

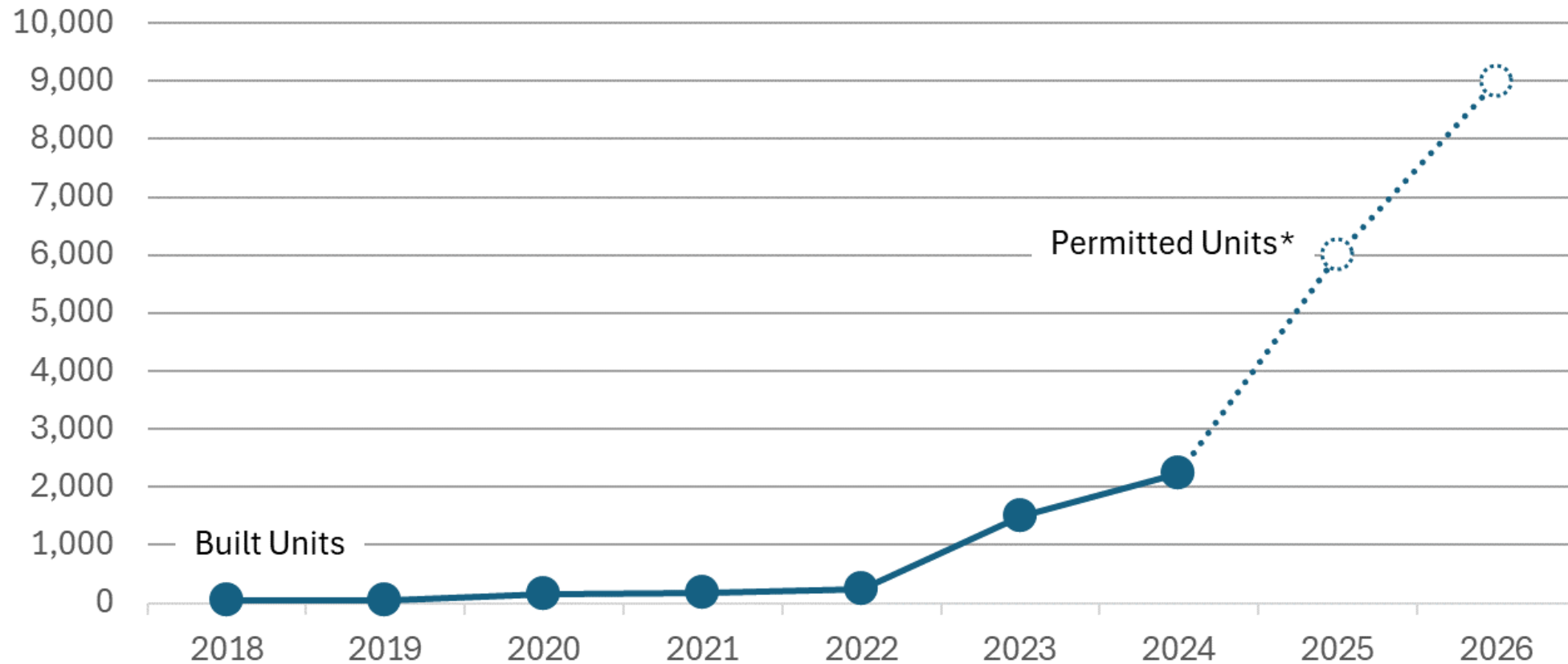
# Massachusetts Multifamily Passive House at Scale

“Wicked Smart Policy”



# Passive House Trends in Massachusetts

Even before the Opt-In Stretch Code Takes Effect, The Cumulative Number of Passive House Units Is Dramatically Increasing



# Policy Promoting Passive House

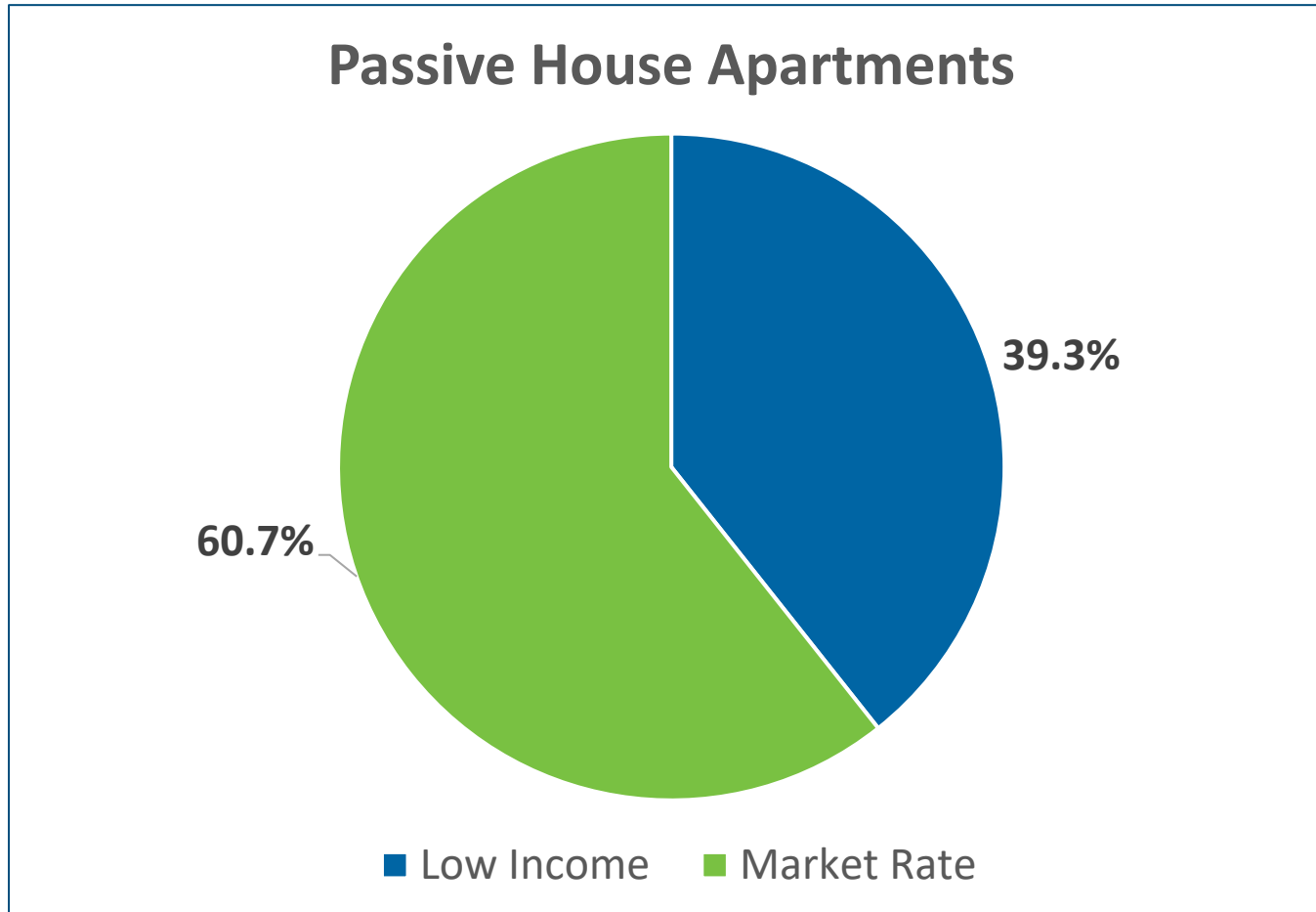


## What percentage of Massachusetts Passive House Multifamily Underway are Subsidized Affordable Housing Buildings?

1. 10%
2. 30%
3. 40%



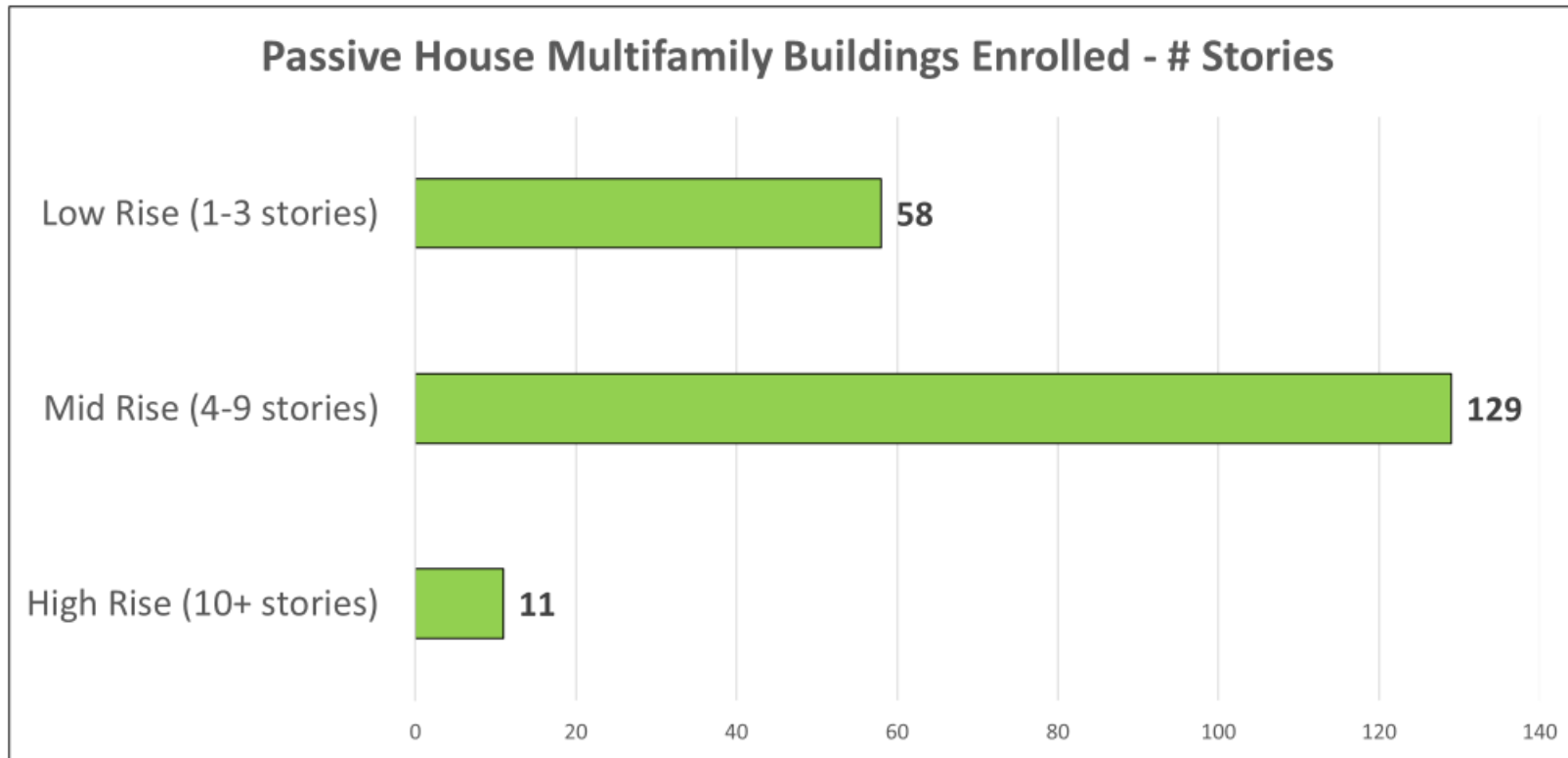
# Market Rate vs. Subsidized Affordable Adoption



WE ARE MASS SAVE®:



# Most MA Passive House Multifamily Buildings are 4-9 Stories



WE ARE MASS SAVE®:



# Passive House Skepticism





# Passive House Design Challenge

- \$1.7 million demonstration program
- Up to \$4,000 per unit incentive
- 8 Affordable Projects: 540 Units

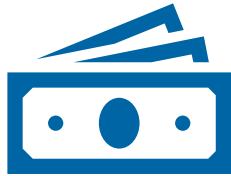




# Passive House Is Possible In All Looks and Sizes



# Demonstrate Incremental Cost

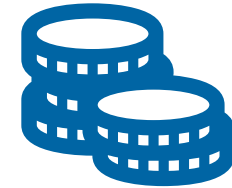


**Incremental Cost Average <3%**



**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

How much lower is PH Distillery North's energy use per square foot than other similar multifamily buildings in Boston?

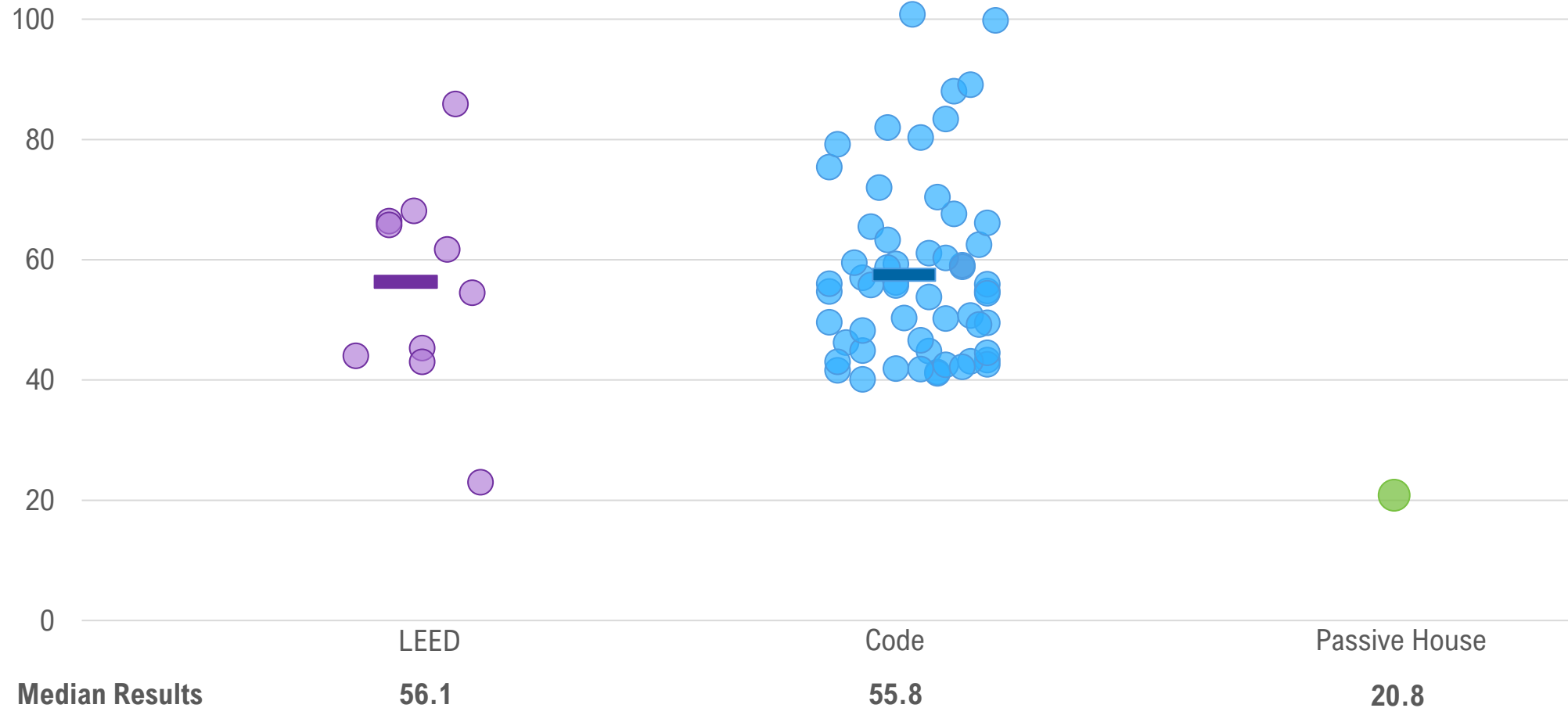
1. 20%
2. 60%
3. 80%



# > 60% Lower Energy Use Intensity in Boston

Passive House Multifamily Building used 63% less energy per square foot than median similar new multifamily in Boston

Energy per sq. ft (EUI)



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. Passive House building is Distillery North.

# > 55% Lower Energy Use Intensity in Philadelphia LIHTC

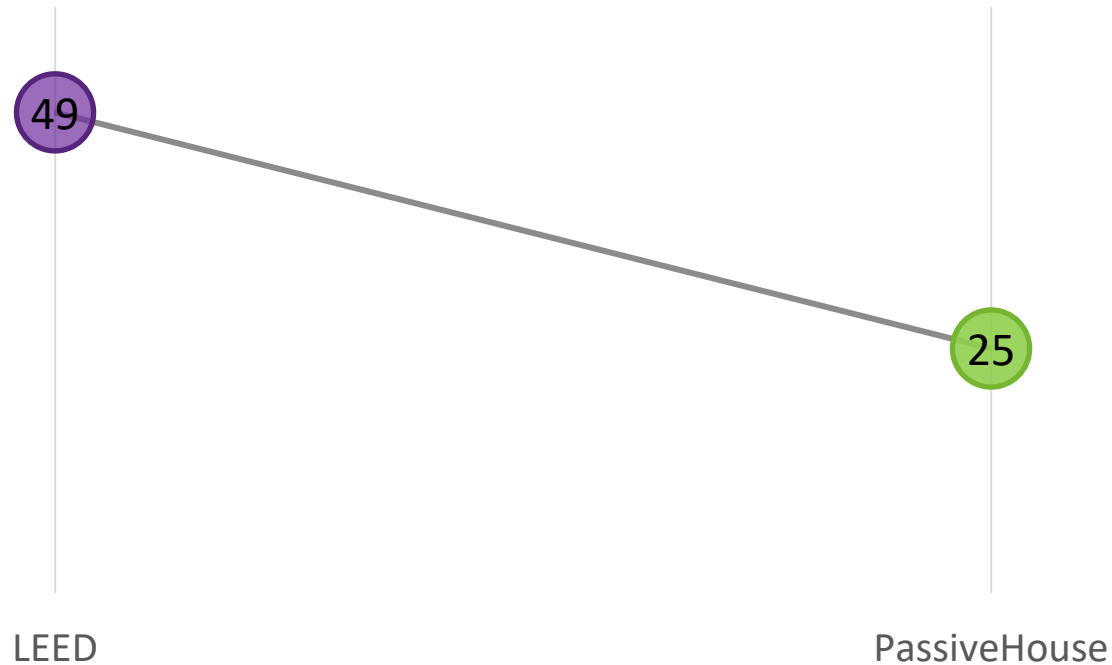
Philadelphia Affordable Housing Multifamily Passive House buildings used **57% less** energy per square foot than median code similar buildings

Energy per sq. ft (EUI)



# Same Build, Different Standard

Passive House version used 49% less energy per square foot than the same build LEED  
Energy per sq. ft (EUI)





## Results:

- Passive House multifamily new construction can be built today in MA with very low incremental cost and significant owner and occupant health and energy benefits



# Passive House Multifamily Incentives

- Feasibility study cost up to \$5,000
- 75% of PH modeling cost up to \$20,000
- **\$3,000 per unit for PH certification**



What's different about Passive House incentives MassSave has offered compared to what most new construction utility programs offer?

1. Predictable, easy to understand incentive level
2. Feasibility Study and energy model support
3. High enough incentive level to get owner & developer attention
4. All of the above



# How to Find Money for Incentive or Demonstration Program

## Demonstration Program

- ▶ State energy offices – IRA one time funding
- ▶ Aim for \$2 million for 6-10 developments
- ▶ Use any documents MassCEC has developed

## New Construction Utility Incentive

- ▶ Does your state or utility have a “systems benefit charge”?
- ▶ Advocate for predictable incentive
- ▶ Design with fall back that is less risky



# Tips after 8 MassCEC Passive House Multifamily Projects

## Most Challenging Issues for Achieving Passive House Certification

- Whole building air tightness
- Ventilation (duct tightness, meeting flow rates, or achieving balancing)
- Laundry rooms
- Podium design

## Tips:

- Projects with more team members with education and experience had the lowest incremental costs and best outcomes.
- Important to require Verifier do a design review, prior to Construction Drawings.
- Aerosol seal ventilation ductwork.
- Require that testing and balancing contractor balance ventilation system, using flow hood/balometer.



# Air Sealing Tips after 8 MassCEC Passive House Multifamily Projects

## Tips:

- Mid point whole building blower door **critically important**; build in plenty of room
  - ✓ be extremely on top of sealing before midpoint whole building testing
  - ✓ manual sealing, with more than 1 midpoint whole building test
  - ✓ potential for reducing leaks with aid of ultrasonic wand or aerosolized air barrier before drywall
- Midpoint blower door, Verifier should be ready to do after hours/weekend, when site is shut down, especially if podium
- Pay particular attention to intentional penetrations, both to the exterior and to separately certified commercial spaces



Photo courtesy of AeroBarrier



Demonstrate

**Normalize**

Opt- In  
Stretch Code



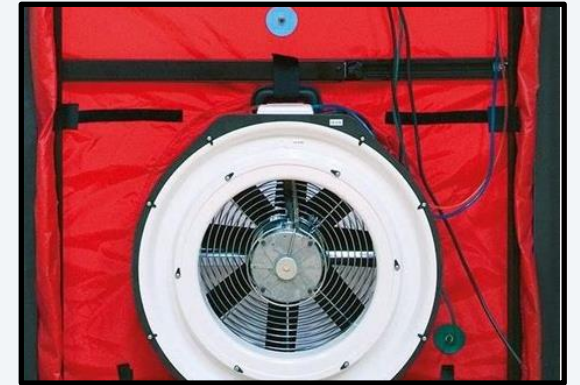
**Predictable Incentives**  
**LIHTC QAP**



**Training**



**Efficiency is just the  
beginning**

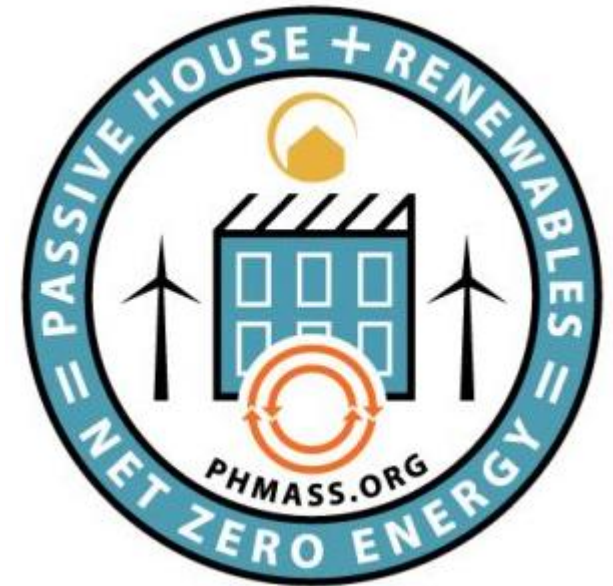


**New Level of Quality  
Assurance**

# Education over 5 years



- PH Lunch & Learns: 79
- PH Workshops: 28
- Total Attendees: 4,638
- PHIUS/ PHI Accreditation Reimbursements: 221
- **See [phmass.org](http://phmass.org) video library for free recordings**



# How to Find Money for Passive House Education

- ▶ State-level Workforce training funds
- ▶ Energy Efficiency Workforce training funds
- ▶ ½ cost for CPHC, PHBuilder, PH Rater/Verifier credentials:  
NY, CT and MA utility efficiency programs
- ▶ Repurpose PHMA trainings- NY Building Exchange trainings



# Adapt Existing Education

## 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





# Prioritize PH in Affordable Housing Scoring (QAP)

States with Passive House 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



# State Environmental Impact Analysis

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



Demonstrate

Normalize

**Opt-In  
Stretch Code**



**32+ Communities**

**More than 27% of  
Massachusetts Population**

**Opt-In Stretch Code**



BUILT  
ENVIRONMENT  
PLUS



ZeroCarbonMA



MOTHERS  
OUT  
FRONT



350.org

# Publications Ready To Help You!

- [“Scaling Up Passive House Multifamily: The Massachusetts Story”](#) ACEEE 2021
- [Phius policy page](#) – Searchable Incentives, QAPs, Codes
- [“Safe At Home”](#) – Pitch document for policymakers about why Passive House
- [“Stepping Up to Passive”](#) -- Roadmap based on successful PH policy and programs
- [“Policy That Works”](#) ACEEE 2022 survey of states and policies where PH is growing

