

Massachusetts is Ready for Net Zero

2021 REPORT, MARCH 1ST

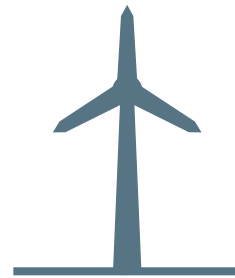
NET ZERO - 5.5 Million Sq Ft in MA



**ENERGY
EFFICIENCY**



**MINIMIZE
FOSSIL FUEL**



**ON + OFF-SITE
RENEWABLE ENERGY**

NET ZERO READY - 7.2 Million Sq Ft in MA

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MAR 01, 2021



What's this all about?!

Built Environment Plus sent a request out to the Massachusetts Building Community for data on what's happening around net zero buildings. We wanted to take a pulse on:

1. **How many Net Zero projects exist or are in development in and around Massachusetts.**
2. **Does it cost more to build these projects?**
3. **What building types are achieving net zero?**
4. **Who is bringing these projects to reality?**
5. **How are they getting it done?**

The Building Community answered the call in nine short days and we released our first draft report on February 10th, 2021. Continued effort has increased the total of Net Zero Ready, or Net Zero Projects, collected in the analysis to 7.2 Million GSF in MA. These represent built or in-process projects, and we have since removed out-of-state projects. It's clear from this survey that Massachusetts is more than ready for net zero.

The bottom line is:

1. ***The Net Zero and Net Zero Ready building stock exceeds 7 million square feet and is growing at an exponential rate in the Commonwealth today.***
2. ***The vast majority are doing this with little to no added cost. 85% reported <1% construction cost premium to achieve Net Zero Ready.*****
3. ***Net Zero Buildings span a wide range of types, with a high degree of representation from K-12, higher education, healthcare, laboratory, office, and multi-family.***
4. ***There are dozens of builders, architects, engineers and owners already bringing these projects to reality. Some are developers.***
5. ***Net Zero Ready buildings are highly energy efficient: 82% are at least 35% more efficient than the current stretch code baseline and all rely on heat pumps as the primary source of heat.*** Net Zero buildings also procure on-site and/or off-site renewable energy to offset 100% of consumption on a net annual basis.***

To be listed as Net Zero Ready in this database, buildings must be:

- Located In Massachusetts
- Highly Energy Efficient (25% total energy reduction vs. the ASHRAE 90.1 baseline).
- All electric for building heating operation*

To be listed as Net Zero, buildings must meet the Net Zero Ready criteria and:

- Procure renewable energy (from on-site and/or off-site) equal to 100% of the site energy consumption on a net annual basis.

We know there are additional Net Zero Buildings in Massachusetts, and for the projects we do have, the data is not 100% complete. We intend to update this document as we gather more information.

* All electric for building heating operation means that electricity is used for heating during "normal operation" when systems are operating as intended and ambient temperature is above the ASHRAE 99% design condition. Special use buildings such as health care facilities and laboratories are given more leeway and may be included if the building relies primarily on heat pumps for building heating and through efficiency and electrification achieve ≥90% fossil fuel reduction vs. the ASHRAE 90.1 baseline)

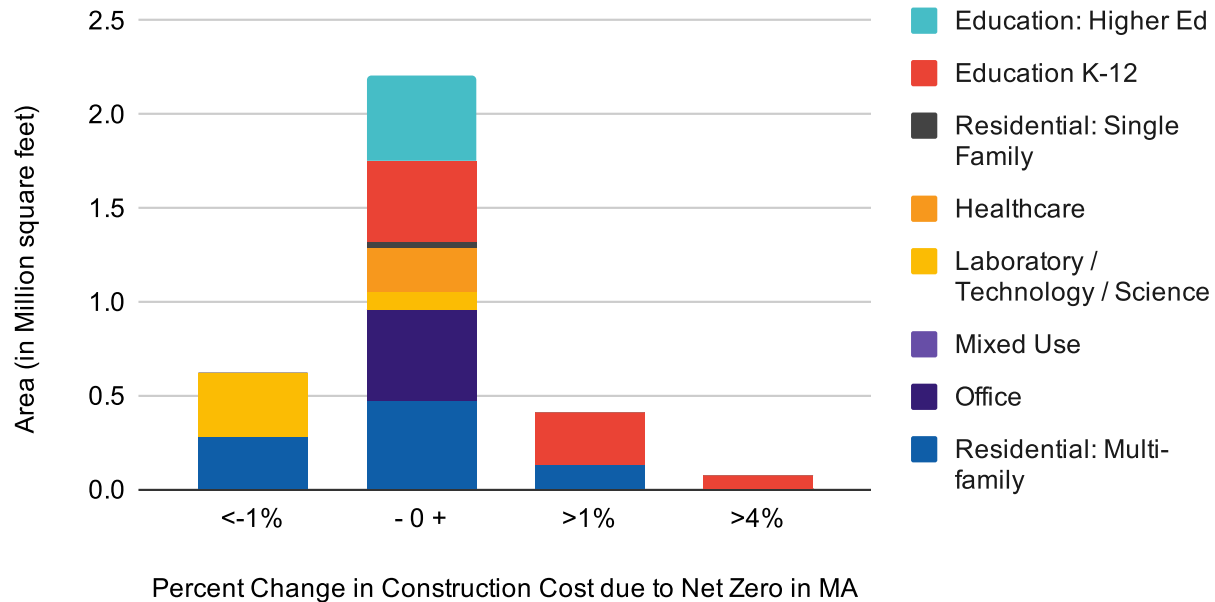
**47% of the project GSF shared cost difference for net zero. Of those, 85% of them reported <1% construction cost premium.

***54% of the project GSF shared energy efficiency data. Of that 82% are at least 35% more efficient.

HOW MUCH DOES IT COST TO BUILD NET ZERO READY?

*47% OF GSF REPORTED ON % COST DIFFERENCE

NOT MUCH!



Net zero ready buildings are being built at the same cost as conventional buildings. 85% of net zero ready buildings reported have less than a 1% construction cost premium.* This is consistent across all building types and sizes, including high-rise buildings that are hundreds of thousands of square feet.

FEAR: Net zero is expensive.

REALITY: The vast majority of net zero buildings carry little to no added construction cost and significantly reduce operating cost. This means that net zero buildings typically have lower total cost of ownership than conventional buildings. The financial case is even more compelling when construction is financed via loans or bonds; in this scenario the operating savings more than offsets the loan payment premiums. This results in positive cash-flow from day one.

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7.2 Million Sq Ft in Massachusetts Currently Documented. More Pending...

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The Companies Working on these Net Zero Projects: Sorted by Sq Ft

OWNERS:

City of Cambridge
Preservation of Affordable Housing (POAH)
Somerville Community Corporation (SCC)
Gate Residential
Somerville Housing Authority (SHA)
Town of Belmont
Alexandria Real Estate
Gate Residential Properties
Midwood Investment & Development
Leggat McCall Properties, DLJ Real Estate Capital Partner
University of Massachusetts Medical School
Boston University
MIT
Chelsea Soldiers' Home
City of Watertown
Acton Boxborough Regional School District
Madison Park CDC, Trinity Financial
Samuels & Associates P-12 Property LLC
Just-A-Start Corporation
Town of Lexington
Homeowner's Rehab, Inc.
Pennrose
Westborough Public Schools
Massbay Community College
Capstone Communities LLC
Hope Real Estate Enterprises LLC
North Shore Community College
Bristol Community College
Commonwealth of Massachusetts
The Neighborhood Developers
Traggorth Companies
Cape Cod Community College
Broadway Investments Realty, LLC
Fred Gordon
NSCDC

Clark University
Tlee Development
Rees Larkin Development
Hampdentailor LLC
NOW Communities, LLC
Town of Eastham
Hampshire College
Cambridge Housing Authority
E3 Development
MassDevelopment Finance Agency
Hitchcock Center for the Environment
Z Capital Investments
Mass Audubon
MA Dept. of Conservation & Recreation
Chungha Cha
Harvard University
Ryan Bushey
Deborah Frieze

ARCHITECT:

Arrowstreet
ICON Architecture, Inc
NBBJ
Perkins & Will
Perkins Eastman
Adrian Smith + Gordon Gill Architecture
SGA
Architectural Resources Cambridge
ZGF
KPMB
Kieran Timberlake
Payette
William Rawn Associates
Ai3 Architects
DHK Architects
Placetaylor
Elkus Manfredi Architects
DiMella Shaffer
Sasaki
Mount Vernon Group Architects
Bruner/Cott
Utile
Architerra

HMFH Architects
Oudens Ello Architecture
Cambridge Seven Associates
Monte French Design Studio
ZeroEnergy Design
Studio G Architects
Charles Rose Architects
William McDonough + Partners
DiNisco Design Architects & Planners
Donald Powers Architects
Miller Pollin Architecture
designLAB architects
Urbanica
Interface Studios
Mills Whitaker Architects
Maple Hill Architects
Maryann Thompson Architects
Franziska Amacher, FAIA
Snøhetta
Ryan Bushey
Next Phase Studio

MEP ENGINEER:

BR+A
Garcia, Galuska & DeSousa
Arup
Petersen Engineering
Cosentini Associates
Wozny Barbar
Rist Frost Schumway
AKF
WSP
RW Sullivan Engineering
BLW Engineers
Buro Happold
Van Zelm
Vanderweil Engineers
ZeroEnergy Design
Ripcord
Zade
Norian Siani, Inc
VAV International
2rw Consulting Engineers
TMP Consulting Engineers
Kohler & Lewis Engineering

Drew Gillett
South Mountain Company

ENERGY CONSULTANT:

Thornton Tomasetti
Steven Winter Associates
The Green Engineer
New Ecology
Marc Rosenbaum
Linnaen Solutions

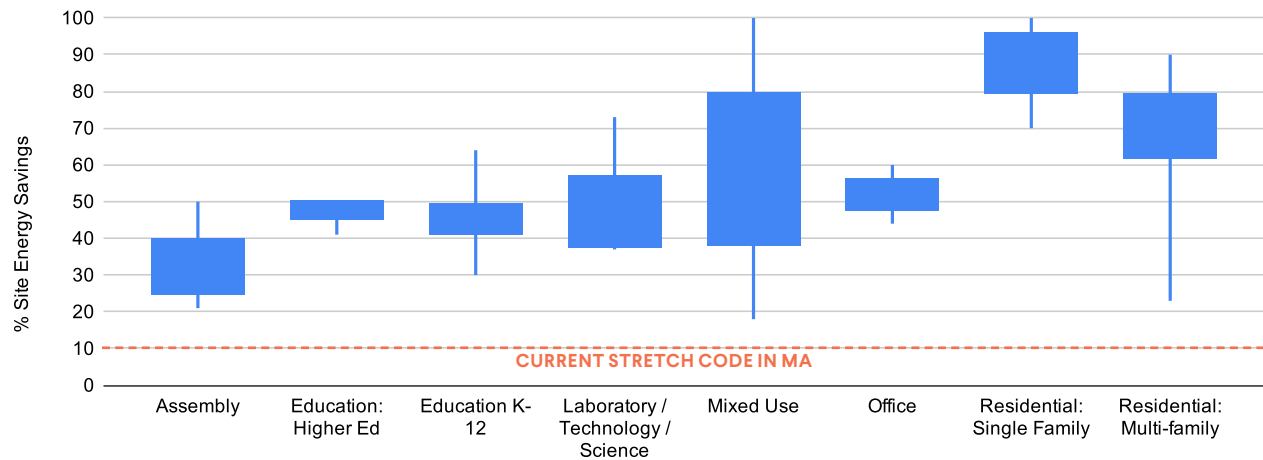
BUILDER:

Callahan Construction Managers
Consigli Construction Co.
Brait Builders
Moriarty
Gilbane Building Company
Placetaylor
Brait Builders
W.T. Rich
TR White Company
Haycon
Skanska
NEI GC
Shawmut
Stack + Co
Groom Construction
Olive Branch Builders
NPS Contractors
Bond Brothers
Wright Builders
MCR Construction
Columbia Construction Co.
Lee Kennedy
Walsh Brothers
Transformations, Inc.
One Way Development
Dellbrook JKS
Suffolk
Eastward Homes
Auburndale Builders
South Mountain Company
Fontaine Brothers

HOW MUCH BETTER CAN WE DO THAN THE CURRENT CODE?

*54% OF GSF REPORTED ON % ENERGY REDUCTION

MUCH BETTER!



Efficient buildings are far surpassing the current Stretch Code. Compared to the code baseline, 82% of submissions achieved at least 35% savings*, whereas the current Stretch Code only requires a meager 10% savings.

FEAR: Isn't the current Stretch Code difficult enough already?

REALITY: The current Stretch Code is not a stretch. Well insulated building envelopes and high performance heat recovery easily outperform the current stretch code. With the addition of heat pumps, the energy consumption is slashed.

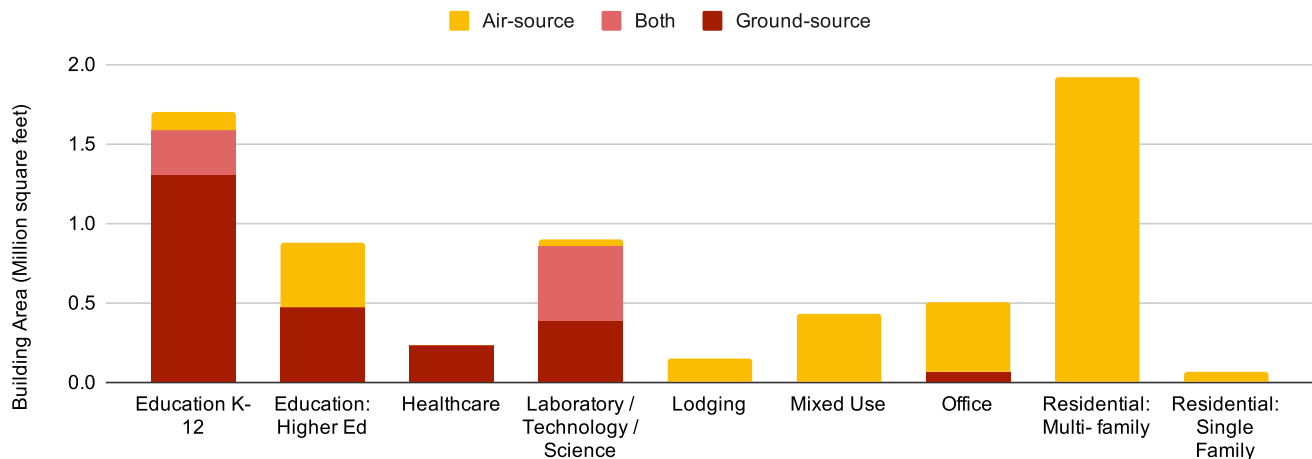
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HOW ARE BUILDINGS USING ELECTRICITY FOR HEATING?

*97% OF GSF REPORTED ON TYPE OF HEAT PUMP

GROUND AND AIR-SOURCE HEAT PUMPS!



7 million square feet of buildings are using heat pumps as the primary heating source. This spans all building types and sizes reported, including high-rise buildings that are hundreds of thousands of square feet.

FEAR: Net zero buildings must be 100% electric with no exceptions.

REALITY: Net zero standards promote electrification, but allow flexibility for fossil fuel use where appropriate. Examples include: back-up systems, lab buildings, healthcare facilities, commercial kitchens, large domestic hot water systems, and others.

FEAR: The electric grid can't support electric buildings.

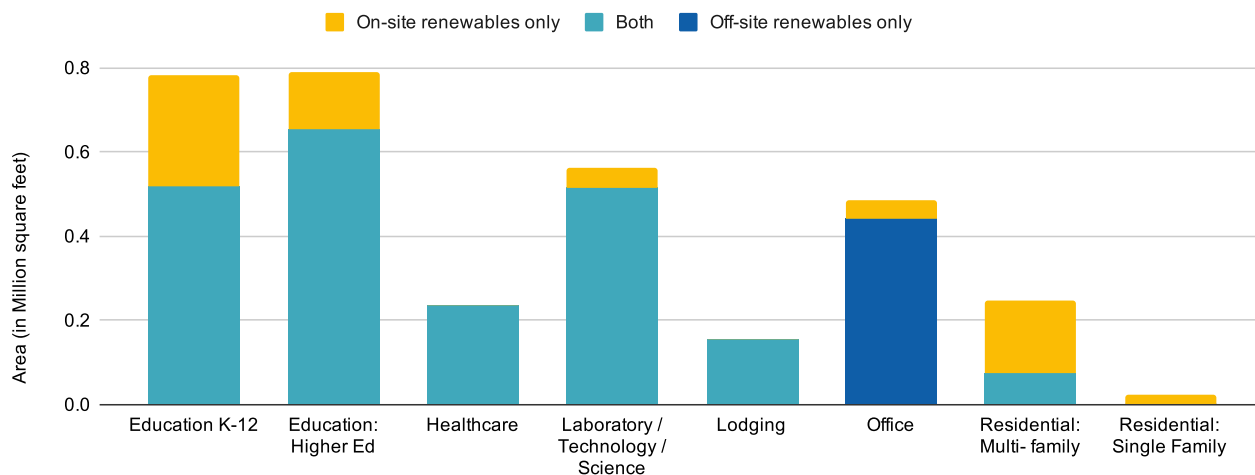
REALITY: New net zero buildings have lower peak electric demand than their peers.

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HOW ARE BUILDINGS ACHIEVING NET ZERO?

*52% OF GSF REPORTED ON RENEWABLES

ON-SITE AND OFF-SITE RENEWABLE ENERGY!



Of the 7+ million SF of net zero ready buildings, 5.5 million SF anticipate achieving net zero energy. Net zero buildings procure on-site and/or off-site renewable energy to offset 100% of annual consumption.

FEAR: Net zero buildings must produce all energy on-site.

REALITY: Net zero buildings can procure renewable energy from off-site.

FEAR: Renewable electricity costs more than grid electricity.

REALITY: There are many procurement methods for renewable energy. Some marginally increase cost. Others cost less, such as: power purchase agreements and virtual power purchase agreements.

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This Report is still a Work in Progress...

For questions related to this report, please reach out to communications@builtenvironmentplus.org

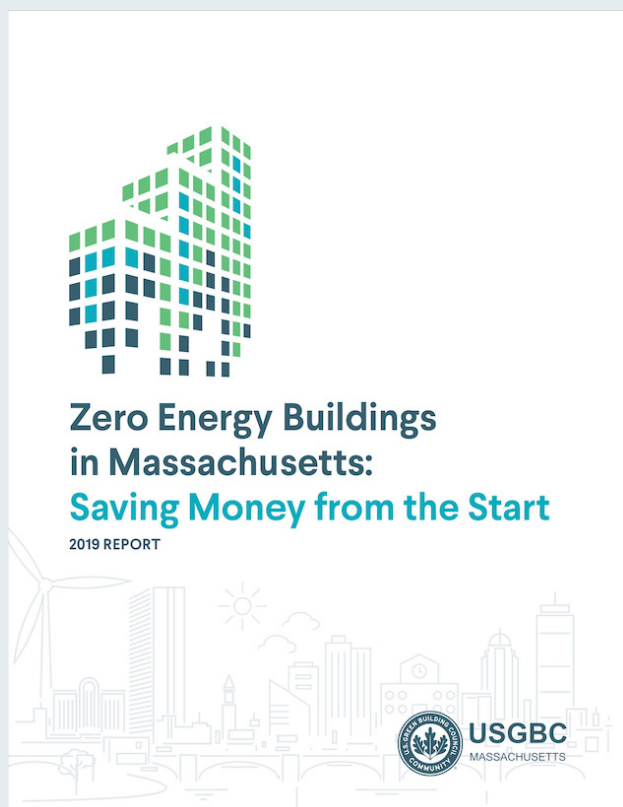
To learn more about Built Environment Plus check out our website <https://builtenvironmentplus.org/> and to check for updates to this report visit <https://builtenvironmentplus.org/road-to-net-zero/>

We are continuing to add to the database. Use [this form](#) to contribute additional projects or contact the email address above to request a spreadsheet.

Thank you to the many people and organizations who contributed to this effort, especially the Boston Society for Architecture. The building community united to provide this data swiftly.



Driving Sustainable and Regenerative Design, Construction, and Operations of the Built Environment.



The 2019 Cost Report

Our report, Zero Energy Buildings in MA: Saving Money from the Start, assessed in 2019, zero energy (ZE) upfront building costs, model performance, and life-cycle costs in Massachusetts. With buildings being a major source of greenhouse gas emissions, scientists, advocates, and local leaders are working to curb emissions and reduce energy use in the built environment by both retrofitting existing buildings and constructing new buildings to achieve Zero Energy Standards. While stakeholders and decision makers frequently cite high costs as the primary barrier to ZE buildings, we and report lead Integral Group found that many types of ZE buildings can be built with no added upfront cost and some commercial buildings can see return on investment in as little as one year.

[READ IT HERE](#)

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