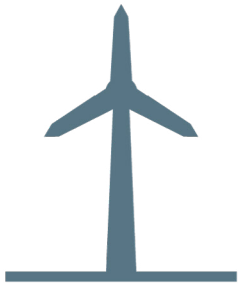
Massachusetts is
Ready for Net Zero

2021 REPORT, FEBRUARY 10TH

NET ZERO - 4.13 Million Sq Ft

ENERGY EFFICIENCY

MINIMIZE FOSSIL FUEL



ON + OFFSITE RENEWABLE ENERGY

NET ZERO READY - 5.2 Million Sq Ft

DRAFT
FEB 10, 2021

BUILT ENVIRONMENT PLUS

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 our call and in nine short days we released this draft report on our findings. Submissions are still flooding in. We will update this document as we gather more data.

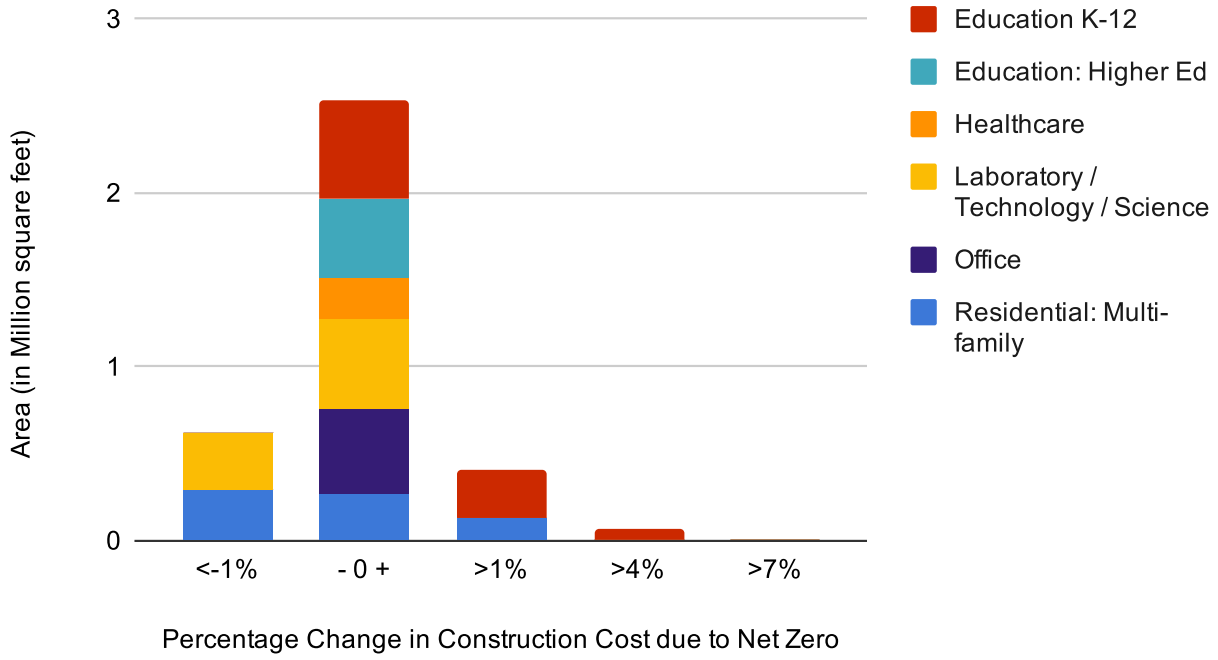
The bottom line is:

1. ***The Net Zero and Net Zero Ready building stock exceeds 5 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. 87% 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: 86% 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.***

It's clear from this quick survey that Massachusetts is more than ready for net zero. The opt-in Net Zero Stretch Code as part of the S.9 Climate Bill is a clear and essential next step.

HOW MUCH DOES IT COST TO BUILD NET ZERO READY?

NOT MUCH!



Net zero ready buildings are being built at the same cost as conventional buildings. 87% 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. When construction is financed via loans or bonds, the operating savings more than offset the loan payment premiums. This results in positive cash-flow from day one.

NET ZERO READY DATABASE SNAPSHOT

5.2 Million Sq Ft Currently Documented. More Pending...

4 Assembly
35,968 GSF




Lexington Visitor's Center	Walden Pond Visitor Center	Eastham Public Library	MA Audubon Broad Meadow Brook
Lexington	Concord	Eastham	Worcester
6,693	5,575	17,500	6,200

9 Education: Higher Ed
729,182 GSF






RW Kern Center	Millersville University Lomardo Welcome Center	Confidential	Southern CT State University Business School	Princeton University Racquet Center	House Zero	Boston University Center for Computing and Data Sciences	Mass Bay Community College Health Sciences	Clark University Alumni & Student Engagement Center
Amherst	Millersville	Allston	New Haven	Princeton	Cambridge	Boston	Framingham	Worcester
17,000	14,600	9,000	67,169	184,413	3,000	329,000	70,000	35,000

7 Education: K-12
1,026,044 GSF

Douglas & Gates Schools	Confidential	King Open/Cambridge St Upper Schools & Community Complex	Annie E. Fales Elementary School	Lexington Children's Place	Tobin Montessori Vassal Lane Upper Schools Project	Oyster River Middle School
Acton	Eastern Massachusetts	Cambridge	Westborough	Lexington	Cambridge	Durham
174,000	98,200	243,000	70,000	18,945	275,000	146,899

1 HealthCare
236,000 GSF

Chelsea Soldiers' Home Community Living Center
Chelsea
236,000

6 Lab / Tech / Science
1,329,100 GSF

Cape Cod Community College Frank and Maureen Wilkens Science and	Bristol Community College Sbrega Health & Science Building	15 Necco Street Project	University of Massachusetts Medical School - New Educational Research	Stony Brook University Institute for Discovery and Innovation in Medicine and	325 Binney Street
Barnstable	Fall River	Boston	Worcester	Stony Brook	Cambridge
38,500	50,600	369,000	335,000	61,000	475,000

2 Mixed Use
205,200 GSF

The Foundry	Parcel 12 (Hotel)
Cambridge	Boston
50,200	155,000

3 Office
501,000 GSF

Sustainable Energy Fund Office Building	Div of Fisheries & Wildlife Field HQ	One Bromfield
Schnacksville	Westborough	Boston
15,000	45,000	441,000

9 Residential: Affordable
438,238 GSF

Finch Cambridge	1005 Broadway	Harbor Village	31 Tufts	191 Talbot	Confidential	Hyde Park LGBTQ Senior Housing	Clarendon Hill Redevelopment	2072 Mass Ave. Apartments
Cambridge	Chelsea	Gloucester	Somerville	Dorcester	Suffolk County	Boston	Somerville	Cambridge
100,000	44,150	35,000	13,800	14,195	75,383	90,000	0	65,710

2 Residential: Single Family
4,360 GSF

McCracken Home	Bushey Residence
Mystic	Oak Bluffs
2,060	2,300

10 Residential: Multi-Family
796,649 GSF

Ryder	The Distillery North	E+ Highland	2085 Washington St	201 Hampden	1463 Dorchester Ave	52 Fisher	11 E Lenox Street	The Davis House	355 Bennington St
Revere	Boston	Boston	Boston	Roxbury	Dorchester	Mission Hill	Boston	Somerville	Boston
276,758	37,000	30,200	171,284	20,305	20,324	8,736	42,820	3,722	185,500

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

OWNERS:

City of Cambridge
Alexandria Real Estate
Gate Residential Properties
Midwood Investment & Development
National Development
UMass Medical School
Boston University
Chelsea Soliders' Home
Princeton University
Acton Boxborough Regional School District
Madison Park CDC
Trinity Financial
Samuels & Associates P-12 Property LLC
Oyster River Community School District
HRI
Pennrose
Massbay Community College
Westborough Public Schools
Southern Connecticut State University
Capstone Communities LLC
Hope Real Estate Enterprises LLC
Stony Brook University
Bristol Community College
Commonwealth of MA, DCAMM
TND
Traggorth
DCAMM
Fred Gordon
Clark University
Tlee Development
Rees Larkin Development
Town of Lexington
Hampdentailor LLC
Town of Eastham
Hampshire College
Sustainable Energy Fund
Millersville University
E3 Development
Harvard University
Z Captial Investments
Mass Audubon
MA Dept. of Conservation & Recreation
Chungha Cha
Ryan Bushey
Courtney and Lynn McCracken
Preservation of Affordable Housing
Somerville Community Corporation
Gate Residential
Somerville Housing Authority

ARCHITECT:

Arrowstreet
NBBJ
Adrian Smith + Gordon Gill Architecture
Sasaki
Elkus Manfredi
ARC
ZGF
KPMB
Perkins Eastman
Payette
William Rawn Associates
ICON Architecture, Inc
DHK Architects
Elkus Manfredi Architects
Lavallee Brensinger Architects
DiMella Shaffer
Bruner/Cott
Architerra Inc.
Placetailor
HMFH Architects
Ellenzweig
Cambridge Seven Associates
Utile
Studio G Architects
DiNisco Design Architects & Planners
Oudens Ello Architecture, LLC
Ashley McGraw Architects
Spillman Farmer Architects
Barkow Leibinger
Mills Whitaker Architects
Maple Hill Architects
Maryann Thompson Architects
Snohetta
Ryan Bushey
MBV Architects

MEP ENGINEER:

BR+A
Garcia, Galuska, Desousa
ARUP
Wozny Barbar
RFS
WSP
Van Zelm
RW Sullivan
AKF
Yeaton
Petersen
Kohler Ronan
BLW
Vanderweil
Norian Siani
Ripcord
VAV International
Zade
TMP
Kohler & Lewis
South Mountain Company
MBV Architects

ENERGY CONSULTANT:

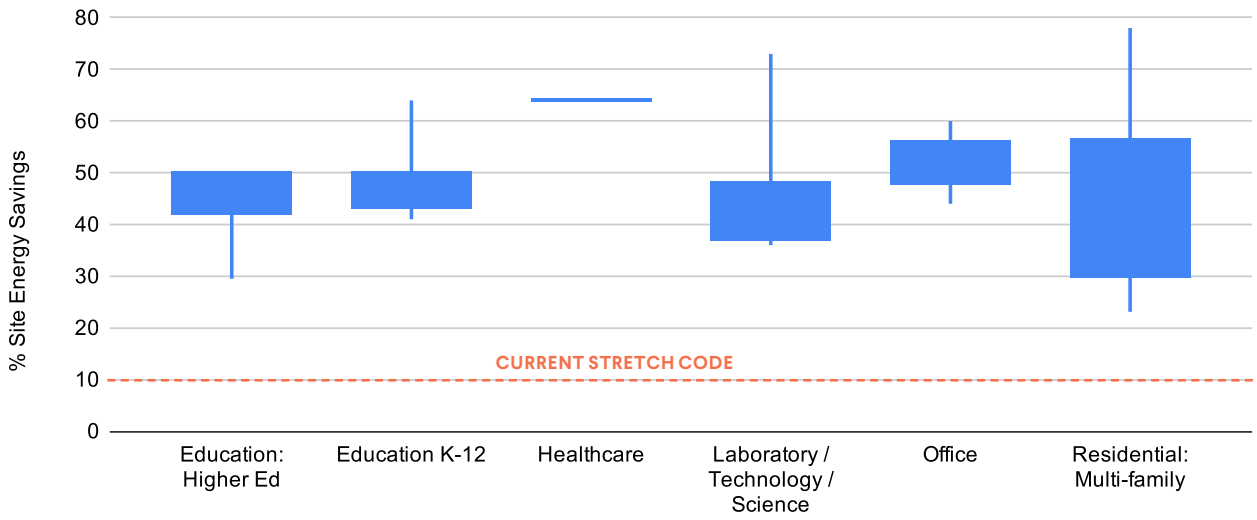
The Green Engineer
Thornton Tomasetti

BUILDER:

Moriarty
Suffolk
Consigli Construction Co.
Shawmut
Dellbrook JKS
W. T. Rich
Bauen Corporation
NEI GC
Gilbane Building Company
Haycon
Bond Brothers
Columbia Construction Co.
Groom Construction
Placetailor
Wright Builders
TN Ward
Perrotto
One Way Development
Lee Kennedy
MCR Contruction
South Mountain Company
Michael Joplin

HOW MUCH BETTER CAN WE DO THAN THE CURRENT CODE?

MUCH BETTER!



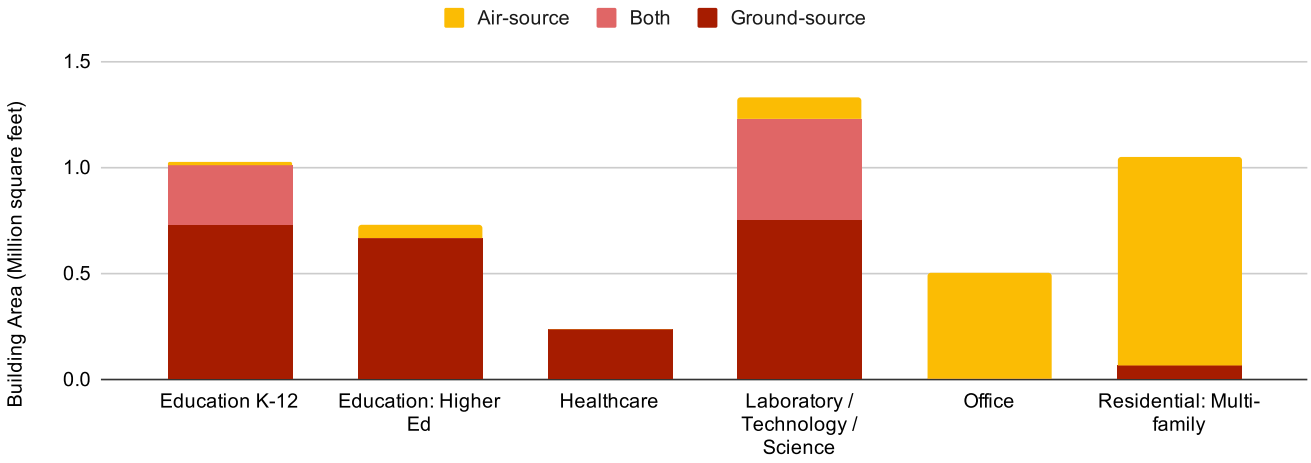
Efficient buildings are far surpassing the current Stretch Code. Compared to the code baseline, 86% of submissions achieved at least 35% savings, whereas the current Stretch Code only requires a meager 10% savings.

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.

HOW ARE BUILDINGS USING ELECTRICITY FOR HEATING?

GROUND-SOURCE AND AIR-SOURCE HEAT PUMPS!



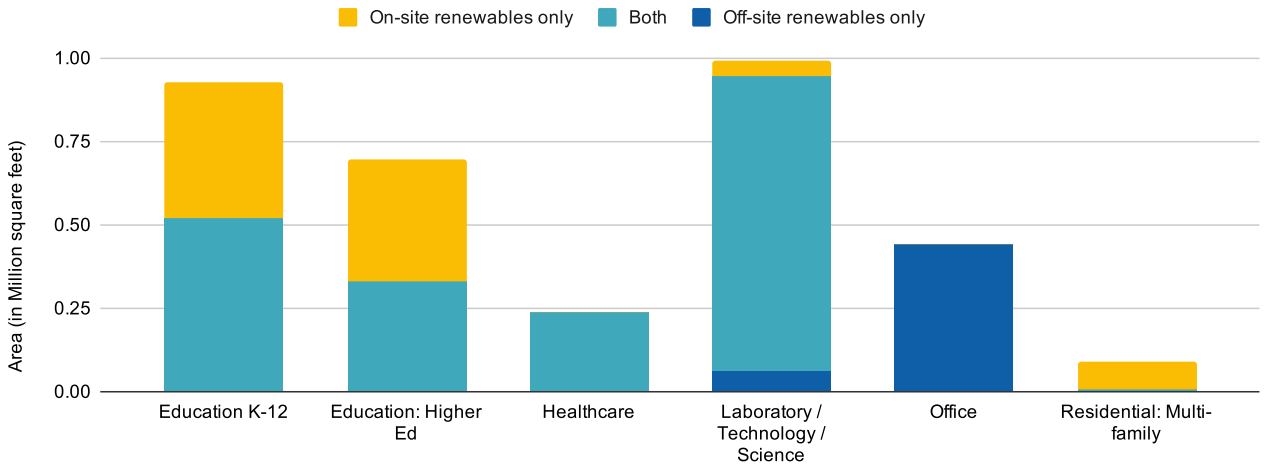
All 5+ million square feet of buildings are using heat pumps as the primary heating source. This spans all building types and sizes reported, including high-rise buildings that are hundreds of thousands of square feet.

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.

HOW ARE BUILDINGS ACHIEVING NET ZERO?

ON-SITE AND OFF-SITE RENEWABLE ENERGY!



Of the 5+ million SF of net zero ready buildings, 3.4 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.

This Report is Just Getting Started...

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

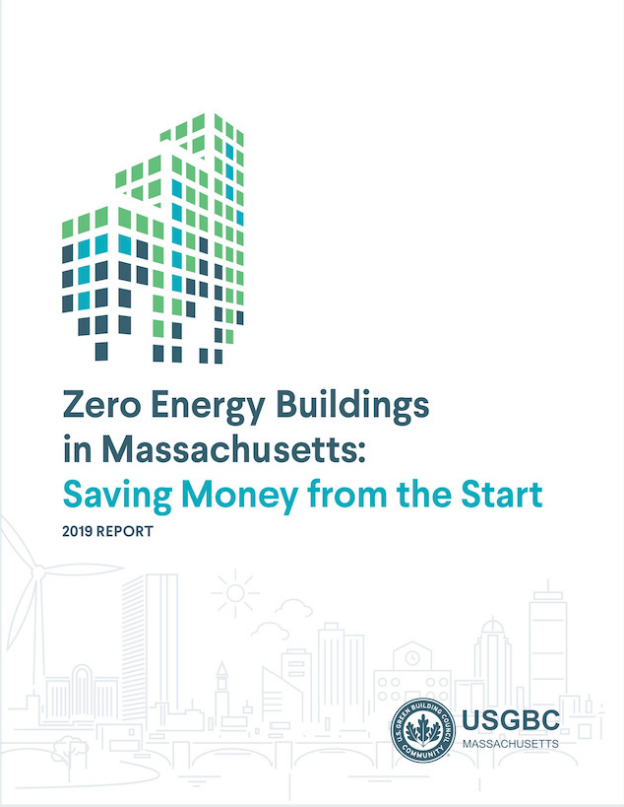
To learn more about Built Environment Plus check out our website https://builtenvironmentplus.org/ and to check for updates to this report visit https://builtenvironmentplus.org/road-to-net-zero/

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. The building community united to provide this data swiftly.

BUILT ENVIRONMENT PLUS

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.

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