

Austin's Affordable Housing Passive House Challenge

Presented to the Austin Resource
Management Commission

Feb 2024

Heating and cooling buildings
accounts for one-fourth of global
energy-related carbon emissions

What is Passive House?

CHARACTERISTICS

Very low energy use compared to code

Building envelope with continuous insulation and air barrier

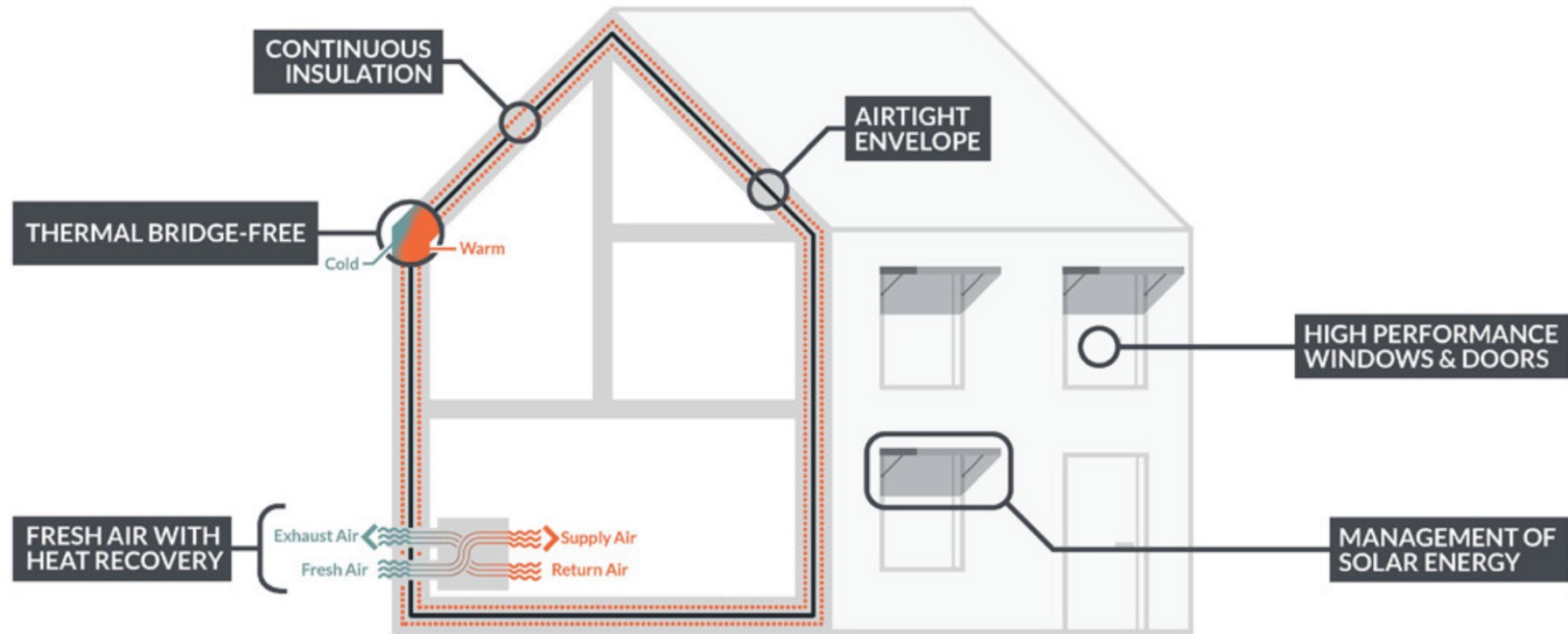
Optimized solar gain

Continuous ventilation with heat recovery

Thermal bridge free construction

Resiliency

Austin RMC 2.2024



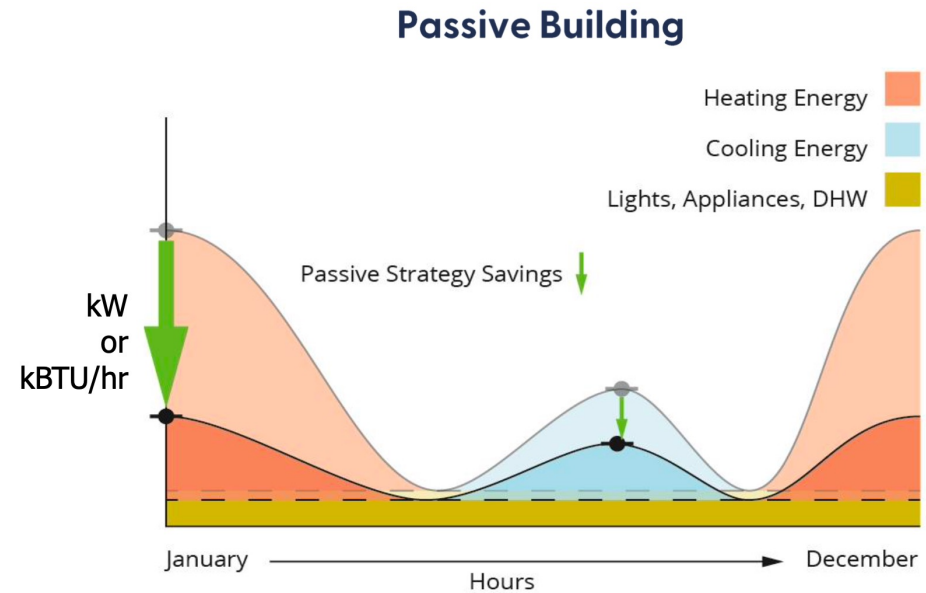
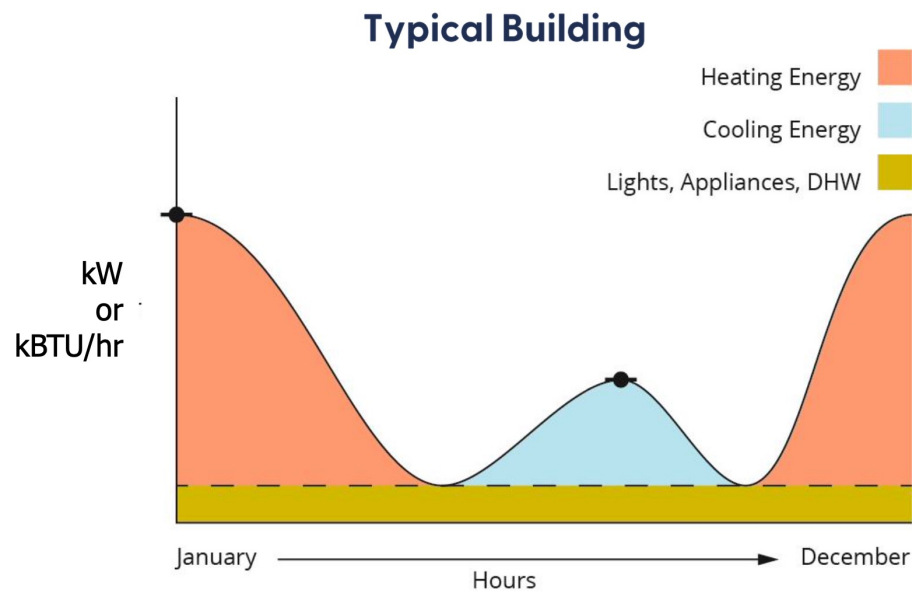
PASSIVE HOUSE PRINCIPLES

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PASSIVE HOUSE BENEFITS

DRAMATIC PEAK LOAD
REDUCTION AND SHIFT



Annual Energy = kWh/yr (or kBTU/yr) → area under the curve

Peak Power = kW (or kBTU/hr) → point at top of curve

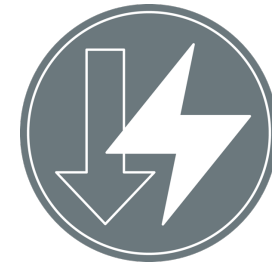
PASSIVE HOUSE BENEFITS



DURABLE



NO DUST
NO NOISE



ENERGY
EFFICIENT



HEALTHY










NO UNWANTED
MOISTURE OR
ODORS

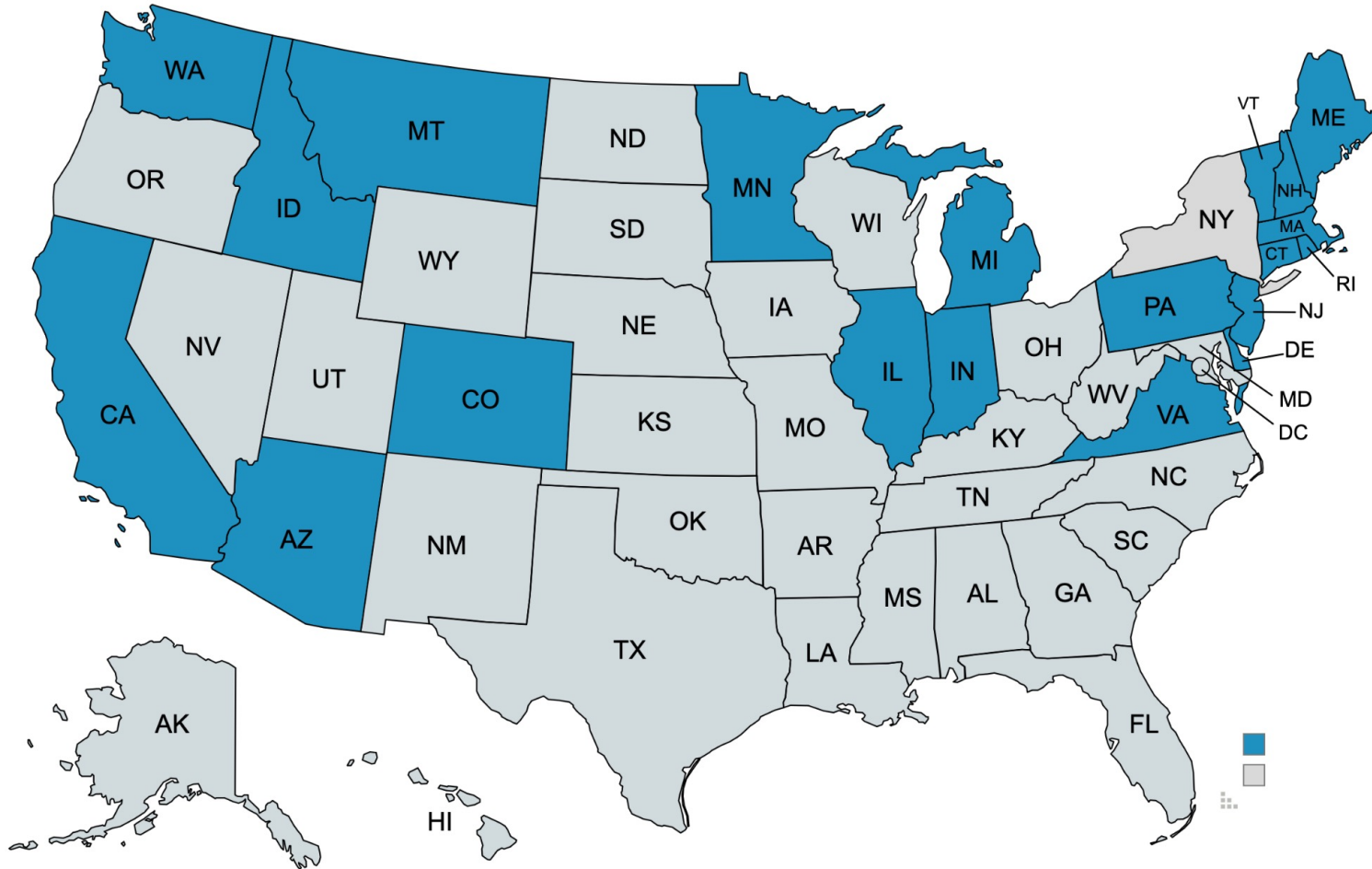


RESILIENT

U.S. DOE HIGH PERFORMANCE STAIRCASE

| | | | | | | | | |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| | | | | | | | | Source Zero Renewable Energy System |
| | | | | | | Balanced Ventilation HRV/ERV | Balanced Ventilation HRV/ERV | |
| | | | | SOLAR READY Depends on climate | | SOLAR READY ALWAYS | SOLAR READY ALWAYS | |
| | | | | Eff. Comps. & H ₂ O Distrib | | Eff. Comps. & H ₂ O Distrib | Eff. Comps. & H ₂ O Distrib | |
| | | | | EPA Indoor airPLUS | | EPA Indoor airPLUS | EPA Indoor airPLUS | |
| | | | | Ducts in Condit. Space | | Ducts in Condit. Space | Ducts in Condit. Space | |
| | | HVAC QI w/WHV | HVAC QI w/WHV | HVAC QI w/WHV | Micro-load HVAC QI | Micro-load HVAC QI | | |
| | | Water Management | Water Management | Water Management | Water Management | Water Management | | |
| | | Independent Verification | Independent Verification | Independent Verification | Independent Verification | Independent Verification | | |
| IECC 2009 Enclosure | IECC 2012 Enclosure | IECC 2009 Enclosure | IECC 2012 Enclosure | IECC 2012/15 Encl./ES Win. | Ultra-Efficient Enclosure | Ultra-Efficient Enclosure | | |
| HERS 85-90 | HERS 70-80 | HERS 65-75 | HERS 55-65 | HERS 48-55 | HERS 35-45 | HERS < 0 | | |
|  IECC 2009 |  IECC 2012 |  ENERGY STAR v3 |  ENERGY STAR v3.1 | |  ZERH |  phius CORE | |  phius ZERO |


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20 States have PH incentives in their low income housing tax credit scoring (QAPs)


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2017/2018 Massachusetts
created a Passive House
Challenge Program



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The Challenge:

Dispel Misperceptions

about Passive

House Construction

Costs

Passive House standards provide a framework for the construction of

.. ..

Program Area

High Performance Buildings

Program Duration

2017 – 2018

Activities Supported

- Design & Construction
- Pilot Projects

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8 Projects (543 units) funded,
Incremental costs were ~2%

Energy use in these buildings is
50-70% below their peers

| OWNER & PROJECT | LOCATION | UNITS | AWARD | INCREMENTAL COST |
|----------------------------------------------------------------------------------|--------------|-------|-----------|--------------------------------------|
| Beacon Communities Old Colony Phase Three C | South Boston | 55 | \$220,000 | 3.5% |
| Community Builders North Commons | Northampton | 53 | \$212,000 | 4.1% |
| Dakota Partners Depot Village* | Hanson | 48 | \$192,000 | N/A |
| Homeowner's Rehab Inc.'s Finch Cambridge | Cambridge | 98 | \$147,000 | 1.4% (Itemized Cost) |
| NeighborWorks Southern Mass's Holbrook Center Senior Housing | Holbrook | 72 | \$131,200 | 1.6% |
| NorthShore Community Development Corporation's Harbor Village | Gloucester | 30 | \$120,000 | 1.8% |
| Preservation for Affordable Housing Mattapan Station | Mattapan | 135 | \$540,000 | 2% |
| Preservation of Affordable Housing The Kenzi at Bartlett Station | Roxbury | 52 | \$168,000 | 1% |

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As of January 2024 **all multi family projects above 12,000 sf are mandated to certify with PH** for energy code compliance in stretch code jurisdictions in MA

(jurisdictions include Boston, Brookline, Watertown, Somerville, Cambridge, Acton, Aquinnah, Arlington, Concord, Lexington, Lincoln, Maynard, Newton, Sherborn, Stow, Truro, Wellesley, Wellfleet).

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Meanwhile in PA:

*Notably, the Passive House projects don't seem to be more expensive to build than conventional buildings, likely thanks to the early integrated design process that development teams are compelled to engage in so that their LIHTC proposals can be competitive. According to Pennsylvania Housing Finance Agency (PHFA) data, **the construction cost premium for Passive House versus conventional projects was 5.8% in the first year, 1.6% in the second, and minus 3.3% in the third year, suggesting that learning and innovation by project teams may be driving down costs over time.***

LOCAL TEST DRIVES



Zilker Studios

- Austin, TX
- 110 Units



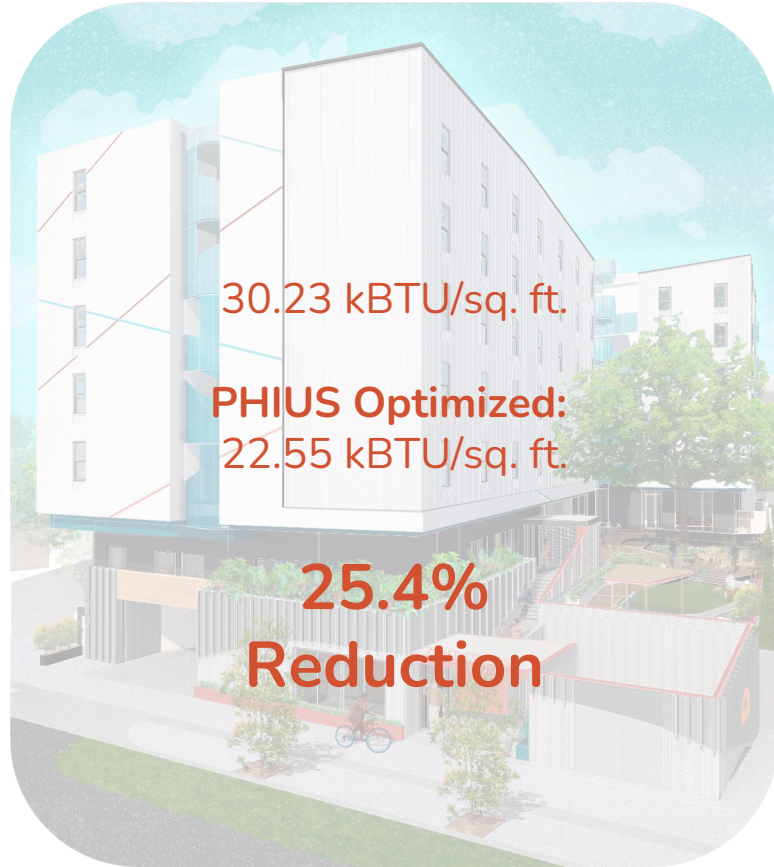
Integral Care

- Austin, TX
- 60 Units



Temenos

- Houston, TX
- 95 Units



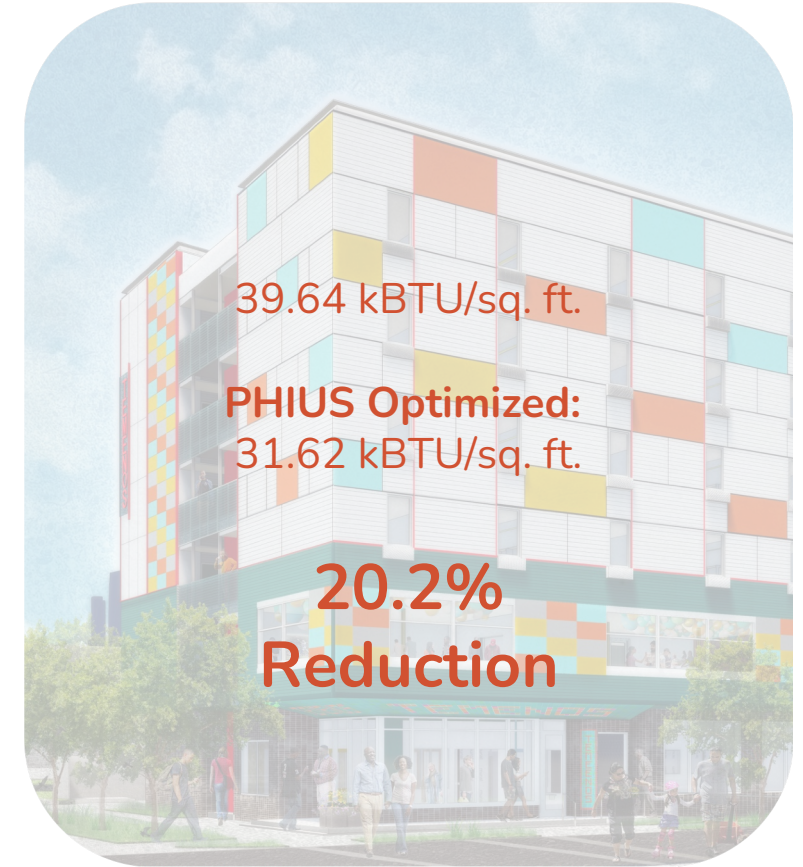
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And... all of these have open air corridors, which is difficult with a PH project. Enclosing the corridors nets an additional 25% EUI reduction!

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The pitch

\$4,000,000 (total, over next 4 years) to fund a challenge program.

Projects in Austin that are receiving funding from RHDA Program could apply

\$4,000 per unit – paid as a grant to developer

- \$1,000 for commitment, hiring a passive house consultant and rater

- \$1,500 at Design Certification

- \$1,500 at Project Certification (end of construction)

Projects commit to opening their books for cost add of certification (hard and soft) and to participate in a performance tracking program to measure occupant comfort, indoor air quality, energy use and grid benefits (demand reduction and peak shift)

Certifying projects receive an additional \$5000 per unit tax credit under Inflation Reduction Act due to ZERH program nesting within PH program.

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Why do this?

Proof of Concept – PH projects can be done here, are not difficult or expensive and yields superior buildings - does PH deliver claimed benefits in our climate?

Market Shift – significant reduction in first cost delta once a few projects have been built and the design, construction and supply community learns and reacts

Only upside – funds are going towards building healthier, more efficient buildings for most vulnerable people in Austin, and are matched 125% by federal tax credits.

Thanks for listening!!