and-specialized-opt-in-code-language/download>

the following occupancies: apartment/multifamily buildings, hotels/motels, lodging/rooming house, vacation timeshares, dormitories, fraternities/sororities, covenants/monasteries.

WHAT IS THE TIMELINE OF THE 2023 MA ENERGY CODE UPDATES?

The effective dates are indicated below for each of the energy codes. Effective dates are applicable to all projects with permits pulled on or after the effective date.

Base Code:

The Base Code is not applicable to Truro. For other communities the 10th Edition of the MA Base Code was scheduled to take effect on January 1, 2023. It is not projected to go take effect until the late summer of 2023Buil at the earliest.

Residential Low-Rise Stretch Code:

The Residential Low-Rise Stretch Code went into effect on January 1, 2023. A second phase with more stringent requirements will become effective on July 1, 2024.

Commercial Stretch Code:

The Commercial Stretch Code goes into effect on July 1, 2023.

Specialized Stretch Code (Residential Low-Rise & New Construction):

The Specialized Code has been available for adoption since December 23, 2022. If passed at Town meeting, it will go into effect no sooner than 6 months after the Town meeting vote.

IF I PUT A NEW ROOF ON MY HOUSE, DO I HAVE TO UPGRADE ANYTHING BASED ON THE NEW CODES?

No

IF MY HOUSE THAT IS LARGER THAN 4,000 SF BURNS DOWN, AND I HAVE TO REBUILD, DO I NEED TO FOLLOW THE NEW CODES?

Yes

IF MY HOUSE THAT IS SMALLER THAN 4,000 SF BURNS DOWN, AND I REBUILD TO THE SAME FOOTPRINT, DO I NEED TO FOLLOW THE NEW CODES?

Yes

DOES THE SPECIALIZED CODE ALLOW THE INSTALLATION OF BACKUP GENERATORS?

Yes

DOES THE SPECIALIZED CODE ALLOW A GAS OR PROPANE GRILL?

Yes, outside gas grills that are not connected to piping inside the home are allowed. However,

an indoor gas, propane, wood, or other biomass heating appliance makes a home a mixed fuel building.

I'VE ALWAYS THOUGHT THAT ELECTRIC HEAT WAS THE MOST EXPENSIVE WAY TO HEAT A HOME. IS THAT STILL THE CASE?

It used to be true, when electric heat was synonymous with baseboards that provided heat by electric resistance heating. But modern heat pumps are powered by electricity and extract heat from the air and use that to heat the building. They are about three times more efficient than the old baseboards, in that they provide three times the heat for the same amount of electricity used. It's like an energy efficient refrigerator that produces cold from electrical energy, but in reverse. There are several types of heat pumps, with "mini-splits" being the most common. The Town of Truro is installing several mini-splits per year in the various municipal buildings as an incremental shift from fossil fuels to electric energy.

AFFORDABILITY

I AM ON A FIXED INCOME. HOW CAN I GET HELP TO REDUCE MY TOTAL ELECTRIC BILL?

Per Eversource and Mass.gov, If you meet these income amounts (form 1040 tax return) below you are eligible for the electric utility discount rate. The electric utility discount rate reduces your total electric bill by 42%.

Household Size	Maximum Income Level
1	\$42,411
2	\$55,461
3	\$68,511
4	\$81,561
5	\$94,610
6	\$107,660
7	\$110,107
8	\$112,554

9	\$115,001
10	\$117,448

To enroll in the electric utility discount rate, you must apply for fuel assistance* through South Shore Community Action Council. Enrolling in fuel assistance will automatically enroll you in the electric utility discount rate program. You can apply for fuel assistance on-line at <https://www.toapply.org/SSCAC> or, you can call South Shore Community Action Council to schedule an in-person meeting at (508) 746-6707.

In advance of contacting (either by phone or online) South Shore Community Action Council, you will need to have the following documents:

- photo identification
- a list of all household members
- proof of income
- information on your heating or electric bills
- an active lease or mortgage statement

*If you are currently already enrolled in one of the following other programs listed below, you can submit proof of your participation to Eversource as an alternative way to get on the discount rate; however, we highly recommend you still apply for fuel assistance to help pay for your heating bills. https://www.eversource.com/content/docs/default-source/my-account/discount-rate-app-ema.pdf?sfvrsn=7a53ddec_4

- Supplemental Security Income (SSI)
- Transitional Aid to Families with Dependent Children (TAFDC)
- Emergency Aid to Elderly, Disabled and Children (EAEDC)
- Food Stamps
- Refugee Resettlement Benefits
- MassHealth Standard, CarePlus, or Limited1
- Head Start
- Free and Reduced School Lunch or Breakfast Program
- MassVeterans Benefits (G.L.c. 115)
- Dependency & Indemnity Compensation (DIC) for Surviving Spouse or Parents of Veterans
- Improved Veterans Disability Pension
- ConnectCare Plan, Types 1, 2, or 3A
- Health Safety Net Plan – Primary or Secondary
- Women, Infants & Children (WIC)

BUILDERS

WILL THIS HURT TRURO BUILDERS?

Not really, it should help. The stretch code and specialized code are nearly identical after July 1, 2024.

If Truro adopts the specialized code this spring, it will give Truro builders a 6-month head start over builders in other Towns in integrating the new code into their business plan. This will give them a competitive advantage.

MassSave, Federal and State grants and incentives have been structured to support building to the new codes.

If the upfront cost of a quieter, more comfortable home with lower long term operating costs is slightly greater under the stretch and specialized codes builders will need to charge their clients more.

The incentives that go to the homeowner (or spec builder) subsidize those additional costs benefitting both the builder and the homeowner.

In effect, builders that know and can communicate the various incentives to clients will get paid to build clients a better home and get paid for it.

COSTS:

I HEARD THAT THE STRETCH CODE WILL ADD \$30,000 TO A NEW HOME ON CAPE COD, IS THAT TRUE? THIS COULD HURT POTENTIAL HOMEOWNERS WITH TIGHT BUDGETS/COSTS

Let's address the rumor first.

During a meeting of a Cape Cod builder's organization, a developer or home builder stated that an average home on Cape Cod will cost a homeowner \$30,000 more than a home built to the base code .

The Department of Energy Resources (DOER) states that after incentives home the homeowner would save \$ 20,000 when building for a 2500 square foot home

The Energy Committee (EC) was given several email addresses and phone #s for the builders group so we could compare the two claims apples-to-apples.

We verified the numbers and email addresses then reached out multiple times over a 2-week period. No emails or voice messages were acknowledged or returned.

One EC member said that since neither the organization or speaker replied, it lessens the claim's credibility. They may not want to engage in a dialogue as they aren't confident in their numbers. It lessens the credibility of the c

COSTS:

DID THE ENERGY AND CLIMATE ACTION COMMITTEE DO A COST ANALYSIS ON HOW THIS WOULD IMPACT HOMEOWNERS BEFORE VOTING?

The Committees used data from DOER, Passive House and the US DOE, among others to assess cost impacts of the Specialized Code. Overall cost is minimally impacted³.

CAN GENERAL STATISTICS BE GIVEN? I.E, HOW MUCH MIGHT THIS CHANGE IN CODE RAISE THE PRICE OF A MEDIAN HOME IN TRURO?

- **BACKGROUND**

The Residential Specialized Code will affect homeowners building new detached one- and two-family dwellings and attached single-family dwellings, such as townhouses.

There are three pathways for compliance: Zero Energy, All-Electric, or Mixed-Fuel. The requirements of each pathway hence the costs are dependent on the energy source of the building (all-electric or fossil fuels) and the building size (up to 4,000 SF (square feet) or over 4,000 SF).

³ Stretch Code costs and benefits - 4,000 SF home example <https://www.mass.gov/doc/residential-stretch-code-costs-and-benefits-case-studies/download>

The specialized Code will not have a cost impact on current homeowners and homebuyers of existing buildings, which make up about 95% of home sales in Truro⁴. **The Specialized Code is only applicable to new construction. Larger additions, alterations and changes of use to existing buildings also must follow the Stretch Code,** smaller additions and alterations follows the Base Code.

The Residential Specialized Code affects homeowners building new detached one- and two-family dwellings and attached single-family dwellings, such as townhouses.

There are three pathways for compliance: Zero Energy, All-Electric, or Mixed-Fuel. The requirements of each pathway, hence the costs, are dependent on the energy source of the building (all-electric or fossil fuels) and the building size (up to 4,000 SF (square feet) or over 4,000 SF).

Mixed fuel buildings generally will cost more than all electric ones.

WHAT IS A PASSIVE HOUSE?

A Passive House is designed to be highly-insulated and air-tight, and is primarily heated by passive solar gain and internal gains from people and equipment. Passive house buildings need a mechanical ventilation system w/ heat or energy recovery because they are so tight.

Orientation and shading are key components to Passive House design. Passive House design methodology often results in large window areas on the south facade, with minimal amounts of windows on the east, west, and especially the north façade.

Passive buildings are quieter, more comfortable, and healthier. They save you money over time.

⁴ Assuming 8-10 new homes and approximately 300 existing home sales (a turnover of about 10% of the existing housing stock).

WHAT IS HERS? (you'll need this in a minute)

Home Energy Rating System

The HERS Index is a scale used to communicate the energy performance of a residence.

Think of HERS as MPG for homes, except the lower the HERS score, the more energy efficient the home. A HERS score of 50 (HERS 50) uses 50% of the energy of the baseline home HERS 100, also called the reference design.

The HERS 100 reference design is the average energy performance of all homes built in the US in 2006. HERS scores are determined by RESNET® accredited HERS energy raters

WHAT IS HERS 0?

When the expected energy performance of the rated design does not require an annual net purchase of energy (i.e., it produces as much as it consumes), the HERS Index score is 0. This includes not only offsetting electricity use in the home, but also offsetting fossil fuel or biomass fuel use on a site MMBtu basis. This means solar systems should be sized to offset all energy use, both electric and non-electric.

Energy Rating System | Energy Audit & Ratings | RESNET

The Stretch Code is in the initial phase-in period

Currently, all-electric buildings following the HERS (Home Energy Rating System⁵) rating pathway must reach HERS 55. The Specialized Code requires a HERS 45 so, **there will only be a cost differential between building to the Stretch Code and Specialized Code during the six-month interim period from January 1, 2014 until July 1, 2024,**

For any size, all-electric buildings, the **Specialized Code becomes the same as the updated Stretch Code beginning July 1, 2024, HERS 45, so these buildings will cost the same.**

⁵ <https://www.hersindex.com/hers-index/what-is-the-hers-index/>

COSTS Continued

CAN YOU GIVE SPECIFIC COST EXAMPLES?

DOER performed a cost-benefit analysis between the base code and the stretch code for different sized homes for fossil fuel vs all-electric homes.

After adding together initial cost, incentives and rebates, **an all-electric small single-family home** (2,100 SF example) built to HERS 42 vs. HERS 52 costs \$28,597 less to build to HERS 42.

This results in a \$1,244 lower annual mortgage payment for the homeowner⁶. After subtracting the costs of \$191 of annual energy consumption, **the homeowner pays \$1,053 less annually.**

After adding together initial cost, incentives and rebates, **an all-electric large single-family home** (4,000 SF example) built to HERS 42 vs. HERS 52 costs \$20,062 less to build to HERS 42,

This results in a \$873 lower annual mortgage payment. After incorporating \$325 of additional annual energy consumption costs, **the homeowner pays \$548 less annually.**

- **Mixed-fuel buildings up to 4,000 SF:**

The minimum efficiency requirements for the Specialized Code become the same as the Stretch Code on July 1, 2024.

The Stretch Code is in the initial phase-in period where mixed-fuel buildings i.e., buildings using any type of fossil fuel, following the HERS rating pathway need to meet a HERS 52 rating. The Specialized Code requires a HERS 42 rating, so **there will only be a cost differential for building to the Specialized Code during the six-month interim period before July 1, 2024⁷.**

DOER's pricing analysis for a mixed-fuel large single family home building to HERS 42 vs. HERS 52 resulted in a modest \$3,184 higher price to build to HERS 42, which would result in an estimated \$139 higher annual mortgage payment for the homeowner. After incorporating \$440 of annual energy consumption savings, the homeowner would end up paying a net of \$302 less annually.

⁶ Assuming historically typical mortgage terms.

⁷ Historically, Truro would have about 7 new home permits in a six-month period.

Pre-wiring for electrification is required for the Specialized Code.

This is optional for the Stretch Code.

Solar PV system of 4kW minimum for single family is required for the Specialized Code. Shaded sites and Passive House certified buildings are exempt from this requirement. This is optional for the Stretch Code. Fortunately, Solar PV systems are easily financed and have a positive payback financially.

- For mixed-fuel buildings over 4,000 sf.,
 - **NOTE:** the majority of new homes in Truro are under 4,000 sf. due to the building code restriction of a 3,600-sf. maximum building size per minimum lot size (0.775 acres or 3 acres in Seashore District) with additional sf. allowed for lot sizes over the minimum size lot or by special permit.
 - These buildings must follow the Zero Energy pathway for the Specialized Code where the minimum efficiency requirements are HERS 0 or Passive House U.S. (Phius) ZERO. The Stretch Code requires HERS 42 or Passive House (Phius CORE or Passive House International (PHI)).
 - Pre-wiring for electrification is required for the Specialized Code. This is optional for the Stretch Code.
 - Solar PV system or other renewables (or credits for off-site renewable energy if following the Phius ZERO option) are required for the Specialized Code to result in net zero energy consumption over the course of a year as measured in MMBtus or KWheq, on a site energy basis, excluding energy use for charging vehicles. This is optional for the Stretch Code.
 - Studies, such as The Economics of Zero-Energy Homes (Rocky Mountain Institute), and the Zero Energy Buildings in Massachusetts: Saving Money from the Start (USGBC MA), demonstrate that Net Zero buildings carry a negligible construction cost premium and result in significantly lower total cost of ownership.⁸
 - Survey results of houses built to Net Zero energy showed the cost premium for single family buildings was predominately zero.⁹
- In the long run, because in Mixed fuel buildings the Specialize Code requires pre-wiring for electric space heating, electric water heating, and electric appliances, new construction homeowners not building an all-electric home will avoid costly retrofits down the road.

⁸ Net Zero Stretch Code Support Letter - https://builtenvironmentplus.org/wp-content/uploads/2020/02/Zero_Stretch_Code_Letter_of_Support_Feb_11.pdf

⁹ https://builtenvironmentplus.org/wp-content/uploads/2022/12/12.08.22_Incentives_MasterPresentation.pptx.pdf?mc_cid=f11edcea8d&mc_eid=UNIQID

Cape Light Compact (MassSave) and IRA incentives for stretch code buildings are structured to save homeowners money up front. In effect, the homeowner or builder is paid to build a better home.

NOTE: The cost analysis metrics above do not incorporate IRA incentives, which will strengthen the economic case for the Specialized Code.

MASSACHUSETTS HAS AMONG THE HIGHEST ELECTRICITY RATES IN THE U.S. HOW MIGHT THE INCREASE ELECTRIFICATION INCREASE THE COST OF UTILITIES FOR HOMEOWNERS IN TRURO?

Market forces and Department of Public Utilities set rates. We'll have to wait and see.

GRID

LOCAL RESIDENTS HAVE RAISED QUESTION ABOUT THE CAPE'S POWER GRID'S CAPABILITY TO SUPPORT THIS CODE CHANGE AND INCREASED IN ELECTRIFICATION.

These concerns may be unfounded. According to Eversource, the section of Circuit 96 that supplies all of Truro has the capacity for 3-5 megawatts of added local generation¹⁰. The average home in MA uses about 0.33 kWh/sf/month, therefore, 3-5 megawatts would power 1,667–2,778 new 4,000 sf. homes of average electric use¹¹.

When electricity is added to the local grid from a solar farm at the transfer station for instance, it flows locally first, strengthening the grid

⁴ Eversource Hosting Capacity Map

<https://eversource.maps.arcgis.com/apps/webappviewer/index.html?id=7b13d31f908243e49406f198b359aa71>

⁵ <https://callmepower.com/faq/electricity-prices/electricity-prices-per-sq-ft>. 574 kWh/mo. ÷ 1,744 sf average household size = 0.33 kWh/sf/mo. A 4,000-sf house × 0.33 kWh/sf/mo. = 1,320 kWh/mo. 1,320 kWh/mo. ÷ 730 hrs./mo. (8,760/12) = 1.8 kW = 0.0018 MW.

⁶ https://www.iso-ne.com/static-assets/documents/2021/03/new_england_power_grid_state_profiles.pdf

⁷ <https://e4thefuture.org/wp-content/uploads/2020/06/New-England-Electrification-Load-Forecast.pdf>

NOTE: Local microgrids with local distributed generation (DG) such as a solar array at the transfer station and other locations dump would strengthen the resiliency of Truro's electric distribution grid. The Truro grid could easily uptake the 1.5 MW of power potentially generated by these solar arrays. The Committees and Eversource will present the state of Truro's grid to the Select Board before pre-Town meeting.

GRID

I WAS TOLD THAT EVERSOURCE COULD OR WOULD NOT SUPPORT AN ADDITIONAL POWER TO THE PUBLIC SAFETY BUILDING TO BE ELECTIFIED. IS THAT TRUE?

It is not.

The Public safety needs new siding. The siding is at the end of its service life. For years there have been untraceable leaks at some of the windows.

This is a perfect time for investing in upgrades.

Eversource said they needed more information from the Town, not that they couldn't upgrade the service due to lack of capacity.

GRID

THAS EVERSOURCE WEIGHED IN AND PROVIDED FEEDBACK ON THEIR ABILITY TO SUPPORT THESE UPGRADES WITH THE EXISTING GRID?

Sounds like they have it covered; we'll keep checking.

Eversource and the Independent System Operator for New England (ISO-NE) plan years in advance. Per ISO-NE, "While state-sponsored energy-efficiency and behind-the-meter solar PV resources are driving down grid electricity use and flattening overall electricity demand in New England, the ISO forecasts that both energy usage and peak demand will increase slightly over the next 10 years. Electrification of transportation and buildings are the primary factors for this increase"⁶.

The New England Electrification Load Forecast, prepared by Synapse Energy Economics⁷, states that under the Commonwealth's most energy-intensive, all-options pathway: "While electrification will undoubtedly increase electric demand and energy consumption in New England, we conclude that the electric grid is well-suited

to handle this transformation for the upcoming decade in the context of energy, capacity, and transmission system planning

GRID

IF THEY DON'T BELIEVE THEY CAN CURRENTLY SUPPORT IT, HOW MANY YEARS WILL IT TAKE TO GET TO THAT POINT ?

See above Question

GRID

SINCE OUR POWER GRID IS VERY WEAK, HOW MIGHT THIS PLACE OUR ELDERLY POPULATION AT INCREASED RISK IF POWER IS KNOCKED OUT IN A STORM ?

The Energy Committee has inquired with Eversource about the weakness of the power grid and will report back our findings. Most power outages happen when a tree falls on a wire and Eversource is mandated to fix outages as soon as possible. However, this supports a case for local resilient microgrids. The battery in Provincetown is one component of a microgrid that serves to strengthen the grid that serves Truro. In the event of a power outage, the battery can provide up to 3 hrs. of power during peak summer conditions and up to 10 hrs. of power in non-peak conditions to more than 10,000 customers from Provincetown to Eastham. New homes built to the Specialized Energy Code will fare better during an outage than existing homes as they hold the heat longer

HOW WILL THIS AFFECT THE WALSH PROPERTY ?

If the Walsh property is developed as a multifamily project, it must be done to Passive House standards.

HOW ABOUT THE DPW BUILDING?

All-Electric : For buildings to be considered all electric, they must use air source or ground source heat pumps for space heating, heat pumps or solar thermal systems for water heating, and all electric appliances, including those used for cooking and drying. In addition, there are minimum efficiency standards that must be achieved.

Mixed Fuel: This path is for buildings using fossil fuels for space heating, water heating, or cooking. Unlike the Updated Stretch Code, this option requires electric readiness for future electrification, meaning the building should be wired to accommodate future electric use and plugs must be installed near the fossil fuel equipment for future installation of electric equipment. In addition, the Municipal Opt-In Stretch Code requires on site solar PV and minimum efficiency requirements for fossil fuel equipment.

DEFINITIONS:

Residential Building: Detached one- and two-family dwellings and townhouses as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane. ⁴

R-1: Residential occupancies where the occupants are primarily transient in nature (ex. Boarding houses, hotels, motels). ¹²

R-2: Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature (ex. Apartment houses, convents/monasteries, dormitories, fraternities/sororities, vacation timeshare properties, nontransient hotels/motels/boarding houses).

R-3: Residential occupancies where the occupants are primarily permanent in nature and not classified as R-1, R-2, R-4, or I **and** buildings do not contain more than two dwelling units **or** are adult and childcare facilities providing accommodations for 1-5 persons for less than 24 hours.

R-4: Residential occupancies arranged for occupancy as residential care including 6-16 occupants, excluding staff.

I (Institutional Group): The use of a building or structure, or a portion thereof, in which people are cared for or live in a supervised environment (ex. having physical limitations because of health or age, harbored for medical treatment or other care or treatment, detained for penal or correctional purposes, or liberty of the occupants is restricted).

Addition: Any extension or increase in the conditioned space floor area, number of stories or height of a building or structure⁴

Alteration: Any construction, retrofit or renovation to an existing structure other than repair or addition. Also, a change in a building, electrical, gas, mechanical or plumbing system that involves an extension, or addition or change to the arrangement, type or purpose of the original

¹² R1-4,I: 780 CMR 3.00 Use and Occupancy Classification <https://www.mass.gov/doc/7th-edition-780-cmr-massachusetts-building-code-780-cmr-300-use-and-occupancy-classification/download>

installation.¹³

Level 1: The removal and replacement of the coverings of existing materials, elements, equipment, or fixtures using new materials, elements, equipment or fixtures that serve the same purpose. Level 1 alterations do not involve space reconfiguration.

Level 2: Extensive space reconfiguration that does not exceed 50% of the building area.

Level 3: 50% or more of the aggregate area of the existing home is renovated and reconfigured¹⁴.

Increase of energy demand: Is not considered an Alteration, but rather a Change of Use. This includes fossil fuel, biomass and electric energy.¹⁵

Change of Use: A change in the use of a building or a portion of a building that results in any of the following: (1) change of occupancy classification, (2) change from one group to another group within an occupancy classification, (3) change in use within a group for which there is a change in the application of the requirements of this code.⁴

Increase of energy demand: Is considered a Change of Use. This includes fossil fuel, biomass and electric energy.⁴

Repair: The reconstruction or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

Home Energy Rating Score (HERS): The HERS Index is a scale used to communicate the energy performance of a residence. The higher the score, the worse the energy performance. HERS scores are determined by RESNET® accredited HERS energy raters and compare a reference design (HERS 100: the average energy performance of all homes built in the US in 2006) against the home's design (rated design.) For example, a HERS score of 50 (HERS 50) uses 50% of the energy compared to the reference home (HERS 100).

When the expected energy performance of the rated design does not require an annual net purchase of energy (i.e., it produces as much as it consumes), the HERS Index score is 0. This includes not only offsetting electricity use in the home, but also offsetting fossil fuel or biomass fuel use on a site MMBtu basis. This means solar systems should be sized to offset all energy use, both electric and non-electric.

Passive House: A performance-based building certification that focuses on the dramatic reduction of energy use for space heating and cooling. It is a set of metrics for energy

¹³ <https://codes.iccsafe.org/content/IRC2021P1/chapter-11-re-energy-efficiency> N1101.6 (R202) Defined terms.

¹⁴ International Existing Building Code (IEBC 2021)

¹⁵ <https://www.mass.gov/doc/draft-2023-technical-guidance-for-the-stretch-energy-code-and-specialized-code/download>

performance, a certification that can be achieved, and a philosophy for how to design & construct better buildings. Through Passive House, we can deliver a high level of energy savings and carbon reduction for all building types while providing a healthier and more comfortable space to live and work.

A Passive House can be any building – a school, an apartment building, a new residential home or a historical renovation, even a large office skyscraper. Through a thoughtful and integrated design process and a detail-oriented approach to construction that prioritizes a well-insulated and air-sealed envelope, natural light and solar gain, and highly-efficient HVAC systems, we can create buildings that use over 90% less energy for space conditioning and over 60% less energy overall.

Passive House buildings achieve:

- Drastically lower energy use and operational cost savings
- Healthy air quality from ventilation systems
- Consistent and comfortable room temperatures without air drafts
- Increased natural lighting and quieter acoustic conditions
- A more resilient and comfortable building

On top of all of this, the lower energy demand of Passive House buildings means that the limited energy they do need can be easily provided by solar power, creating a pathway to a net-zero or net-positive building.¹⁶

Passive House Institute US (Phius): A non-profit organization which certifies professionals, buildings and products to promote climate-specific high-performance passive buildings. If pursuing Phius certification for code compliance, certified professionals to assist can be found on the Phius website: <https://www.phius.org/find-professional>

Passive House Institute (PHI): Based in Germany, maintains a separate international passive house certification program. PHI also certifies buildings, products and professionals to advance high performance passive buildings. Certified professionals and other resources to learn more about PHI certification can be found on their website: <https://passivehouse.com>

All-Electric Building: A building with no on-site combustion equipment for fossil fuel use or capacity including fossil fuel use in space heating, water heating, cooking, or drying appliances. Exterior generators and outdoor propane grills may be included in All-Electric buildings, however indoor gas fireplaces and propane/gas cooktops may not be included. Homes built with non-electric fireplaces and gas, or propane cooking equipment are instead required to comply with the Mixed-Fuel compliance path.

¹⁶ [What is Passive House? | PASSIVE HOUSE Massachusetts \(phmass.org\)](#)

Mixed-Fuel Building: A building that includes combustion equipment or piping for combustion equipment, fossil fuel fireplaces, or biomass heating equipment.

Individual Dwelling Unit: A single unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation (i.e., do not share cooking, bathing, or toilet facilities.) Apartments, condominiums, townhomes, and single-family homes are examples of individually separate dwelling units. Examples of buildings that may not have individual separate dwelling units are dormitories, barracks, and assisted living facilities.¹⁷

Net Zero Building: A building which is consistent with achievement of MA 2050 net zero emissions, through a combination of highly energy efficient design together with being either a Zero Energy Building, or an All-Electric Building, or where fossil fuels are utilized, a building fully pre-wired for future electrification and that generates solar power on-site from the available Potential Solar Zone Area.

Zero Energy Building: A building which through a combination of highly energy efficiency design and onsite renewable energy generation is designed to result in net zero energy consumption over the course of a year as measured in MMBtus or KWh_{eq}, on a site energy basis, excluding energy use for charging vehicles.¹⁸

Potential Solar Zone Area: The combined area of any flat roofs, or low-sloped roofs and any steep-sloped roofs oriented between 90 degrees and 300 degrees of true north where the annual solar access is 70 percent or greater. Annual solar access is in the ratio of “annual solar insolation with shade” to the “annual solar insolation without shade”. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.

or Passive House plus solar ready provisions. The **Specialized Code** requires compliance with the Stretch Code plus following one of the Specialized code pathways: Zero Energy, All-Electric or Mixed-Fuel.

¹⁷ <https://www.mass.gov/doc/draft-2023-technical-guidance-for-the-stretch-energy-code-and-specialized-code/download>

¹⁸ <https://www.mass.gov/doc/225-cmr-2200-residential-specialized-stretch-energy-code/download>

APPENDIX: MOST OF THIS HAS BEEN COVERED ABOVE

SPECIALIZED CODE QUESTIONS GENERATED BY THE TOWN OF TRURO

The following questions originated from the Town of Truro in reference to the Specialized Code; the answers presented reflect the same.

DID THE ENERGY AND CLIMATE ACTION COMMITTEE DO A COST ANALYSIS ON HOW THIS WOULD IMPACT HOMEOWNERS BEFORE VOTING? CAN GENERAL STATISTICS BE GIVEN? FOR INSTANCE, HOW MUCH MIGHT THIS CHANGE IN CODE RAISE THE PRICE OF A MEDIAN HOME IN TRURO? HOW MIGHT THIS INCREASE THE COST OF UTILITIES FOR HOMEOWNERS IN TRURO?

The Committees used data from DOER, Passive House and the US DOE, among others to assess cost impacts of the Specialized Code. Overall cost is minimally impacted¹⁹.

The Specialized Code will not have a cost impact on current homeowners and homebuyers of existing buildings, which makes up 99% of home sales in Truro. The Specialized Code is only applicable to new construction. Larger additions and alterations and changes of use to existing buildings must follow the Stretch Code, which Truro has already adopted as of January 1, 2023, as one of the 300 out of 351 municipalities in the Commonwealth that are Green Communities. Smaller additions and alterations will follow the Base Code.

The Residential Specialized Code will affect homeowners building new detached one- and two-family dwellings and attached single-family dwellings, such as townhouses. There are three pathways for compliance: Zero Energy, All-Electric, or Mixed-Fuel. The requirements of each pathway are dependent on the energy source of the building (all-electric or fossil fuels) and the building size (up to 4,000 sf. or over 4,000 sf.).

- For all-electric buildings of any size, the Specialized Code is the same as the Stretch Code that will be effective July 1, 2024. Currently, the Stretch Code is in the initial phase-in period where all-electric buildings following the HERS rating pathway need to meet a HERS 55 rating. The Specialized Code requires a

¹⁹ Stretch Code costs and benefits- 4,000 sq ft home example
<https://www.mass.gov/doc/residential-stretch-code-costs-and-benefits-case-studies/download>

HERS 45 rating, so there will only be a cost differential for building to the Specialized Code during the interim period up until July 1, 2024, which are:

- Based on DOER's pricing analysis, an all-electric small single-family home built to HERS 42 vs. HERS 52 is \$28,597 less cost to build to HERS 42, which would result in a \$1,244 lower annual mortgage payment for the homeowner. After incorporating \$191 of additional annual energy consumption costs, the homeowner would end up paying a net of \$1,053 less annually.
- Based on DOER's pricing analysis, an all-electric large single-family home built to HERS 42 vs. HERS 52 is \$20,062 less cost to build to HERS 42, which would result in a \$873 lower annual mortgage payment for the homeowner. After incorporating \$325 of additional annual energy consumption costs, the homeowner would end up paying a net of \$548 less annually.
- For mixed-fuel buildings up to 4,000 sf.,
 - The minimum efficiency requirements for the Specialized Code are the same as the Stretch Code that will be effective July 1, 2024.
 - Currently, the Stretch Code is in the initial phase-in period where mixed-fuel buildings following the HERS rating pathway need to meet a HERS 52 rating. The Specialized Code requires a HERS 42 rating, so there will only be a cost differential for building to the Specialized Code during the interim period up until July 1, 2024. DOER's pricing analysis for a mixed fuel large single family home building to HERS 42 vs. HERS 52 resulted in a modest \$3,184 higher price to build to HERS 42, which would result in a \$139 higher annual mortgage payment for the homeowner. After incorporating \$440 of annual energy consumption savings, the homeowner would end up paying a net of \$302 less annually.
 - Pre-wiring for electrification is required for the Specialized Code. This is optional for the Stretch Code.
 - Solar PV system of 4kW minimum for single family is required for the Specialized Code. Shaded sites and Passive House certified buildings are exempt from this requirement. This is optional for the Stretch Code.
- For mixed-fuel buildings over 4,000 sf.,
 - **NOTE:** the majority of new homes in Truro are under 4,000 sf. due to the building code restriction of a 3,600-sf. maximum building size per minimum lot size (0.775 acres or 3 acres in Seashore District) with additional sf. allowed for lot sizes over the minimum size lot or by special permit.
 - These buildings must follow the Zero Energy pathway for the Specialized Code where the minimum efficiency requirements are HERS 0 or Passive House U.S. (Phius) ZERO. The Stretch Code requires HERS 42 or Passive House (Phius CORE or Passive House International (PHI)).
 - Pre-wiring for electrification is required for the Specialized Code. This is optional for the Stretch Code.
 - Solar PV system or other renewables (or credits for off-site renewable energy if following the Phius ZERO option) are required for the

Specialized Code to result in net zero energy consumption over the course of a year as measured in MMBtus or KWheq, on a site energy basis, excluding energy use for charging vehicles. This is optional for the Stretch Code.

- Studies, such as The Economics of Zero-Energy Homes (Rocky Mountain Institute), and the Zero Energy Buildings in Massachusetts: Saving Money from the Start (USGBC MA), demonstrate that Net Zero buildings carry a negligible construction cost premium and result in significantly lower total cost of ownership.²⁰
- Survey results of houses built to Net Zero energy showed the cost premium for single family buildings was predominately zero.²¹
- In the long run, because the Specialize Code requires pre-wiring for electric space heating, electric water heating, and electric appliances, new construction homeowners not building an all-electric home will avoid costly retrofits down the road.

Cape Light Compact (MassSave) and IRA incentives for stretch code buildings are structured to save homeowners money up front. In effect, the homeowner or builder is paid to build a better home.

NOTE: The cost analysis metrics above do not incorporate IRA incentives, which will strengthen the economic case for the Specialized Code.

THERE ARE CONCERNS THAT HAVE BEEN RAISED BY LOCAL RESIDENTS ABOUT THE POWER GRID ON THE CAPE AND THAT IT MAY NOT YET BE CAPABLE OF SUPPORTING THIS CHANGE IN CODE AND INCREASE IN ELECTRIFICATION. HAS EVERSOURCE WEIGHED IN AND PROVIDED FEEDBACK ON THEIR ABILITY TO SUPPORT THESE UPGRADES WITH THE EXISTING GRID. IF THEY DON'T BELIEVE THEY CAN CURRENTLY SUPPORT IT, HOW MANY YEARS WILL IT TAKE TO GET TO THAT POINT?

These concerns may be unfounded. According to Eversource, the section of Circuit 96 that supplies all of Truro has the capacity for 3-5 megawatts of added local

²⁰ Net Zero Stretch Code Support Letter - https://builtenvironmentplus.org/wp-content/uploads/2020/02/Zero_Stretch_Code_Letter_of_Support_Feb_11.pdf

²¹ https://builtenvironmentplus.org/wp-content/uploads/2022/12/12.08.22_Incentives_MasterPresentation.pptx.pdf?mc_cid=f11edcea8d&mc_eid=UNIQID

generation²². The average home in MA uses about 0.33 kWh/sf/month, therefore, 3-5 megawatts would power 1,667–2,778 new 4,000 sf. homes of average electric use²³.

Additionally, Eversource and the Independent System Operator for New England (ISO-NE) plan years in advance. Per ISO-NE, “While state-sponsored energy-efficiency and behind-the-meter solar PV resources are driving down grid electricity use and flattening overall electricity demand in New England, the ISO forecasts that both energy usage and peak demand will increase slightly over the next 10 years. Electrification of transportation and buildings are the primary factors for this increase”⁶.

The New England Electrification Load Forecast, prepared by Synapse Energy Economics⁷, states that under the Commonwealth’s most energy-intensive, all-options pathway: “While electrification will undoubtedly increase electric demand and energy consumption in New England, we conclude that the electric grid is well-suited to handle this transformation for the upcoming decade in the context of energy, capacity, and transmission system planning.”

NOTE: Local microgrids with local distributed generation (DG) such as solar PV arrays at the transfer station and burn dump would strengthen the resiliency of Truro’s electric distribution grid. The Truro grid could easily uptake the 1.5 MW of power potentially generated by these solar arrays. The Committees and Eversource will present the state of Truro’s grid to the Select Board well before pre-Town meeting.

1. Since our power grid is very weak, how might this place our elderly population at increased risk if power is knocked out in a storm?

The Energy Committee has inquired with Eversource about the weakness of the power grid and will report back our findings. Most power outages happen when a tree falls on a wire and Eversource is mandated to fix outages as soon as possible. However, this supports a case for local resilient microgrids. The battery in Provincetown is one component of a microgrid that serves to strengthen the grid that serves Truro. In the event of a power outage, the battery can provide up to 3 hrs. of

⁴ Eversource Hosting Capacity Map

<https://eversource.maps.arcgis.com/apps/webappviewer/index.html?id=7b13d31f908243e49406f198b359aa71>

⁵ <https://callmepower.com/faq/electricity-prices/electricity-prices-per-sq-ft>. 574 kWh/mo. ÷ 1,744 sf average household size = 0.33 kWh/sf/mo. A 4,000-sf house × 0.33 kWh/sf/mo. = 1,320 kWh/mo. 1,320 kWh/mo. ÷ 730 hrs./mo. (8,760/12) = 1.8 kW = 0.0018 MW.

⁶ https://www.iso-ne.com/static-assets/documents/2021/03/new_england_power_grid_state_profiles.pdf

⁷ <https://e4thefuture.org/wp-content/uploads/2020/06/New-England-Electrification-Load-Forecast.pdf>

power during peak summer conditions and up to 10 hrs. of power in non-peak conditions to more than 10,000 customers from Provincetown to Eastham.

New homes built to the Specialized Energy Code will fare better during an outage than existing homes as they will retain heat longer. Residents who dependent on electricity for medical equipment should register with the Council on Aging and notify Eversource.