

Net Zero Buildings

A net zero stretch code will move us closer to our climate goals

Net zero energy (ZE) buildings prioritize energy efficiency, are combustion-free and source 100% of their annual energy from additional renewable energy sources. ZE buildings either generate enough renewable energy onsite or purchase off-site renewable energy to offset emissions from all energy used in the building over a year. Updating the building stretch code to net zero in the near term and adopting a net zero code as our base code by 2025 will play a critical role in lowering emissions in a way that is most cost-effective.

Adopting a net zero stretch code will make it easier for communities across the Commonwealth to set stricter energy efficiency standards and make our buildings safer, more durable, and more resilient to climate impacts while lowering energy bills for consumers.

Buildings produce ~40% of energy-related carbon emissions worldwide. In large cities like Boston, buildings produce 66% of emissions.¹

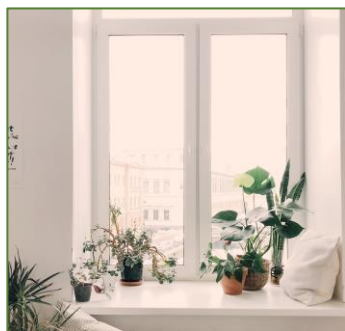
BUILDING CODE 101

How do building codes work?

In Massachusetts, the state Board of Building Regulations and Standards (BBRS) sets a 'base' and 'stretch' code regulating energy efficiency for new construction statewide. The base code is the state-wide default, but communities can adopt the more stringent stretch energy code that goes above and beyond the base code.

Why do we need a new stretch code?

Building technology and needs are changing quickly. While the base code is updated every three years, the BBRS has not updated the stretch code since it was designed in 2009. The stretch code is no longer a stretch – in fact, it's less efficient than the current *base* code.



The problem

While communities can create their own stretch codes that go beyond the base code, this will result in different stretch codes for every community, causing confusion about energy efficiency standards—a situation that the original stretch code was designed to avoid.

The solution

Adopting a strong statewide net zero energy stretch code will help communities with net zero planning and improve how buildings are built today. This will also allow the building industry to plan more effectively for ZE construction.

DIRECT BENEFITS OF ZERO ENERGY BUILDINGS

Health

Powered by renewable energy, net ZE buildings produce significantly fewer air pollutants. Also, as an efficiency measure, they generally use more daylight than standard buildings; exposure to more daylight is correlated with being more physically active, and with sleeping better.²

Climate Resilience

Net ZE buildings are more climate resilient. During storms and blackouts, people can shelter in place for longer when their energy needs are being met on-site.

Financial Resilience

With little or no additional first costs, net ZE buildings are less expensive to operate and cheaper to live and work in than standard buildings. Building energy demand in net ZE buildings can be reduced by up to 54% with technology that is readily available today.³

Key features of a strong ZE stretch code

- Applies to new construction and major renovations
- Requires deep energy efficiency
- Emphasizes electrification
- Excludes on-site combustion with some exceptions
- Emphasizes local renewable energy, requires MA Class I Renewable Energy Credits (RECs)

Are ZE buildings feasible today?

The answer is a resounding yes. The technology to get to net zero is available today. A [Built Environment Plus study on zero energy buildings](#) in Massachusetts found that of the six building types studied, all can be zero energy for an upfront cost of 0 to 7 percent and all types break even in eight years or less when there are no additional upfront costs.⁴

Massachusetts already has many ZE buildings. They include Bristol Community College's Sbraga Health and Science Building in Fall River, the Division of Fisheries & Wildlife's headquarters in Westborough, the RW Kern Center at Hampshire College in Amherst, and various multifamily residential buildings in Roxbury and other parts of Boston.



DID YOU KNOW?

More than 280 Massachusetts cities and towns have adopted the stretch code⁵. Now many of them are ready for the next step - going to Net Zero Energy.

Encouraging ZE construction will help Massachusetts meet its commitment of reducing greenhouse gas emissions by 85 percent below 1990 levels by 2050⁶

Is MA developing a net zero stretch code?

In June 2019, the Board of Building Regulations and Standards (BBRS) tasked its Energy Advisory Committee (EAC) to work on developing a net zero stretch code for the state. It is likely that a net zero stretch code will be adopted as part of the 10th edition of the base energy code; the 2021 International Energy Conservation Code (IECC). The EAC is currently considering multiple ZE code proposals as options for the net zero stretch code. We need to make sure that the final code is centered in equity with a focus on energy efficiency, building electrification, and renewable energy.

RESOURCES

[Zero Energy Buildings in Massachusetts: Saving Money from the Start](#), The Northeast Sustainable Energy Association (NESEA), vimeo.com/447340803/242836bb68

[Guidebook for Zero Emission Buildings](#), City of Boston

TO GET INVOLVED or for more information, contact: Veena Dharmaraj, veena.Dharmaraj@sierraclub.org

SOURCES

1. **Built Environment Plus**; <https://builtenvironmentplus.org/wp-content/uploads/2019/09/ZeroEnergyBldgMA2019.pdf>
2. **Boubekri, M., et al.** *Impact of Windows and Daylight Exposure on Overall Health and Sleep Quality of Office Workers: A Case-Control Pilot Study*; Journal of Clinical Sleep Medicine, Vol. 10, No. 6, 2014; [ncbi.nlm.nih.gov/pmc/articles/PMC4031400/](https://pubmed.ncbi.nlm.nih.gov/254031400/)
3. **Built Environment Plus**; <https://builtenvironmentplus.org/wp-content/uploads/2019/09/ZeroEnergyBldgMA2019.pdf>
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