

Massachusetts is Ready for Net Zero

2022 REPORT, MARCH 18TH UPDATE

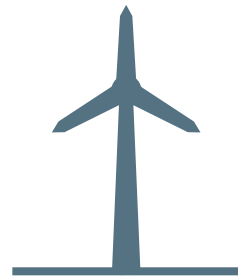
NET ZERO - 12.9 Million Sq Ft in MA



**ENERGY
EFFICIENCY**



**MINIMIZE
FOSSIL FUEL**



**ON + OFF-SITE
RENEWABLE ENERGY**

NET ZERO READY - 16.5 Million Sq Ft in MA

What's this all about?

Built Environment Plus has been actively asking the Massachusetts Building Community for data on what's happening around net zero buildings. We want to take an ongoing 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 original call in nine short days and we released our first draft report on February 10th, 2021. An update in March 2021 unveiled even more progress as we confined the report to built or in-process projects in Massachusetts. Continued data collection increased the total of Net Zero or Net Zero Ready Projects included in the analysis in March 2022 to 16.5 Million GSF in MA. This represents a 130% increase in known square footage in just one year. It is clear from this analysis that Massachusetts is more than ready for net zero.

The bottom line is:

- 1. The Net Zero and Net Zero Ready building stock exceeds 16.5 million square feet and is growing at an exponential rate in the Commonwealth today.**
- 2. Of the 4 million GSF with reported cost data, 85% reported <1% construction cost premium to achieve Net Zero Ready.**
- 3. Affordable Housing, Multifamily Housing, K-12 Schools, and Labs & Tech are leading the way, employing heat pumps and on-site renewables to reach their net zero targets.**
- 4. Affordable Housing makes up 78% of all residential Net Zero and Net Zero Ready square footage, up from 54% in March 2021.**
- 5. Net Zero Ready buildings are highly energy efficient: 90% are at least 35% more efficient than the current stretch code baseline (up from 82% in March, 2021 with 26% more projects reporting energy data). 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.**
- 6. Our list of companies working on these net zero projects has grown substantially in the past year, with a 135% increase to 313 companies working to make net zero buildings the standard in MA.**

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 ongoing document as we gather more information.

* 25% of the project GSF and 55% of submissions shared cost difference for net zero. Of those, 85% of them reported <1% construction cost premium.

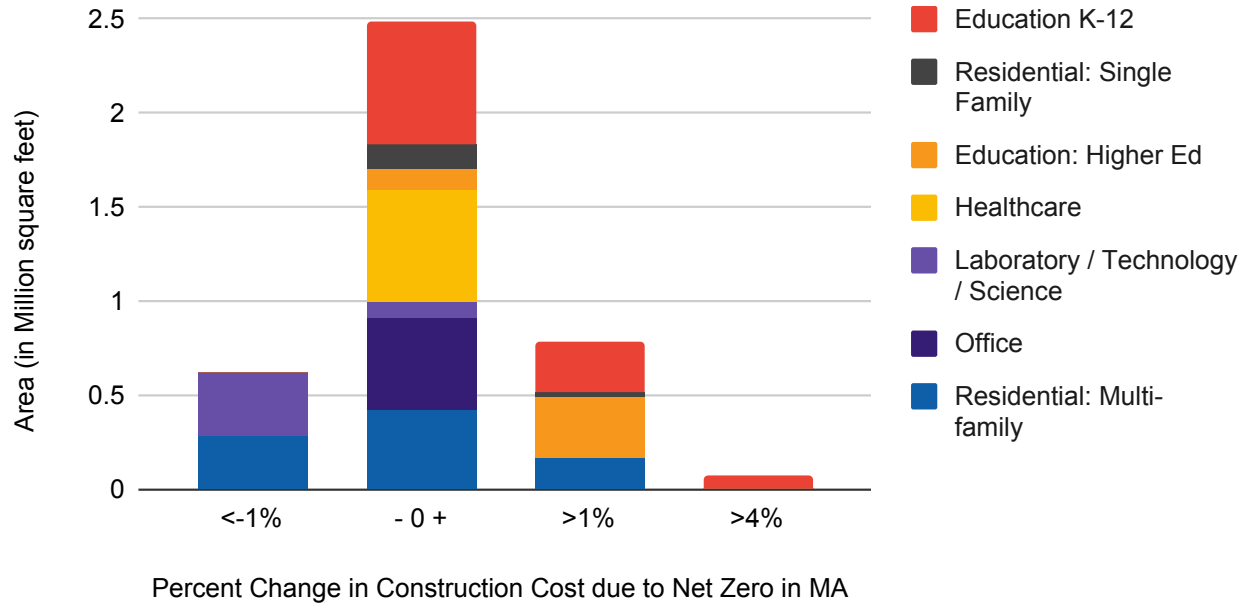
** 68% of the project GSF shared energy efficiency data. Of that 90% are at least 35% more efficient.

*** 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)

HOW MUCH DOES IT COST TO BUILD NET ZERO READY?

*25% OF THE PROJECT GSF AND 55% OF SUBMISSIONS REPORTED ON % COST DIFFERENCE

NOT MUCH!



Net zero ready buildings are being built at the same cost as conventional buildings. Of the 4 million GSF with reported cost data, 85% of net zero ready buildings 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: Of submissions reporting on cost data, net zero buildings often 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.

*25% of the project GSF and 55% of submissions shared cost difference for net zero. Of those, 85% of them reported <1% construction cost premium.

NET ZERO READY DATABASE SNAPSHOT

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

Category	Sq Ft	Project Name	City/Town	Year		
Assembly	73,899	Welles-Rosier Public Library	Welles	2022		
		Southwest Public Library	Southwest	2022		
		W. St. Paul Street	W. St. Paul	2022		
		Environmental Learning Center at West Middlesex State Park	West Middlesex	2022		
		186 Belmont Public Library	Belmont	2022		
Education: Higher Ed	929,281	Cambridge Center	Cambridge	2022		
		Worcester	Worcester	2022		
		Worcester Community College	Worcester	2022		
		Health Sciences	Worcester	2022		
		Engagement Center	Worcester	2022		
		Environmental Classroom	Worcester	2022		
		Health and Student Services	Worcester	2022		
		Health and Student Services	Worcester	2022		
		Health and Student Services	Worcester	2022		
		Health and Student Services	Worcester	2022		
Education: K-12	3,320,433	Cambridge	Cambridge	2022		
		Worcester Community College	Worcester	2022		
		Worcester Community College	Worcester	2022		
		Worcester Community College	Worcester	2022		
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		HealthCare	588,000	Cambridge	Cambridge	2022
				Cambridge	Cambridge	2022
Lab / Tech / Science	2,267,100	Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
Mixed Use	2,632,940	Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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		Cambridge	Cambridge	2022		
Lodging	155,000	Cambridge	Cambridge	2022		
Office	505,200	Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
Residential: Affordable	4,725,218	Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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Residential: Single Family	205,845	Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
		Cambridge	Cambridge	2022		
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		Cambridge	Cambridge	2022		
		Residential: Multi-Family	1,128,882	Cambridge	Cambridge	2022
Cambridge	Cambridge			2022		
Cambridge	Cambridge			2022		
Cambridge	Cambridge			2022		
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Cambridge	Cambridge			2022		

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

OWNER:

Boston Housing Authority	Boston Properties	University of Massachusetts Amherst
Alexandria Real Estate	Phillips Academy	E3 Development
City of Cambridge	Broadway & A St LLC	213 Harvard Street Condominium Trust
Preservation of Affordable Housing	City of New Bedford	Harvard University
Somerville Community Corporation	New Bedford Public Schools	Hitchcock Center for the Environment
Gate Residential	Pennrose	Z Capital Investments
Somerville Housing Authority	Urban Edge	Mass Audubon
Town of Belmont	The Neighborhood Developers	MA Dept. of Conservation & Recreation
Gate Residential Properties	Westborough Public Schools	Zero Energy Modular Affordable Housing Initiative (ZE-MAHI)
Midwood Investment & Development	Massbay Community College	Marcella 120 LLC
City of Arlington	Capstone Communities LLC	Smith College
Holyoke Soldiers' Home	Hope Real Estate Enterprises LLC	Ryan Bushey
DLJ Real Estate Capital Partner	North Shore Community College	
Leggat McCall Properties	Allied Health	
University of Massachusetts Medical School	Hawkins St Union Square LLC	<i>(All Individual Homeowners are excluded from this list)</i>
Boston University	Bunker Hill Community College	
Druker Company	DCAMM	
MIT	Beacon Communities	
Marcus Partners	Bristol Community College	
Chelsea Soliders' Home	Commonwealth of Massachusetts	
City of Watertown	The Neighborhood Developers	
Partners Properties LLC	Traggorth Companies	
Town of Stoneham	Barlett Lot D Preservation Associates	
Town of Acton	Cape Cod Community College	
Madison Park CDC	Broadway Investments Realty, LLC	
Trinity Financial	NSCDC	
Town of Lincoln	Clark University	
Samuels & Associates P-12 Property LLC	Tlee Development	
Town of Swampscott	Elmwood Street Realty Trust	
The Community Builders	MassDevelopment	
Concord, MA	Rees Larkin Development	
Just-A-Start Corporation	Cambridge Housing Authority	
Town of Lexington	Franklin Regional Transit Authority	
Town of Westwood	PT RED	
NeighborWorks Housing Solutions	Hampdentailor LLC	
Related Beal	Woods Hole Research Center Corporation	
Homeowner's Rehab, Inc.	Town of Eastham	
	Hampshire College	

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

ARCHITECT:

Stantec
 Arrowstreet
 Elkus Manfredi Architects
 SGA
 DREAM Collaborative
 Perkins & Will
 NBBJ
 Payette
 CBT
 ICON Architecture, Inc.
 Perkins Eastman
 Adrian Smith + Gordon Gill Architecture
 HMFH Architects
 Utile
 ZGF
 Architectural Resources Cambridge
 KPMB
 Kieran Timberlake
 Ai3 Architects
 SMMA
 Placetaylor
 William Rawn Associates
 Prellwitz Chilinski Associates
 DHK Architects
 Lavallee Brensinger
 Davis Square Architects, Inc.
 DiMella Shaffer
 Sasaki
 Dore & Whittier
 Stefanov Architects Inc.
 Mount Vernon Group Architects
 Bruner/Cott
 Architerra Inc.
 Union Studios
 Oudens Ello Architecture
 Hawkins St Union Square LLC
 Cambridge Seven Associates
 Sebastian Mariscal Studios

Monte French Design Studio
 Studio G Architects
 Brown Lindquist Fenuccio & Raber Architects Inc.
 Charles Rose Architects
 William McDonough + Partners
 DiNisco Design Architects & Planners
 NOW Communities, LLC
 ZeroEnergy Design
 Miller Pollin Architecture
 Urbanica Design
 designLAB Architects
 Interface Studio Architects
 Franziska Amacher
 Mills Whitaker Architects
 Maple Hill Architects
 R. Carter Scott
 Maryann Thompson Architects
 Scott Payette Architects
 David Miller
 Steven Baczek
 SimpleCity Studio
 Ben Nickerson
 Rachel Stevens
 Kraus Fitch Architects
 Maclay Architects
 Peter Stevens
 Boston Green Building
 Coldham & Hartman Architects
 Snøhetta
 Hutker Architects
 John Livermore
 Ryan Bushey
 Peter Brooks
 BrightBuilt Homes
 Peter Kane
 Edy Ambroz
 Matt Coffey
 Mary Kraus

Next Phase Studios

ENERGY CONSULTANT:

Thornton Tomasetti
 The Green Engineer
 New Ecology
 Steven Winter Associates
 enviEnergy
 Marc Rosenbaum
 InPosse
 CLEAResult
 McPhail Associates
 Northern Power Systems
 Transsolar, Inc.
 Building Science Corporation
 Linnaen Solutions
 Conservation Services Group
 Michael Duclos
 VEIC
 Solar Design Associates
 Daniel Roy
 Taza Vercruysse
 Sean Welch

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

MEP ENGINEER:

Petersen Engineering
BR+A
Cosentini Associates
Garcia, Galuska & DeSousa
WSP
Arup
Skanska
Wozny Barbar
Rist Frost Schumway
AKF
Bohler Engineering
BALA
BLW Engineers
RW Sullivan Engineering
CES
SGH
RFS Engineering
LVR Corp.
Places Associates
Merrill Civil Engineers
VAV International, Inc.
Buro Happold
Zade Associates
StudioNYL
Van Zelm
Vanderweil Engineers
Ripcord
Norian Siani, Inc
Griffith & Vary, Inc.
2RW Consulting Engineers
Bala Consulting Engineers
Kohler & Lewis Engineering
Bensonwood
Engineering Design Build
RSE Associates
Allen & Major Associates
Drew Gillett
Ryan Hellwig

Adam Kohler
McBrie Consulting Engineers
David Fink
South Mountain Company
Ben Brungraber
Center for Ecological Technology

BUILDER:

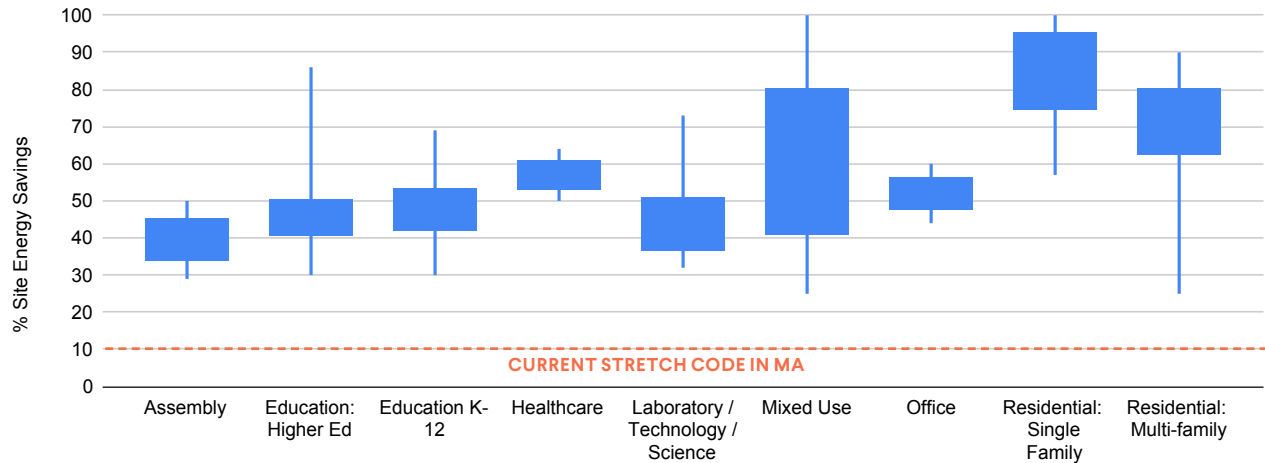
Callahan Construction Managers
Brait Builders
Skanska
Fontaine Brothers
Suffolk
Erland
Lee Kennedy
Moriarty
Consigli Construction Co.
Gilbane Building Company
W.T. Rich
TR White Company, Inc.
Delphi Construction Inc.
Haycon
Sean Ford
NEI GC
The Community Builders
Shawmut
Stack + Co
Groom Construction
Olive Branch Builders
NPS Contractors
Bond Brothers
Wright Builders
GFC Development
MCR Construction
Transformations, Inc.
Columbia Construction Co.
Walsh Brothers
Pioneer Valley Habitat for Humanity
Metric Construction

Consortium for Advanced Residential Buildings (CARB)
One Way Development
Boston Green Building
BOND
Chapman Construction
Dellbrook JKS
Decumanus Green Design/Build, Inc.
Synergy Construction
Holden Builders
Farley Pedler
Edy Ambroz
Caleb Ewing
Bill Hallaren
Dunhill Companies
Karston Construction
Pascal Albanese

HOW MUCH BETTER CAN WE DO THAN THE CURRENT CODE?

*68% OF GSF REPORTED ON % ENERGY REDUCTION

MUCH BETTER!



Efficient buildings are far surpassing the current Stretch Code. Compared to the code baseline, 90% 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?

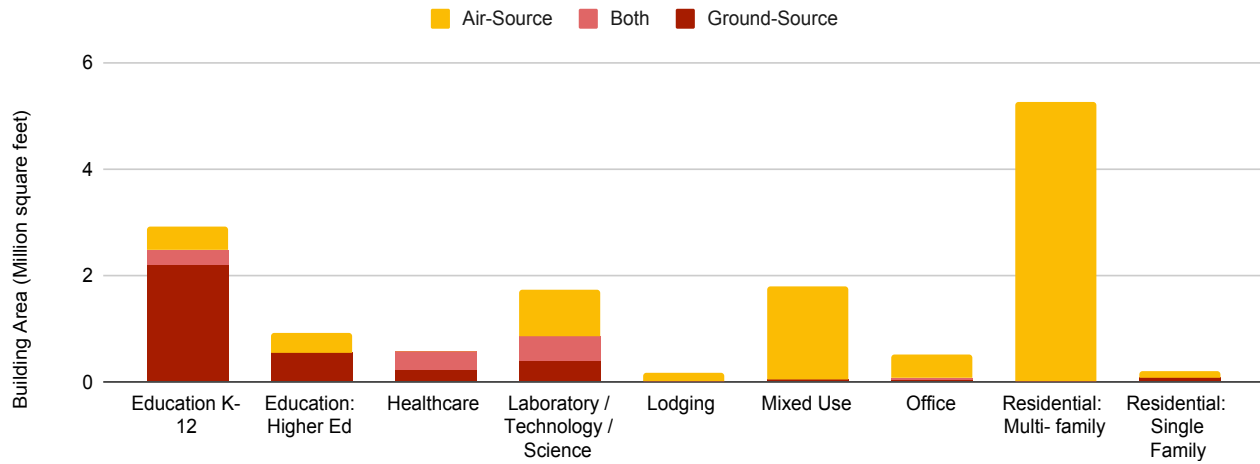
REALITY: The current Stretch Code is not a stretch. Well insulated building envelopes and high performance heat recovery easily outperform the current stretch code. With the addition of heat pumps, the energy consumption is slashed.

*68% of the project GSF shared energy efficiency data. Of that 90% are at least 35% more efficient.

HOW ARE BUILDINGS USING ELECTRICITY FOR HEATING?

*85% OF GSF REPORTED ON TYPE OF HEAT PUMP

GROUND AND AIR-SOURCE HEAT PUMPS!



14+ million square feet of buildings reported 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.

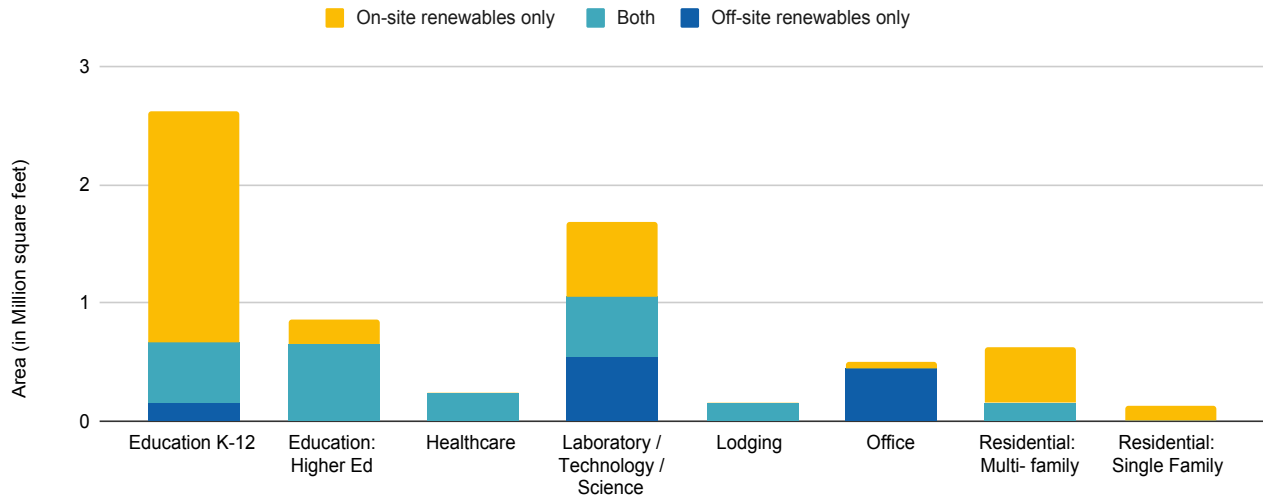
FEAR: The electric grid can't support electric buildings.

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

HOW ARE BUILDINGS ACHIEVING NET ZERO?

*56% OF GSF REPORTED ON RENEWABLES

ON-SITE AND OFF-SITE RENEWABLE ENERGY!



Of the 16.5 million SF of net zero ready buildings, 12.9 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 still continuing to grow...

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

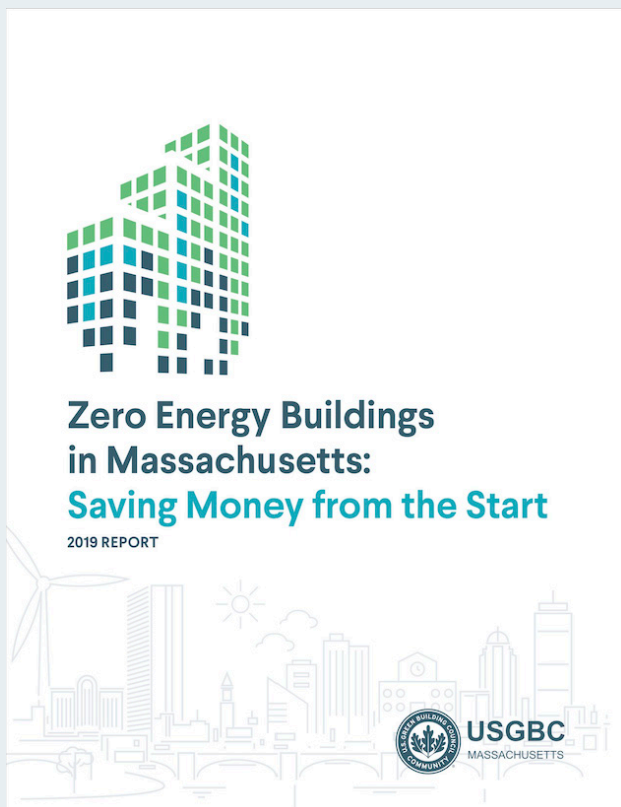
To learn more about Built Environment Plus check out our website <https://builtenvironmentplus.org/> and to check for updates to this report visit <https://builtenvironmentplus.org/road-to-net-zero/>

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, and have proven very committed to our ongoing collection efforts!



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



Our 2019 Cost Report that Started it All.

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](#)