

Passive House Multifamily at Scale

Policy and Practice

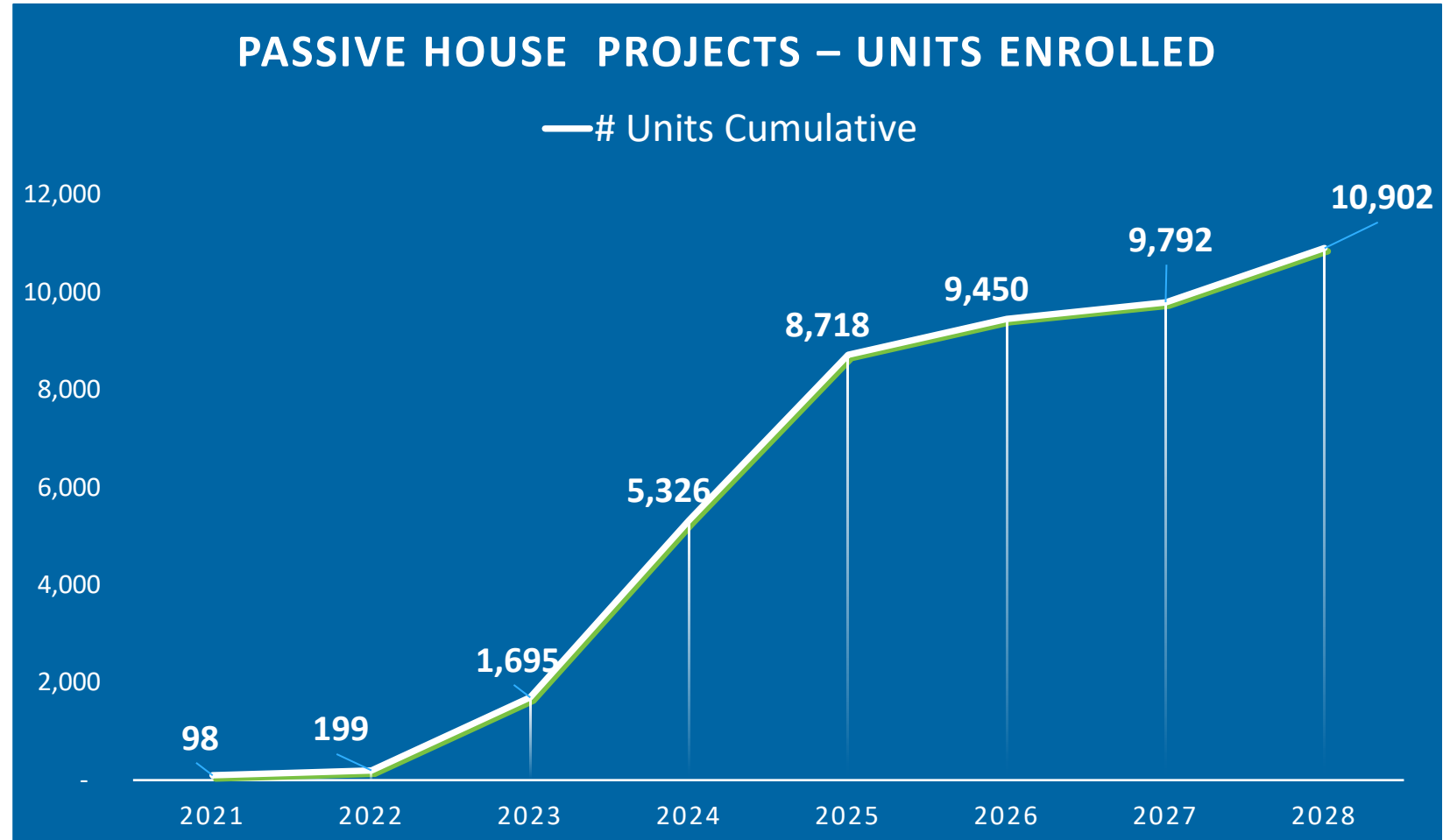


Multifamily Passive House Incentives: Massachusetts Momentum

PH incentive enrollment:

- 198 Buildings
- Over 13,000 Units

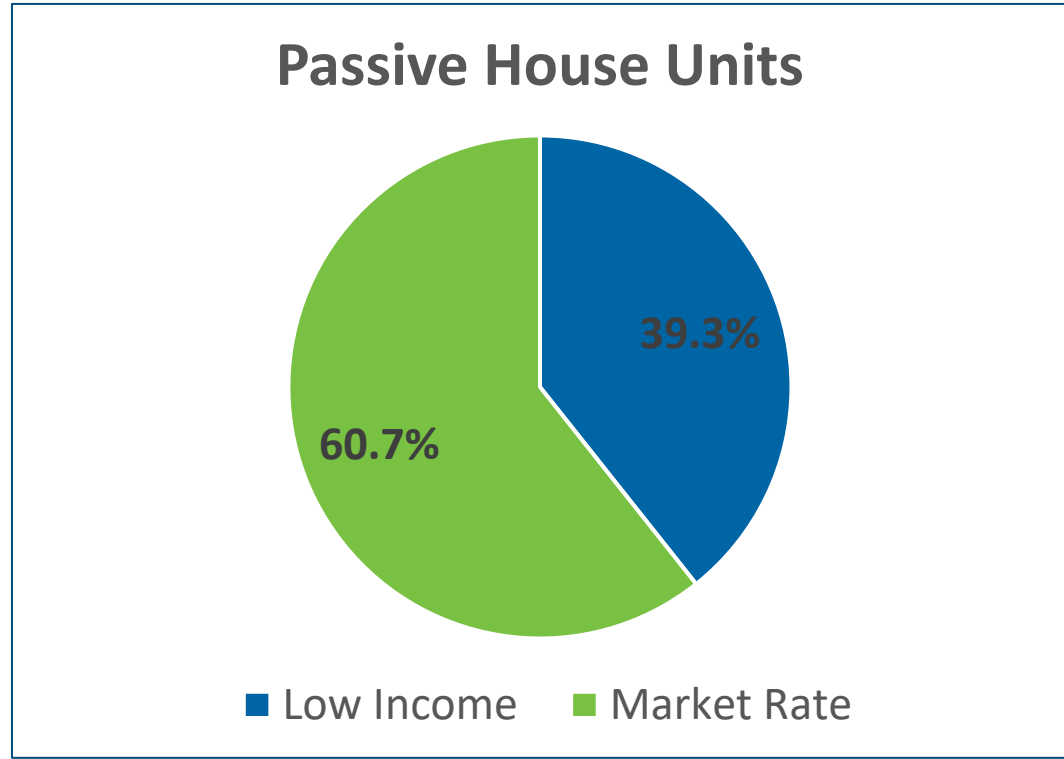
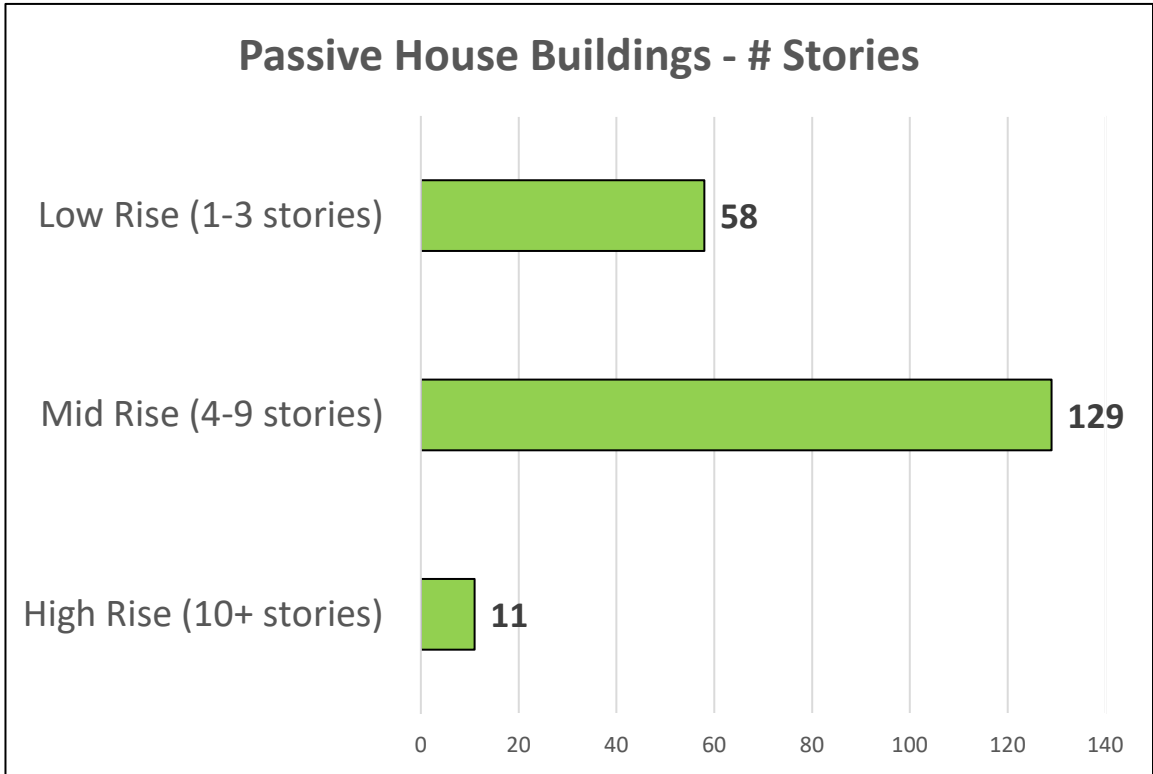
- 12 Passive House Certified
- 66 Design Certified



WE ARE MASS SAVE*:



Multifamily Passive House Incentives: Massachusetts Momentum



WE ARE MASS SAVE®:



Massachusetts Did This: You Can Too!

1. Demonstrate
2. Normalize
3. Educate
4. **Energy Code**



Passive House Skepticism



1. Demonstrate: Incremental Cost



Passive House Design Challenge

- \$4,000 per unit incentive
- 8 Affordable Projects: 540 Units
- 6 Occupied; 2 Under Construction



1. Demonstrate: Incremental Cost

Harbor Village 1.8%



Mattapan Loop 2%



Cambridge Finch 1.4%



Holbrook Maple 1.6%

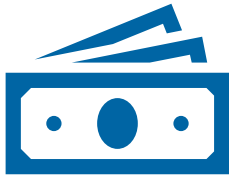


Old Colony 3.5%

Kenzi 1%



1. Demonstrate: Incremental Cost



Average incremental cost: 2.4%



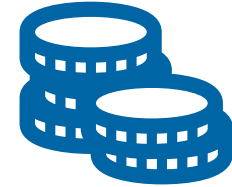
Typical capital cost increases:

Ventilation upgrades to supply fresh air to living and bedrooms

Window & door upgrades

Thermal bridging breaks and air sealing

Additional testing and verification



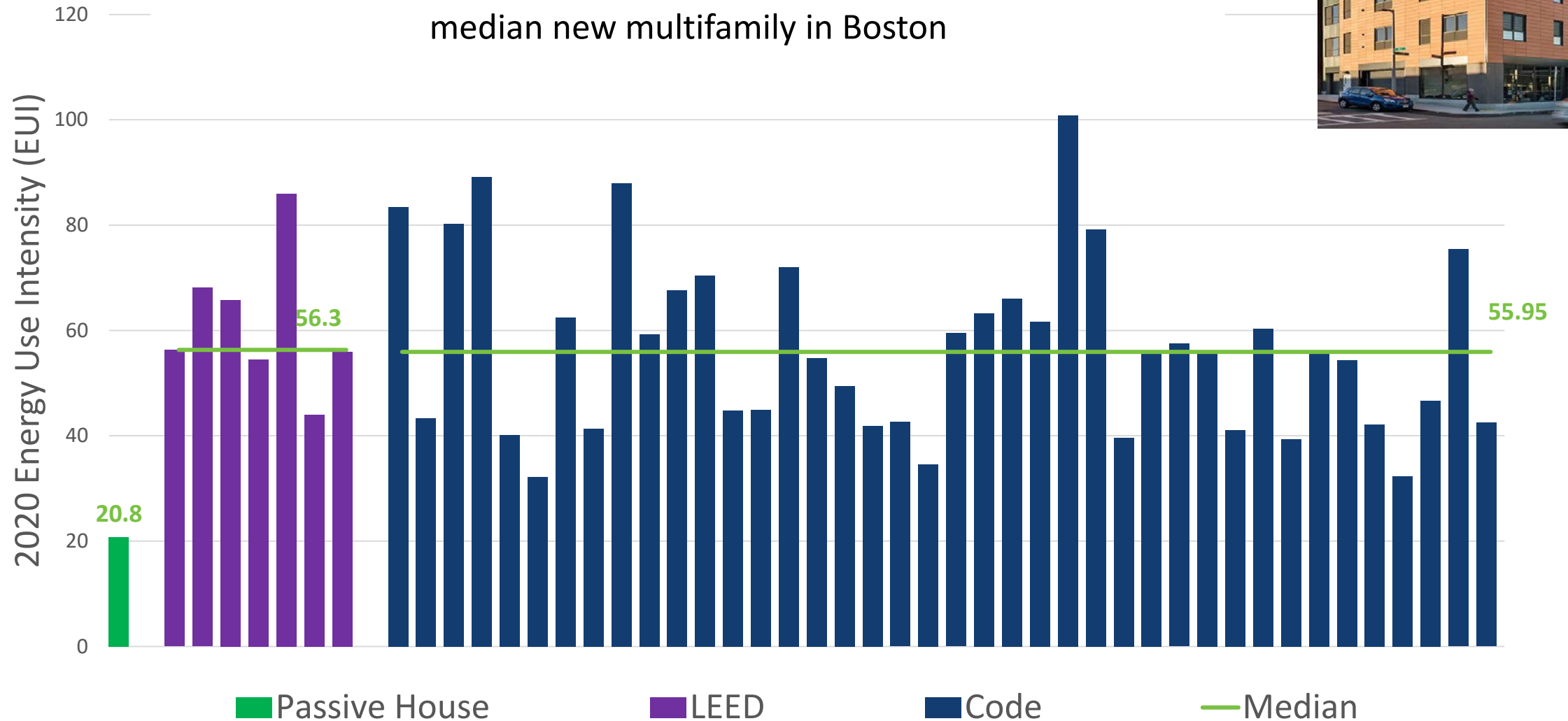
Typical capital cost savings:

Significantly reduced heating and cooling equipment because lower capacity needed

1. Demonstrate: Energy Performance



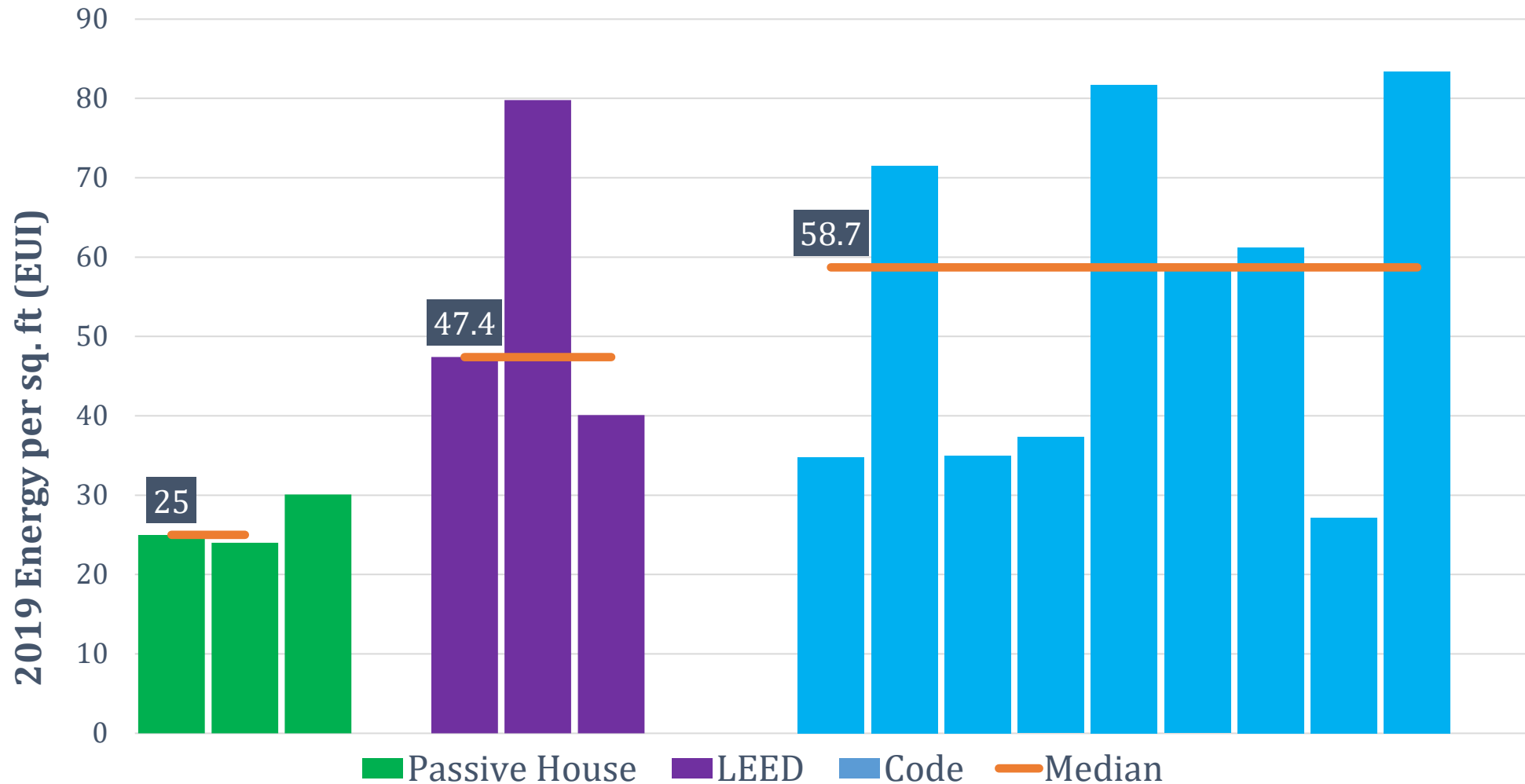
PH Building used **63% less** energy per sq. ft. than median new multifamily in Boston



Data from Boston Energy Disclosure 2020 sorted for new construction multifamily built since 2008; Cross checked for LEED certification; properties with suspected lack of full building energy report are removed.

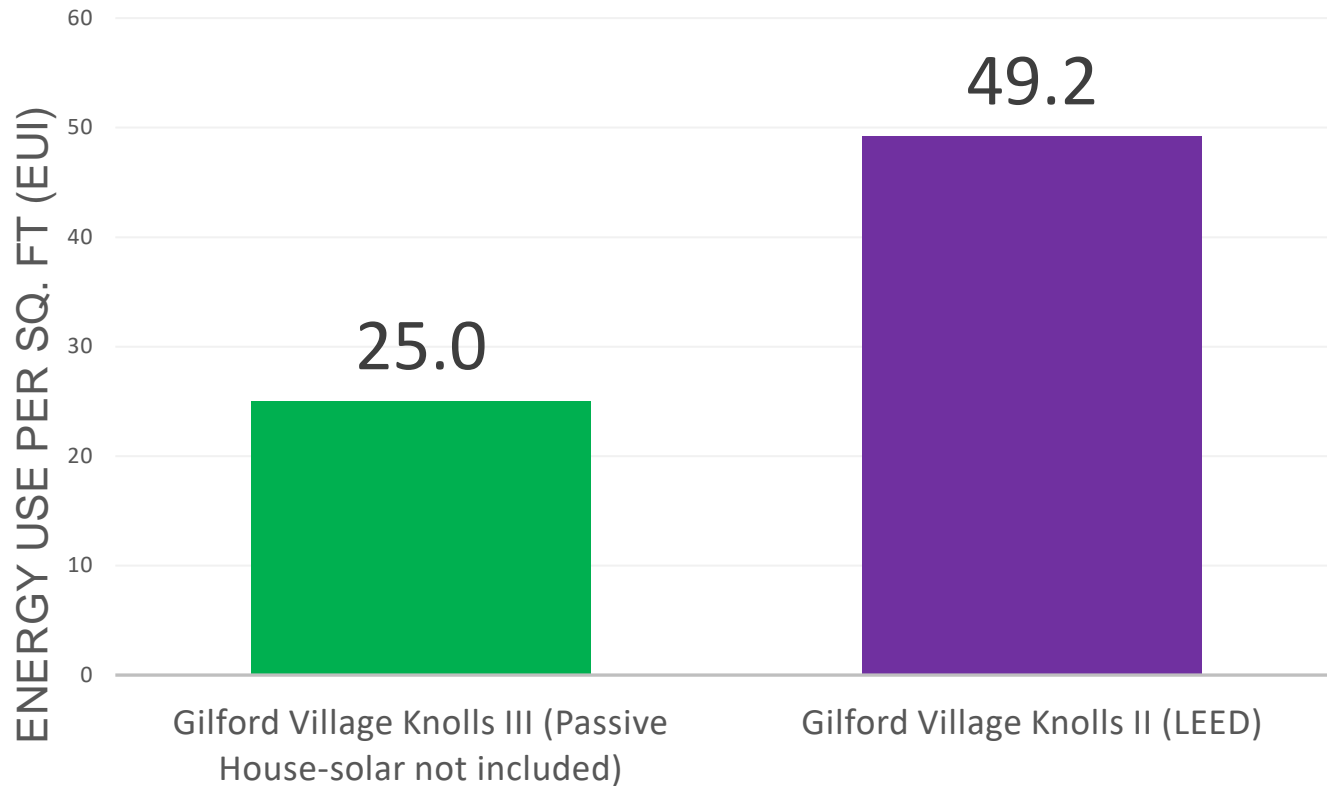
1. Demonstrate: Energy Performance

Philadelphia 2019 Affordable:
PH buildings used **57% less** energy per sq. ft. than median code



Demonstrate: Energy Performance

PH used **49% less** energy per sq. ft. than Gilford Village Knowles II LEED built 2008
(same building, different standard)



2. Normalize



PH Multifamily New Construction Incentives

- Feasibility Study up to \$5K
- 75% of PH Energy Model up to \$20K
- \$3K per unit

2. Normalize

Prioritize PH in Affordable Housing Scoring (QAP)

States with differentiation of PH for more points for PH as compared to LEED/EGC see Passive house adopted

- Pennsylvania
- Connecticut
- Vermont
- Massachusetts
- South Dakota

Having LEED/EGC as equivalent points to PH is not effective way to incentivize PH



2. Normalize

Use Environmental Impact Statements to Push Large Developments to PH

Large projects triggering MEPA need to have GHG analysis

DOER encourages PH as a mitigation strategy



3. Educate

Mass Save ½ Cost Training Reimbursement

Passive House Massachusetts (PHMA)

- SWA Construction Workshops
 - ✓ Carpenters, Window Installers, Air Barrier, Insulation Trades
 - ✓ HVAC & Plumbing Trades
- Cost Estimating for Passive House
- What to Expect When You're Expecting PH

Passive House Accelerator Video Library

Phius Workshops and Recordings



3. Educate

Common Challenging Parts: Consult Others

- Podium construction
- Sequencing
- Adding to an existing building
- Specialized subs

Advice

- Make sure team is educated
- Plan in mid construction blower tests

4. Bring Up Energy Code

- Create an optional “stretch code” that cities/towns can choose to adopt.
- Provides a pathway to more ambitious efficiency AND creates an energy efficiency community.

Cities/towns choose to adopt

Pathway to ambitious stuff

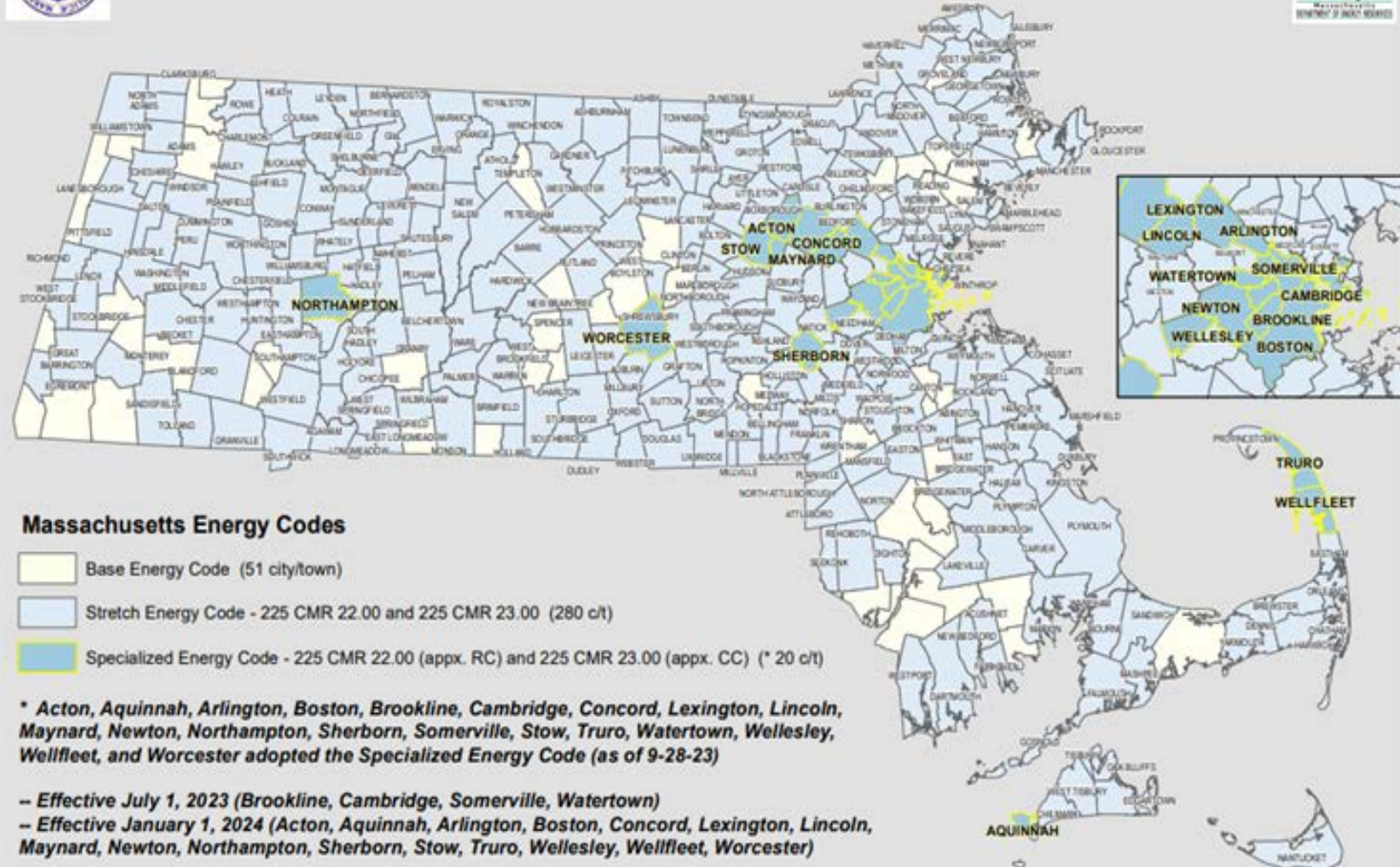


Stretch Code

Create Local Constituencies/Advocates



Massachusetts Building Energy Code Adoption by Municipality



EMBODIED CARBON REDUCTION CHALLENGE

THE CHALLENGE: REDUCE UPFRONT CARBON OF BUILDINGS

ENTRIES DUE MARCH 31, 2024 | 5:00 PM

Competition

MassCEC has engaged Built Environment Plus (BE+) to conduct an Embodied Carbon Reduction Challenge for actual new construction and major renovation

Events & Trainings

BE+ will host a series of events and trainings including an overview of embodied carbon tools for different design phases, tips and tricks for Tally LCA and One Click LCA, case

Resources & Tools

BE+ will be providing licenses for participants (one shareable license per Lead Applicant) for Tally LCA (\$695 value) or One Click LCA (\$1250 value).



CONNECTS



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Find High Performance Pros with proven experience

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Profession Type

All



Project Type

All

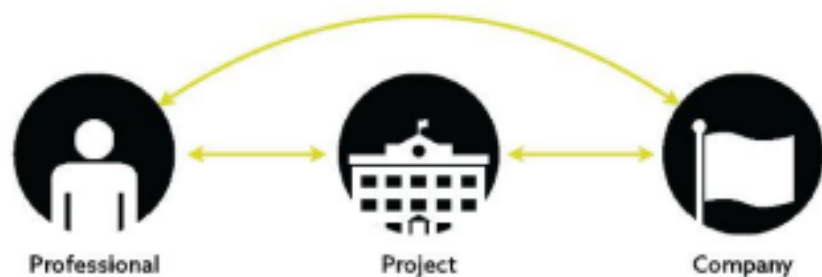


Show Me*

Professionals by # of Projects



SEARCH



1. Everything is interconnected.

Professionals to Projects, Projects to Companies, and Companies to Professionals.

Sort by

Number of Projects

Top Result



2. Filtering and sorting is super-powered by project data.

The results reward companies and individual professionals with proven high-performance project experience.

CONTACT



PROFESSIONAL

Name
Credentials



All U.S. States and Territories



Filter by

Profession Type

Architecture

Construction

Development

Engineering

Sustainability Consulting

3. Search users are guided to contact a professional directly.

Results are ranked by relevant industry and project experience, and once they discover a potential collaborator, they are always guided to a selected contact.

4. Companies, pros, and projects can be anywhere in the U.S.

Architects, contractors, developers, engineers, sub-contractors, and sustainability consultants who work on commercial and large residential buildings are welcome.

POAH's Affordable Multifamily Housing

Connecticut	257
Washington, D.C.	94
Florida	1,356
Illinois	2,155
Kentucky	41
Maine	123
Massachusetts	3,426
Maryland	100
Michigan	645
Missouri	1,538
New Hampshire	264
Ohio	1,104
Rhode Island	1,007
TOTAL	13,000 units

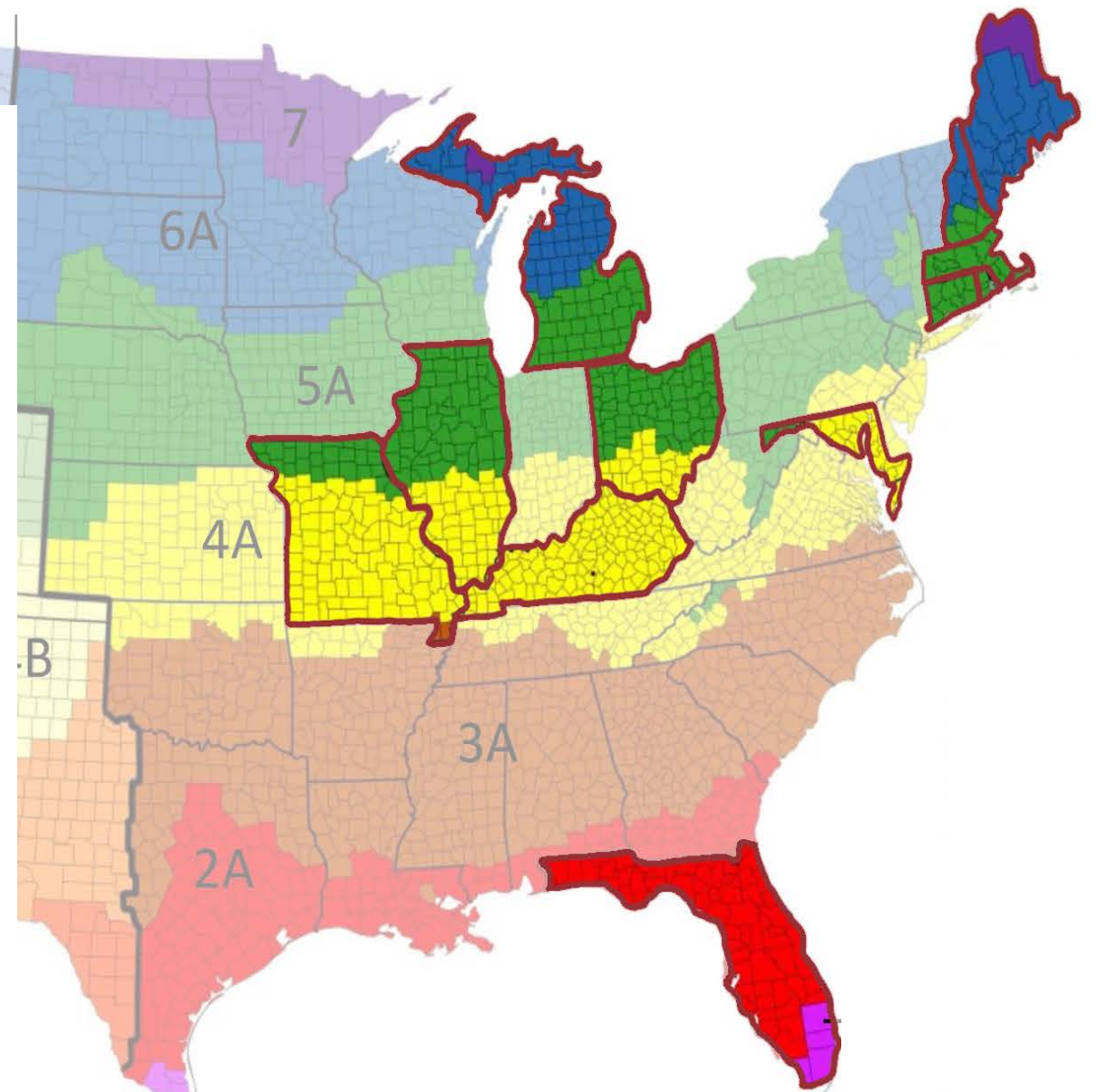
Passive House Units in Design/Construction:

347 (of 900)

60

123

267



CORPORATE OFFICES: BOSTON | CHICAGO | KANSAS CITY | WASHINGTON, D.C.

134 Units Boston, MA*



281 Units Salem, MA



30 Units Brewster, MA



COMPLETED PASSIVE HOUSE* PROJECTS

110 Units Barry Farm, DC



60 Units C40, Chicago, IL



Precertified Passive House Projects in Construction: Asberry & C40

39 Units Mashpee, MA



Emergency Back-up
Solar/Storage
System (battery)

55 Units Boston, MA



Precertified Passive House Projects in Construction: Kenzie & Le Claire

46 Units Wellfleet, MA



122 Units Barry Farm, DC



51 Units Scarborough, ME



42 Units Bourne, MA



Passive House Projects in Design

48 Units Boston, MA



127 Units Salem, MA

47 Units Brewster, MA



- Design did not start as passive house
- Lots of modulation in enclosure
- Tight urban site prevented a construction sequence that would have allowed for effective in-process testing
- Misconception that good compartmentalization test results meant that enclosure airtightness was ok



- Per-floor ventilation design required above standard practice air sealing of louvers, ductwork, connections from equipment to exterior of building
- Passive House boundary didn't include commercial spaces so challenge to create air-tight boundary with MEP systems passing through PH boundary
- Overall building air tightness testing .07 cfm50/sf (4x better than a PHI project)
- Compartmentalization tests passed the PHIUS required air tightness

Lessons Learned at the Loop at Mattapan Station

1. Commit to Passive House early
2. Engage a design/engineering team that knows Passive House or is at least interested in learning it
3. Conduct pre-bid conferences for enclosure and MEP Subs
4. Bring Verifier into project (design) and establish testing protocols and timing
5. Conduct Bi-weekly Passive House Meetings
6. Work with GC to schedule blower door tests before sheetrock is installed. Explain that if test results are unacceptable sheetrock or really any finish will be removed to find holes
7. Have Verifier provide training for each sub working on enclosure (framing, sheetrock, windows, roof, etc.) and MEP trades as they begin work on-site
8. Consider including commercial spaces into passive house boundary to minimize the challenge of the compartmentalization boundary
9. Establish site visits for the window manufacturer to see window install early and during air and water tests or in near future, especially if there are failures

Passive House Multi-family Lessons Learned in Practice

Questions?

