



March 18, 2022

Department of Energy Resources (DOER)  
100 Cambridge Street, Suite 1020  
Boston, MA 02114  
Attention: Nina Mascarenhas

Re: **Stretch Code Straw Proposal Comments**

Dear Commissioner Woodcock, Director McCarey, Msrs. Finlayson and Ormond, et al:

To reach the 2030 emissions reduction goal mandated by the Act Creating a Next Generation Roadmap for Massachusetts Climate Policy (the “Act”), the Commonwealth must swiftly enact and implement an **effective stretch code update** together with a **true net zero opt-in code**.

Sustainable Marblehead, [www.sustainablemarblehead.org](http://www.sustainablemarblehead.org), is a community non-profit organization working with our town’s residents, businesses and leadership to achieve net zero emissions in Marblehead by 2040. We believe this is imperative morally in view of the climate emergency and legally to meet the goals of the Act. Sustainable Marblehead believes ***DOER’s straw proposal falls far short of what is crucial for us to meet our goals.***

The straw proposal does **NOT**:

- Conform to any published standard defining “**net zero**,” thereby violating the Act;
- Apply to **major renovations**, disregarding a crucial decarbonization step mandated by the Act;
- Mandate **electrification** or **renewable energy** despite the MA Decarbonization Roadmap;
- Account for or curb **embodied carbon emissions** related to construction, a heightened risk this decade;
- Sufficiently improve **energy efficiency standards** to support passive houses or net zero buildings;
- Require and incentivize **Green Communities** to adopt the opt-in stretch code, contravening the Green Communities Act.

***Moreover, even according to the DOER’s own numbers, the straw proposal neither meets the 2030 emissions reductions goal nor minimizes life cycle costs as required by law.*** We urge DOER to finalize the stretch code update and opt-in net zero code according to the **Net Zero Stretch Code Framework** included in the appendix. This framework aims at carbon neutrality and equity, ensuring no community is left behind.

If the straw proposal were adopted as is, we have to anticipate a number of towns and cities asking for home rule to be able to move faster on their net zero goals. Different rules will make achieving the economies of scale that DOER wants to accomplish more complicated. Instead of having clarity, we will have confusion.

In addition, if the stretch code opt-in option violates the Act, we fear that litigation will ensnare all of us in unproductive arguments, losing time that we can ill afford. We are already witnessing this. Clarity with a true Net-Zero opt-in code is in the Commonwealth’s interest.

**Massachusetts is ready for net zero.**<sup>1</sup> A year ago, elected and appointed officials from 59 towns and cities – **representing almost 40% of the state’s population** – voiced strong support for the net zero stretch code.<sup>2</sup> Additionally, AIA Massachusetts, as well as the Boston Society for Architecture, AIA Central Massachusetts, and AIA Western Massachusetts – **together representing 5,000 architects in the state** – strongly advocated for a net zero stretch code.<sup>3</sup>

Their letter and appendix reflected hundreds of hours of study and discussion by a **broad coalition of elected and appointed representatives, building professionals, and non-profit organizations**. Just seven months remain until the legislative deadline for these stretch codes to be implemented. In the meantime, our climate crisis is accelerating at a fast pace. **The time to act is now.**

Sincerely,

**For Sustainable Marblehead**

Eileen Mathieu,                      Board Member and Leader, Clean Energy and Public Policy Working Group  
Jean-Jacques Yarmoff,      Board Member and Leader, Building Group

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<sup>1</sup> [https://builtenvironmentplus.org/wp-content/uploads/2021/03/MAisReadyforNetZero\\_03.01.21.pdf](https://builtenvironmentplus.org/wp-content/uploads/2021/03/MAisReadyforNetZero_03.01.21.pdf)

<sup>2</sup> [Letter to Gov Baker 2.4.21](#)

<sup>3</sup> [AIA MA Letter to Gov Baker 2.3.21](#)

## APPENDIX

### Stretch Code Straw Proposal Comments to DOER by MA Net Zero Buildings Coalition

March 9, 2022

#### Executive Summary

***For more information about each point below, refer to the numbered section on the pages that follow.***

1. There is substantial and growing support for a net zero stretch code.
2. Massachusetts is ready for net zero as shown by a surge in completed and planned net zero projects.
3. We face a “perfect storm” of challenges for meeting the 2030 goal to avert the worst climate impacts.
  - a) *We are starting with false comfort in thinking Massachusetts surpassed its 2020 emissions goals.*
  - b) *Pre-pandemic, building sector emissions were not stagnant but rather climbing at 4% per year.*
  - c) *This decade’s growth will send emissions soaring unless stretch codes neutralize emissions.*
4. By DOER’s numbers, the straw proposal doesn’t meet the 2030 emissions reduction goal.
5. DOER’s emissions calculations omit embodied carbon and gas leaks, understating future growth impacts.
6. Reducing embodied carbon in building materials and construction this decade is critical.
7. The straw proposal’s net zero definition doesn’t meet the law or conform to any published net zero standard or regulation.
8. The straw proposal does not “minimize, to the extent feasible, life cycle costs” per the law.
9. The straw proposal fails the next generation in at least ten ways.
10. The Green Communities Act compels green communities to adopt the opt-in net zero stretch code.
11. DOER should incentivize green communities to adopt the opt-in net zero stretch code soon.
12. It is not hyperbole to suggest that this round of stretch codes will largely determine the success or failure of Massachusetts’ next generation climate policy.
13. DOER must develop a suite of more stringent building energy codes – base, updated stretch, and opt-in net zero.
14. Timing is everything. The net zero stretch code needs to become widely adopted in 2023.
15. Accelerating the transition off polluting fossil fuels is most critical for low-income ratepayers.
16. DOER should advance its work in accordance with the MA Net Zero Buildings Coalition’s Net Zero Stretch Code Framework (February 2022).
17. A true net zero code will deploy a newly trained workforce and stimulate homeowners to utilize residential electrification incentives.
18. Decarbonizing existing buildings is key.
19. Legislators should act now to allocate \$250 million to the Zero Carbon Renovation Fund.
20. We have a 2030 goal. Let’s do what it takes to meet it.

## 1. There is substantial and growing support for a net zero stretch code.

***A year ago, elected and appointed officials from 59 towns and cities – representing almost 40% of the state’s population*** – voiced strenuous support for a net zero stretch code in a letter to the Governor. Letter to Gov Baker 2.4.21. Additionally, AIA Massachusetts as well as the Boston Society for Architecture, AIA Central Massachusetts and AIA Western Massachusetts – ***together representing 5,000 architects in the state*** – strongly advocated for a net zero stretch code in a letter to the Governor. AIA MA Letter to Gov Baker 2.3.21. This letter, signed by a broad net zero buildings coalition, indicates growing support.

Increasingly, Massachusetts citizens understand that buildings currently account for 27% of the state’s greenhouse gas emissions (70% or more in some cities) and recognize the need to decarbonize the built environment through net zero regulations and deep energy retrofits. As shown by these letters, they are committed to seeing that a true net zero stretch code is enacted, widely adopted, and working toward electrifying the state’s 2 million existing buildings over the next 30 years.

## 2. Massachusetts is ready for net zero as shown by a surge in completed and planned net zero projects.

***Recent years have seen an exponential growth of net zero, Passive House, and other high-performance buildings across Massachusetts.*** Net zero buildings totaling 6 million square feet have been completed, and a total of 7+ million square feet are planned or under construction. These projects together with relevant data including energy modeling are compiled in a recent study by Built Environment Plus (BE+), formerly the U.S. Green Building Council’s Massachusetts Chapter.

As this study and others show, contrary to the belief by some, net zero development is practical, affordable, and proven across a wide range of project types. By minimizing life cycle costs, they provide financial benefits. By neutralizing or drastically reducing greenhouse gas emissions, they provide public health benefits. By providing better building envelopes and verified performance, they ensure greater occupant comfort and resiliency.

Net zero buildings will enable the Commonwealth to improve public health while growing the economy. Already, leading municipalities have mandated net zero buildings for municipal construction, demonstrating their cost effectiveness and other advantages. Six municipalities – five towns and one city – have also filed home rule petitions to enact zoning by laws requiring building electrification for new construction and major renovations.

## 3. We face a “perfect storm” of challenges for meeting the 2030 goal to avert the worst climate impacts.

***We are starting with false comfort in thinking Massachusetts surpassed its 2020 emissions goals.*** The 2020 goal was met in part because of the pandemic which imposed drastic building occupancy changes resulting in a 16% drop in building sector emissions between 2019 and 2020, from 25.5 MMTCO<sub>2</sub>e to 22 MMTCO<sub>2</sub>e. Energy and Environmental Affairs Secretary Kathleen Theoharides acknowledged this aberration. “This is not necessarily a cause for celebration,” she said. “2020 was an abnormal year by any stretch of the imagination.” <https://www.bostonglobe.com/2022/02/15/science/massachusetts-surpassed-its-2020-emissions-goals-theres-big-asterisk/> Concerningly, the 2020 goal was not yet met in 2019 according to the last reported value for statewide greenhouse gas emissions. (See [MassDEP Emissions Inventories / Mass.gov](#) “Statewide Greenhouse Gas Emissions Level: Proposed 1990 Baseline

Update Appendix C”, “Building Consumption” tab.) Moreover, the aggregate emissions trendline was upward.

**Pre-pandemic, building sector emissions were not stagnant but climbing at 4% per year.** Reversing this upward trend makes meeting the 2030 goal both more difficult and crucial. The MassDEP Emissions Inventory shows that recent “Building Consumption” emissions are trending upward at the rate of 4% per year over the last four years, 2016 to 2019. (Again, see [MassDEP Emissions Inventories | Mass.gov](#) “Statewide Greenhouse Gas Emissions Level: Proposed 1990 Baseline Update Appendix C”, “Building Consumption” tab.) This is 4X the 1% per year average growth rate since 1990, referenced by DOER, and reflects unprecedented growth of the building sector in recent years. According to the MassDEP data, building sector emissions in MMTCO<sub>2e</sub> are follows:

2016 – 21.9

2017 – 23.3

2018 – 24.9

2019 – 25.5

**This decade’s forecast growth will send emissions soaring unless stretch codes neutralize emissions.** Development this decade is expected to outpace any rate before or since. According to the Next Generation Roadmap Buildings Sector Report [MA Decarbonization Roadmap | Mass.gov](#), 60% of the growth between 2020 and 2050 is projected to occur over the next decade – driven primarily by demographic trends and small residential buildings. What this means is that 3X more development is forecast to occur this decade than in each of the two following decades. Stretch codes should require proven strategies to minimize life cycle cost and drive toward net zero development on a site emissions basis. These strategies include exemplary energy efficiency, building electrification, and 100% renewable energy.

#### **4. By DOER’s numbers, the straw proposal doesn’t meet the 2030 emissions reduction goal.**

DOER slides from the 2/8/22 webinar [Slide 1 \(mass.gov\)](#) indicate that building sector emissions are currently about 22 MMTCO<sub>2e</sub> annually. (Slide 2) By 2030 MA must achieve 50% reductions in GHG emissions. (Slide 7) By DOER’s computations, if the straw proposal is enacted, it would yield 500,000 MMTCO<sub>2e</sub> reductions per year by 2030, and 694,000 MMTCO<sub>2e</sub> reductions by 2035. (Slide 4)

A 500K reduction per year is 2.3% from the current baseline. And DOER forecasts that this rate of reduction will not be achieved until 2030. Before the pandemic, building sector emissions were climbing at the rate of 4% per year, as indicated by the last four years reported by the MassDEP Emissions Inventory. After a 16% drop in building sector emission caused by the pandemic in 2020, it seems more likely that building sector emissions will climb back to 2019 levels or 25.5 MMTCO<sub>2e</sub>, than transition to falling at the rate of 2.3% any time soon. Net cumulative emissions reduction might be about 10%, not 50%, as needed to meet the 2030 goal. Hypothetically, a 2.3% per year reduction effective immediately, would still only reduce building sector emissions annually from 22 MMTCO<sub>2e</sub> to 18.3 MMTCO<sub>2e</sub>, a reduction of 17% (compounded) – **not even close to 50% or 11 MMTCO<sub>2e</sub>**.

Unless the transportation or power generation sectors are legally bound to close the gap for the building sector, the 2030 goal will be missed by a wide margin, in violation of legal limits set by the Global Warming Solutions Act [Session Law – Acts of 2008 Chapter 169 \(malegislature.gov\)](#) and Next Generation Roadmap for Climate Policy [MA Decarbonization Roadmap | Mass.gov](#).

## **5. DOER's emissions calculations omit embodied carbon and gas leaks, understating future growth impacts.**

DOER's annual emissions reductions presumably account for building operations only, and do not include embodied carbon emissions from sourcing, production, and transportation of building materials. This is a crucial point given that the Next Generation Roadmap Buildings Sector Report forecasts 60% of the building sector growth will occur during this decade. A true accounting would include embodied carbon emissions and illustrate that aggregate building sector emissions by 2030 are **WAY off the mark**.

Gas leaks are not accounted for in DOER's emissions forecast. A true accounting would assume continued gas leaks at an accelerated rate as aging infrastructure deteriorates and the business case no longer supports replacement infrastructure which will soon become a stranded asset.

## **6. Reducing embodied carbon in building materials and construction this decade is critical.**

The Global Alliance for Building and Construction and Architecture 2030 calculates that global embodied carbon emissions related to all buildings and infrastructure materials to be 23% of global CO<sub>2</sub> emissions each year. For all buildings built between 2021 and 2030, embodied carbon will be responsible for 72 percent of their total emissions.

Operational energy or operational carbon is the energy and corresponding carbon emissions necessary to run a building. Embodied carbon is the energy and corresponding carbon emissions necessary to construct a building and includes the sourcing, production, transportation, and installation of building materials.

Architecture 2030 estimates that the total carbon emissions of new construction between 2020 and 2040 will be 57% from embodied carbon and 43% from operating carbon. As net zero buildings proliferate, the relative impact of embodied carbon will increase. Embodied carbon accounts for greenhouse gas emissions at the start of a building's lifespan and will remain in the atmosphere and affect climate for decades before operational carbon reaches and surpasses the same levels.

This is the most critical decade for reducing emissions, and DOER should ensure that both the updated stretch code and opt-in net zero stretch code regulate embodied carbon. DOER should consider prescriptive paths such as low-carbon concrete specifications. DOER should also consider performance paths such as whole building life cycle assessment for operating carbon and embodied carbon, propelling greater knowledge and modeling capabilities.

## **7. The straw proposal's net zero definition doesn't meet the law or conform to any published net zero standard or regulation.**

The net zero definition appearing on Slide 31 of DOER's webinar slideshow is inadequate and flawed judged against any published standard or regulation. Further, it seems a thinly veiled attempt to circumvent the Next Generation Roadmap statute. The slide says, "Net-Zero new construction is compatible, as built, with the Commonwealth's net-zero emissions economy in 2050." The slide adds three bulleted points:

- Consistent with electrification and deep efficiency approach in EEA's 2050 Roadmap
- Does not necessitate onsite or offsite renewables, nor the assumption that an individual building is net-zero energy
- A building becomes net zero energy when MA electric grid is net zero.

***This conforms with no net zero definition in the world today.*** The common definition of net zero has been honed over the past two decades by 21 studies as referenced by the U.S. Department of Energy (DOE) [here](#). These studies include *Getting to Zero: The Massachusetts Governor's Net Zero Buildings Task Force Report (2008)*, which produced a net zero definition based on site energy and helped spur some of the state's first net zero buildings. Today, fourteen years later, one of the most widely respected building performance standards is Passive House which has advanced an improved net zero definition based on site emissions. ***Not only is DOER's definition aberrant, but it flies in the face of broad net zero support.***

The statute requires the DOER to adopt a definition of a "net zero building." In fact, however, the agency has done nothing of the kind. Translated, the straw proposal's definition means that anything that the agency believes will fulfill the aspirations of the "net zero emissions economy in 2050" qualifies. The agency asserts that this is "consistent with the electrification and deep efficiency approach to EEA's 2050 Roadmap," but that hardly amounts to the definition of a net-zero building. There isn't any assumption that an individual building is net-zero energy, which is the essence of the definition of a net zero building under every net zero study and standard for two decades, as cataloged by the U.S. Department of Energy. The straw proposal's definition does not require a building to use onsite or offsite renewables and doesn't even apply until the MA electric grid is net zero. Apparently, nothing can be a net-zero building until then.

This definition reflects the DOER's refusal to take seriously the municipal opt-in specialized stretch energy code (which it pointedly refuses to call what everyone else calls it, the "net zero stretch code"). The DOER's straw proposal does not authorize municipalities to take the fight against climate change to a new level. It reduces them to adopting modest additions to the DOER's main regulatory effort, the updating of the existing stretch code. ***In effect, the straw proposal is the third veto of the net zero stretch code.***

The statute also requires DOER to adopt net zero performance standards, and DOER hasn't even tried to comply with that requirement. No wonder. Given the definition of a net zero building, in which net zero buildings do not have to be net zero, the very idea of a net zero performance standard is meaningless.

In short, the basic regulatory approach of the straw proposal is flatly inconsistent with the agency's statutory mandate. Instead of proposing a stretch code update and true net zero stretch code that ensure the Commonwealth meets legally mandated emissions limits in 2030, the agency has reduced the net zero stretch code to a ***minor improvement of an updated stretch code which is also insufficient to meeting the 2030 goal. This is, of course, not in accordance with the applicable law.***

## **8. The straw proposal does not “minimize, to the extent feasible, life cycle costs” per the law.**

The Global Warming Solutions Act requires the stretch code to “minimize, to the extent feasible, the life-cycle cost of the facility by using energy efficiency, water conservation or other renewable or alternative energy technologies.”

According to DOER’s webinar commentary, all-electric buildings yielded a life cycle cost reduction – up to 9% better – across all project types when compared with gas. Although no analysis or data was shared, this statement alone suggests that DOER is compelled to require building electrification because it minimizes life-cycle costs. The updated stretch code will become effective in 299 communities in January 2023, without requiring additional and onerous municipal action to adopt the opt-in net zero code. ***By law, building electrification must be a requirement of both the updated stretch code and opt-in net zero stretch code.***

## **9. The straw proposal fails the next generation in at least ten ways.**

1. ***It allows fossil fueled buildings.*** Under all three codes – Base, Updated Stretch, and Opt-In Net Zero Stretch – the Stretch Code Straw Proposal is missing the opportunity to slash building sector emissions by 64%, as can be delivered today by heating electrification, according to DOER’s slides. This perpetuates climate risks to public health, along with significant associated costs, while creating another generation of existing buildings that will soon need to be retrofitted with electrified heating at significantly greater capital expense, burdening our workforce and taxpayers and creating a drag on the economy.
2. ***It allows unlimited curtainwall (R8) which yields significantly less energy efficient buildings than optimally (+/-35%) glazed building enclosures (R27+).*** Aesthetics and flexibility can be met with a variety of design elements and strategies other than curtainwall. The era of unlimited curtainwalls must end.
3. ***The Stretch Code Straw Proposal does not sufficiently “stretch.”*** The updated residential stretch code (HERS 42/45) requires only a 23%/18% improvement as compared to the base code, while the updated commercial stretch code (ASHRAE 90.1 2019) requires only a 5% improvement as compared to the base code (ASHRAE 90.1 2016). Best practice suggests that significantly greater energy efficiency is readily achievable and yields life cycle cost savings. The MA Ready for Net Zero study (March 2021) showed millions of square feet of existing net zero buildings which achieved 40%, 50%, 60% or greater energy efficiency improvement compared to a baseline building.
4. ***It does not require renewable energy to offset 100% of the annual site emissions.*** As a result, projected growth this decade will take us further from the 2030 goal. A true net zero stretch code requiring renewable energy to offset 100% annual site emissions is needed to level emissions. See pictogram in Appendix Section 20 (page 14). This tells the story in a nutshell.
5. ***It does not address major renovations, which are a significant driver of building activity, as well as a significant opportunity to decarbonize.*** From the 2050 Decarbonization Roadmap: The most cost-effective time for an existing building to transition to a heat pump system is during routine home improvements or when an older HVAC system must be replaced.” (page 45) “Electrification of space and water heating is a low-risk, cost effective strategy for decarbonizing the majority of the Commonwealth’s building stock.” (page 44)



6. ***It does not incentivize municipalities to adopt the municipal opt-in net zero stretch code.*** Green Communities grants totaling up to \$10 million annually are ideally suited to this purpose. See Appendix Section 11 (page 10).
7. ***It mentions Embodied Carbon only in the most superficial way in connection with curtainwall buildings.*** As discussed in Appendix Section 6 (page 6), this disregards a major contributor to building sector emissions which is even more important to regulate than operating carbon, especially this decade.
8. ***It requires air tightness testing but not commissioning and performance verification.*** The MA Net Zero Buildings Coalition recommends otherwise. See the Net Zero Stretch Code Framework in Appendix Section 16 (page 11).
9. ***It is silent on refrigerants, and yet additional climate risks are posed by driving toward electrified heating (heat pumps) without specifying low-impact refrigerants and refrigerant handling.*** The MA Net Zero Buildings Coalition is cognizant of these risks and recommends stretch code provisions to address them. See the Net Zero Stretch Code Framework in Appendix Section 16 (page 11).
10. ***Exemptions and waivers are unclear. Without code language, even the building area thresholds for these codes is unclear.*** The MA Net Zero Buildings Coalition recognizes that even the best stretch codes can be weakened by exemptions and waivers. See the Net Zero Stretch Code Framework for a suggested approach in Appendix Section 16 (page 11).

## 10. The Green Communities Act compels green communities to adopt the opt-in stretch code.

DOER's straw stretch code proposal violates the statute by allowing green communities to retain their designation without adopting the opt-in stretch code which is more beneficial.

In 2008, the Green Communities Act <https://malegislature.gov/laws/sessionlaws/acts/2008/chapter169> established the criteria for municipalities to qualify as "green communities" which includes requiring all new residential construction over 3,000 square feet and all new commercial and industrial real estate construction to "minimize, to the extent feasible, the life-cycle cost of the facility to the using energy efficiency, water conservation and other renewable or alternative energy technologies." This precise language also defines the stretch code and effectively mandates green communities to adopt it.

Nothing in the statute anticipates two stretch codes. However, the law requires green communities to "minimize, to the extent feasible, life-cycle cost." This requires net present value computations (standard calculations in life cycle cost assessment) to determine and compare the cost effectiveness of the two stretch codes as applied to various building types. The opt-in net zero stretch code minimizes life-cycle cost to a greater degree than the updated stretch code. Why? Because as shown by many studies, net zero buildings can be built for little if any cost premium and produce annual energy cost savings over the lifespan of a building, typically 50+ years, thus lowering the life-cycle cost. ***Therefore, green communities are compelled by law to adopt the opt-in net zero stretch code.***

## **11. DOER should incentivize green communities to adopt the opt-in net zero stretch code soon.**

DOER should incentivize green communities to adopt the opt-in net zero stretch code using the state-funded green communities grant pool, up to \$10 million per year, as provided for in the Green Communities Act. Only green communities adopting net zero standard should be eligible to compete for the entire pool up to \$10 million in the first round of grant applications. Any balance remaining after these net zero green communities receive their awards could be the basis for a second round of grant applications by green communities still using the updated stretch code.

DOER should consider allowing green communities a three-year “concurrency period” during which individual municipalities could decide, by vote of Town Meeting or Town Council, whether and when to transition from the updated stretch code to the opt-in net zero stretch code. Green communities adopting the opt-in net zero stretch code would become known as “net zero green communities.” At the end of the concurrency period, green communities that have not yet adopted the opt-in net zero stretch code should be encouraged to do so through a possible DOER “leading by example” municipal training program.

## **12. It is not hyperbole to suggest that this round of stretch codes will determine the success or failure of Massachusetts’ next generation climate policy.**

At the beginning of the next three-year code cycle, the updated Stretch Code will become the operative building energy code for 299 Massachusetts communities representing nearly 90% of our population. Updating will happen in an instant, no municipal action necessary, taking effect in January 2023. This is the decade that matters most, according to climate scientists. DOER must produce building energy codes and advance integrated state incentive programs that together drive down emissions in accordance with the state’s emissions targets. Building energy codes are not up for political persuasion but must use a science-based approach to address climate data and meet state laws.

If this updated Stretch Code fails us and we do not meet the 2030 goal, building sector emissions which account for 27% of aggregate emissions will likely continue to rise in connection with expanded development, contributing to the intensification of global feedback loops (atmosphere, ice, forest, ocean) over which we have no control. Considering the seriousness of this potential risk, leading communities, some of which have more aggressive climate goals than the state’s, are already moving to pursue other governance options. And with good reason.

## **13. DOER must develop a suite of more stringent building energy codes – base, updated stretch, and opt-in net zero.**

Building energy codes need to meet the 2030 goals and support forecast development activity this decade. Unless they do so, building sector emissions will rise. Three building energy codes – Base, Updated Stretch, and Opt-In Net Zero Stretch – should be well coordinated and promulgated by January 2023, providing benefit as soon as possible. The opt-in net zero code should be available for adoption as of January 2023, effective immediately or within six months. All three should ***pertain to both new construction and major renovations, the latter defined as significantly affecting 50% or more of the building space.*** To meet the 2030 goal, the following important provisions are crucial:

1. **Base Energy Code** – require good energy-efficient, all-electric, EV Electric Vehicle-ready, and PV Photovoltaic-ready buildings. DOER notes that 2020 Massachusetts new homes average HERS 51.
2. **Updated Stretch Code** – require better energy-efficient, all-electric, PV Photovoltaic-ready, low embodied carbon, EV Electric Vehicle-charging. A 20% improvement from HERS 51 is HERS 41.
3. **Opt-in Net Zero Stretch Code** – require best energy-efficient, all-electric, net zero (on-site emissions), low embodied carbon, EV Electric Vehicle charging + 100% renewable power generated on-site or off-site or purchased from approved sources, validated by Passive House or other third-party certification. DOER notes that Passive House standards are comparable to HERS 34.

#### **14. Timing is everything. The net zero stretch code needs to become widely adopted in 2023.**

According to the Next Generation Roadmap Buildings Sector Report, a high performance, net zero on-site emission stretch code adopted in 2023 could reduce annual 2050 emissions from residential and new commercial construction by 1.30 MMT CO<sub>2</sub> (87% reduction), whereas adoption by 2030 could reduce annual 2050 emissions from residential and commercial new construction by 0.8 MMT CO<sub>2</sub> (54% reduction). ***Stepping up adoption by seven years could realize a savings of 0.7 MMT CO<sub>2</sub> or 61% more emissions. A true net zero stretch code needs to become widely adopted and effective in 2023.***

Stretch codes offer advantages of uniformity, enforceability, and adaptability through periodic updates. Unless DOER delivers stretch codes aimed at meeting state emissions reduction goals, leading communities have shown readiness to pursue other potential fossil fuel free governance solutions to meet the 2030 goal which is imminent. These include home rule petitions, local zoning incentives, and special permits.

#### **15. Accelerating the transition off polluting fossil fuels is most critical for low-income ratepayers.**

Local and state policies will work in coordination with a net zero stretch code to ensure that low-income ratepayers are not burdened with rising fossil fuel prices during the clean energy transition. By expanding workforce training and incentivizing heat pump retrofits for low- and moderate-income ratepayers, these ratepayers will not be burdened with expensive utility bills but rather benefit from 50% more energy efficient home heating systems. Net zero code adoption isn't just for wealthy towns. Energy-burdened communities benefit most from energy-efficient affordable housing and declining emissions.

#### **16. DOER should advance its work in accordance with the MA Net Zero Buildings Coalition's Net Zero Stretch Code Framework (February 2022).**

Through a collaborative effort, representatives of the MA Net Zero Buildings Coalition developed a consensus one-pager that suggests a ***net zero definition*** and ***seven important new code provisions*** – energy efficiency, electrification, renewable energy, embodied carbon, building energy reporting & commissioning, refrigerants, exemptions & waivers. These provisions apply to both commercial and residential projects, and to major renovations as well as new construction. See the following page.

## NET ZERO DEFINITION

An energy-efficient, all-electric, low embodied carbon building that achieves carbon neutral building operations through the production and/or procurement of renewable energy.

### CARBON NEUTRALITY GOAL

Achieve statewide carbon neutrality per the Global Warming Solutions Act which calls for emissions reductions from 1990 levels of at least 50% by 2030 and at least 75% by 2040, leading to “net zero” by 2050. Support municipalities in meeting or exceeding these emission reduction goals.

### EQUITY GOAL

Prioritize net zero stretch code adoption and energy-efficient affordable housing in energy-burdened communities. Ensure “No community left behind.”

### COMMERCIAL & RESIDENTIAL PRINCIPLE

Transition all building types to 100% renewable energy. Ensure “No square foot left behind.”

### NEW CONSTRUCTION & RENOVATION PRINCIPLE

Electrify all buildings starting with new construction and major renovations.

### ENERGY EFFICIENCY

#### IMPORTANT NEW CODE PROVISION

Set energy efficiency standards consistent with leading benchmarks to reduce greenhouse gas emissions, operational expenses, and grid load.

### ELECTRIFICATION

#### IMPORTANT NEW CODE PROVISION

Require primary heating/cooling systems, appliances and other systems to be 100% electric to take full advantage of renewable energy and provide cost-effective heat and air-conditioning.

### RENEWABLE ENERGY

#### IMPORTANT NEW CODE PROVISION

Require buildings to be powered by 100% renewable energy which can be on-site or off-site, generated and/or purchased from approved sources, so that building operations are carbon neutral.

### EMBODIED CARBON

#### IMPORTANT NEW CODE PROVISION

Require Whole Building Life Cycle Assessment (WBLCA) to account for and minimize embodied carbon in the sourcing, production, and transportation of building materials.

### BUILDING ENERGY REPORTING & COMMISSIONING

#### IMPORTANT NEW CODE PROVISION

Require building energy reporting and disclosure, together with initial and periodic commissioning, to ensure that building systems operate as designed.

### REFRIGERANTS

#### IMPORTANT NEW CODE PROVISION

Require the selection of low-impact refrigerants and refrigerant recycling (prohibiting disposal) to limit ozone depletion and carbon emissions.

### EXEMPTIONS & WAIVERS

#### IMPORTANT NEW CODE PROVISION

Exemptions should be narrowly defined, fully justified, and subject to review as technology changes. Waivers should only be available in limited instances through a clearly defined process. These might include emergency generation and process gases or other instances of technological infeasibility.

For more information contact Northeast Energy Efficiency Partnerships - Darren Port [dport@neep.org](mailto:dport@neep.org) Kai Palmer-Dunning at [kpunning@neep.org](mailto:kpunning@neep.org)

## **17. A true net zero code will deploy a newly trained workforce and stimulate homeowners to utilize residential electrification incentives.**

The surest way to create strong market demand for the state's jobs initiative and residential electrification program is to promulgate a true net zero stretch code and incentivize its adoption. The net zero code will work in tandem with the state's residential electrification and workforce development efforts. At a recent Northeast Sustainable Energy Association (NESEA) program, MassCEC representatives proposed a pilot that would be akin to MassSAVE "on steroids," with a focus on providing homeowners with a pathway to decarbonization. Other speakers focused on state-supported workforce training for heat pump retrofits, as mandated by the Next Generation Roadmap Act. A net zero stretch code will leverage state investment in jobs training and electrification incentives, ensuring good jobs and a strong economy.

## **18. Decarbonizing existing buildings is key.**

Most of the projected 2050 building space – 81% according to the Next Generation Roadmap Buildings Sector Report, or 73% according to the DOER straw proposal webinar – already exists today. Reducing emissions to meet statutory goals requires decarbonizing existing buildings, 74% of which are by square footage residential buildings, according to the Next Generation Roadmap Buildings Sector Report.

This report envisions a straight-line approach to emissions reductions, starting this decade, stating, "In order to achieve required emissions reductions in and before 2050 in the Buildings Sector, significant growth in the pace and scale of heating system retrofits is required. For the residential sector, that translates to an average of nearly 100,000 homes installing heat pumps or other renewable thermal systems each year for the next 25-30 years. The commercial sector requires a comparable level of effort."

The legislature recently voted approval of \$100 million in ARPA funding to incentivize heating system retrofits and energy efficiency improvements of existing buildings. But \$100 million will be depleted in a year and "stretched thin" over 100,000 homes, providing only \$1,000 per structure, barely enough for air infiltration sealing. A new proposal seeks an additional \$250 million in anticipated ARPA funding to boost this existing building retrofit incentive. This would provide another \$2,500 per structure. A residential heat pump retrofit with modest energy efficiency improvements could easily cost 10-20X this amount or \$25,000-\$50,000.

The DOER presentation included MassSave subsidies of \$15,000 per dwelling unit for HERS 45 and \$25,000 per dwelling unit for HERS 35 (reflecting Passive House performance). Valuable as these incentives are, they must be accompanied by explicit MassSave promotion (not discouragement) of heat pumps. MassSave incentives are not currently available in 31 municipal light plant communities. A comparable publicly funded incentive program should be required in and developed for these communities.

## **19. Legislators should act now to allocate \$250 million to the Zero Carbon Renovation Fund.**

***A Zero Carbon Renovation Fund of \$250 million***, allocated from the remaining ARPA funds, will respond to the climate crisis and improve the health and well-being of Massachusetts residents by renovating existing buildings to zero carbon. Administered through MassCEC, this fund will result in deep carbon savings by transforming existing MA buildings to be energy efficient, all electric, renewably powered, and renovated with low-embodied carbon materials. This is especially important today, before the grid is decarbonized.



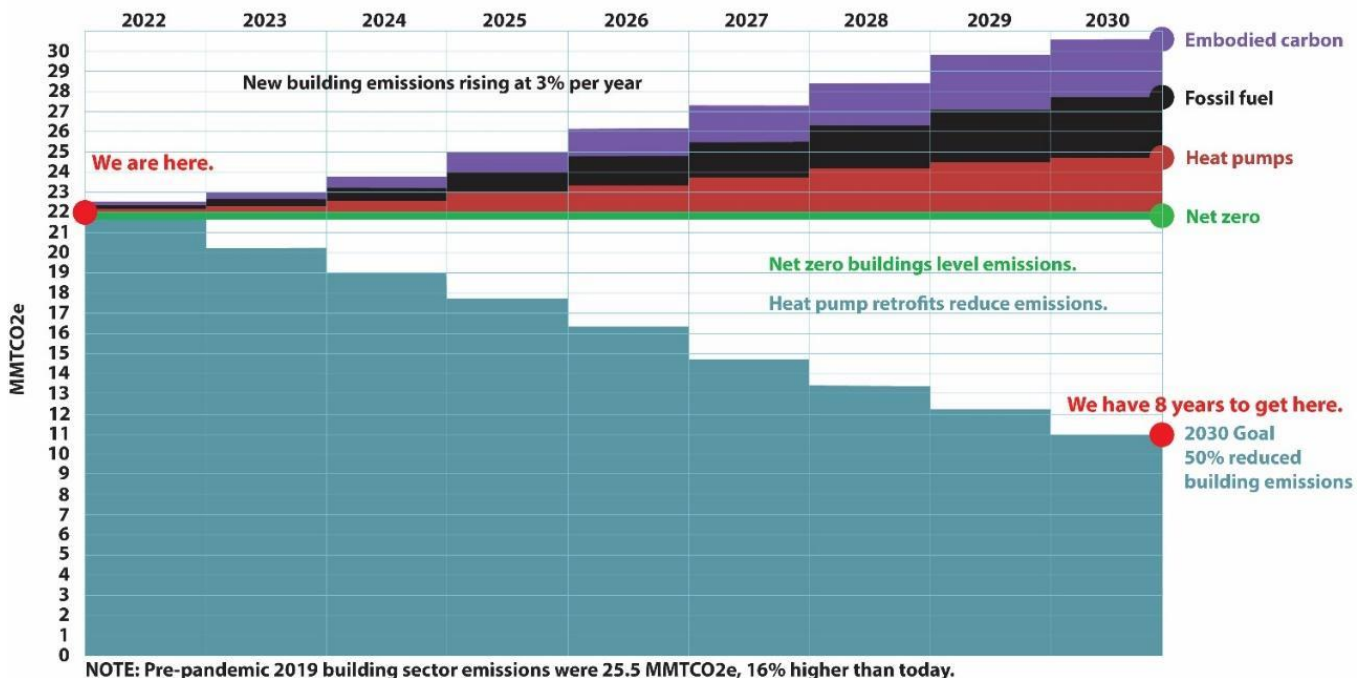
**The proposed Zero Carbon Renovation Fund will promote affordability.** This fund would assist affordable housing, public housing, low- and moderate-income homes, municipal buildings including but not limited to schools, and small businesses with [Massachusetts State Supplier Diversity Office Certifications](#).

**This is a bold proposal to address the urgent need for zero carbon retrofits.** “Nearly one third of Massachusetts’ emissions come from its more than 2 million *existing* buildings.” However, as stated in the [Massachusetts 2050 Decarbonization Roadmap Study](#), “Electrification and efficiency in existing buildings presents a larger challenge, as this stock represents the bulk of emissions reductions needed by 2050.” By reference to this study, the Act Creating a Next Generation Roadmap for Massachusetts Climate Policy hinges on retrofitting over 1 million existing homes by 2030 and 350 million square feet of commercial retrofits, “with at least two-thirds [of existing buildings] receiving deep energy efficiency improvements.”

## 20. We have a 2030 goal. Let’s do what it takes to meet it.

As illustrated by the pictogram below, we have eight years to meet the 2030 goal. Building sector emissions climbing at rate of 3% per year (less than the pre-pandemic rate of 4% per year), will take us further from the 2030 goal. If fossil fuel buildings are allowed and only moderate energy efficiency is required, the rise will be steeper, as shown in black. If all-electric buildings and higher energy efficiency are required, the rise will be less steep, as shown in red. A widely adopted net zero stretch code will level building sector emissions this decade, as shown by the horizontal green line. Embodied carbon emissions associated with construction are expected to rise significantly this decade, as shown in purple.

**Net Zero Buildings & Heat Pump Retrofits Are Needed to Meet the 2030 Goal of 50% Emissions Reduction**



To meet the 2030 goal, we need net zero new construction to level emissions, as shown in green, AND electrification of existing buildings to reduce emissions, as shown in blue. It’s that simple. DOER must develop an effective stretch code update and a true net zero opt-in code that neutralize building sector emissions and ensure no community is left out of the clean energy transition.