Treehouse at Easthampton Meadow

Decarbonizing Our Affordable Housing Stock

TREEHOUSE FOUNDATION | BEACON communities®

An Intentional Intergenerational Community

Treehouse at Easthampton Meadow

A planned neighborhood where adoptive families and their children, older youth, and elders invest in one another's health, dreams, and futures.

Location: Easthampton, MA
Year Built: 2006
Owner: Treehouse Foundation
Developer and Manager: Beacon Communities

TREEHOUSE FOUNDATION | BEACON communities®

About Beacon

Our Mission

Create and nurture healthy, vibrant and sustainable communities that positively impact the lives of our residents and make enduring contributions to the vitality of our cities and towns. We call this Living Well by Design.

20,000 +
Apartment Homes

135 +
Locations

10
States

800 +
Team Members

55 +
Years Experience

BEACON communities®

TREEHOUSE FOUNDATION
ReEnvisioning Foster Care

Treehouse Foundation is an intentional, intergenerational community designed to support children who have experienced foster care through **affordable housing** and **access to services.** Its primary goal is to move children into permanent, loving families while surrounding them with a supportive multi-generational network of neighbors.

Every child rooted in family and community.

THE TREEHOUSE MODEL

A Proven Success

	Treehouse Model	National average for foster youth
Kids aging out / returning to DCF	0%	16%
Justice involvement	0%	46%
Teen parenthood	2%	48%
Post high-school education	100%	10%
High school graduation rate	100%	58%

**Data from Treehouse Easthampton from 2006-today.*

Treehouse by the Numbers

Apartments: 60
Buildings: 25
Stories: 1 and 2 stories
Demographic: 48 Senior (1-BR), 12 Family (3- 4- and 5-BR)
Affordability: 54 Affordable, 6 Market

TREEHOUSE FOUNDATION | BEACON communities®

The Right Time to Decarbonize

Current Systems

- Gas-fired individual heat and hot water systems
- Low-efficiency electric air conditioning and cooking
- Insulated wall assembly but drafty

Resident Concerns

- Cold-feeling homes
- Unbalanced heat and A/C in townhouses

Project Overview and Decarbonization Objectives

Comprehensive Decarbonization Strategy

The plan targets reducing emissions by deep retrofits including envelope, mechanical, and renewable energy upgrades.

Energy Demand Reduction

Enhanced insulation, airtight construction, and high-performance windows reduce heating and cooling energy needs significantly.

Electrification of Systems

Replacing gas heating and hot water with electric heat pumps and electric resistance heaters to improve efficiency.

Testing and Verification

Blower door testing and third-party commissioning ensure real-world performance matches design intent.

Upgrades to Residential and Community Buildings

TREEHOUSE FOUNDATION | BEACON communities®

Residential Building Envelope Upgrades: Siding, Windows, and Doors

Siding Removal and Reuse

Careful removal and partial reuse of existing vinyl siding minimizes waste and enhances sustainability.

Enhanced Exterior Insulation

Installing a continuous weather barrier, exterior insulation, and new sheathing improves airtightness and reduces thermal bridging.

High-Performance Windows and Doors

Replacing old windows and doors with triple-pane glass and insulated doors reduces heat loss and air infiltration.

Scheduled Upgrade Timeline

Phased construction from December 2025 to April 2027 ensures occupant comfort while improving building performance.

TREEHOUSE FOUNDATION | BEACON communities®

Attic Conversion and Thermal Control Improvements

Attic Conversion Benefits

Converting attics into conditioned space improves energy efficiency and mechanical system integration.

Spray Foam Insulation Application

Applying low-emitting spray foam insulation to the underside of roof sheathing creates an air-tight thermal barrier.

Thermal and Air Leakage Control

Sealing vents and stabilizing attic temperatures reduces uncontrolled air leakage and protects HVAC components.

Project Scheduling and Impact

Early attic retrofit supports optimized mechanical installations and durable, low-carbon building performance.

Residential Heating, Cooling, and Domestic Hot Water Electrification

Heat Pump System Replacement

Replacing gas furnaces with electric air source heat pumps improves comfort and eliminates fossil fuel combustion.

Ductwork Reuse Benefits

Reusing existing ducts reduces costs, limits resident disruption, and shortens installation time, enabling efficient electrification.

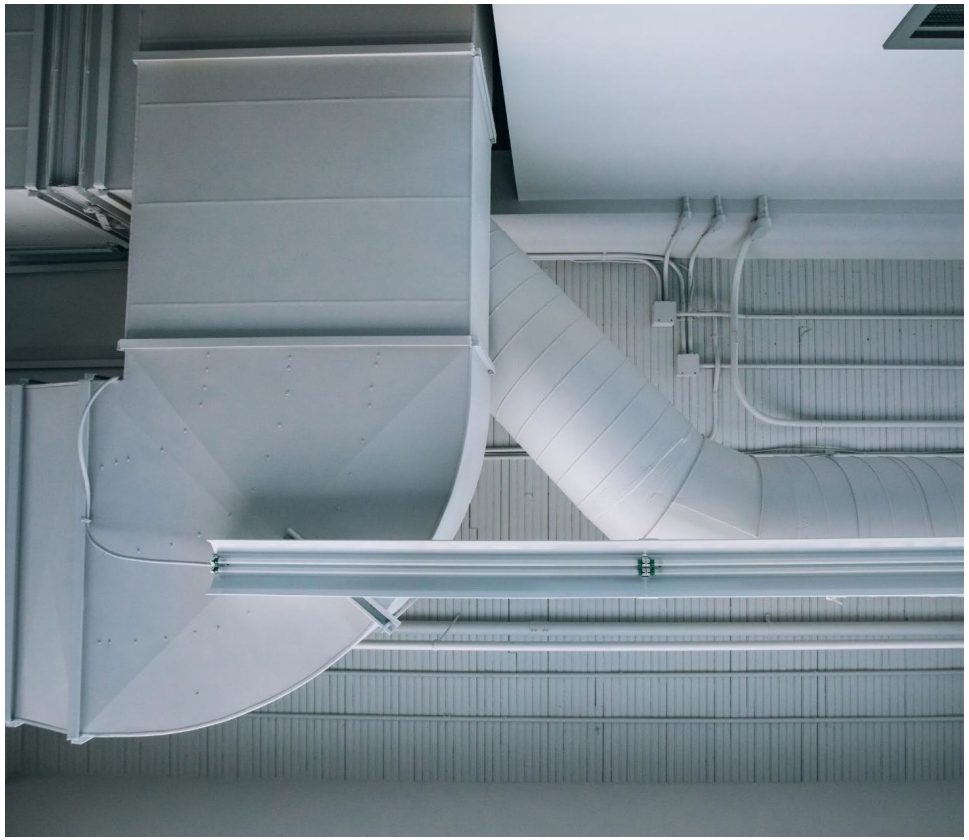
Electric Domestic Hot Water Heaters

Switching from gas to high-efficiency electric resistance water heaters decreases maintenance and safety risks.

Integrated Decarbonization Approach

Combining electrification with envelope upgrades and solar generation lowers energy use and carbon emissions.

Residential Ventilation and Indoor Air Quality Enhancements



Balanced Ventilation Importance

Tighter building envelopes require controlled ventilation to maintain healthy indoor air quality and occupant comfort.

Energy Recovery Ventilation Units

ERV units supply fresh air while exhausting stale air, recovering heat and moisture to reduce energy loss.

Integrated Mechanical Strategy

ERVs replace bathroom fans and are integrated with heating systems, enhancing overall mechanical efficiency.

Health and Energy Benefits

Filtered incoming air reduces pollutants, improving health, while ERVs lower heating and cooling energy demands.

Community Building Electrification and Solar Integration

Electrification of Mechanical Systems

Replacing gas-fired heating and hot water systems with efficient electric heat pumps and resistance units eliminates fossil fuel use.

Ventilation Upgrades

Installation of energy recovery ventilation units improves indoor air quality and ensures energy-efficient ventilation in shared spaces.

Solar Photovoltaic Installation

Solar panels installed on the south-facing roof generate renewable electricity, offsetting building energy loads and promoting sustainability.

Envelope Upgrades

Building envelope improvements enhance energy efficiency, supporting the overall decarbonization strategy for the community building.

Verification, Commissioning, and Long-Term Performance

Testing and Verification Through Blower Door Assessments

Comprehensive Blower Door Testing

Blower door tests measure whole-building airtightness and detect uncontrolled air leakage pathways to ensure performance.

Multi-Stage Testing Schedule

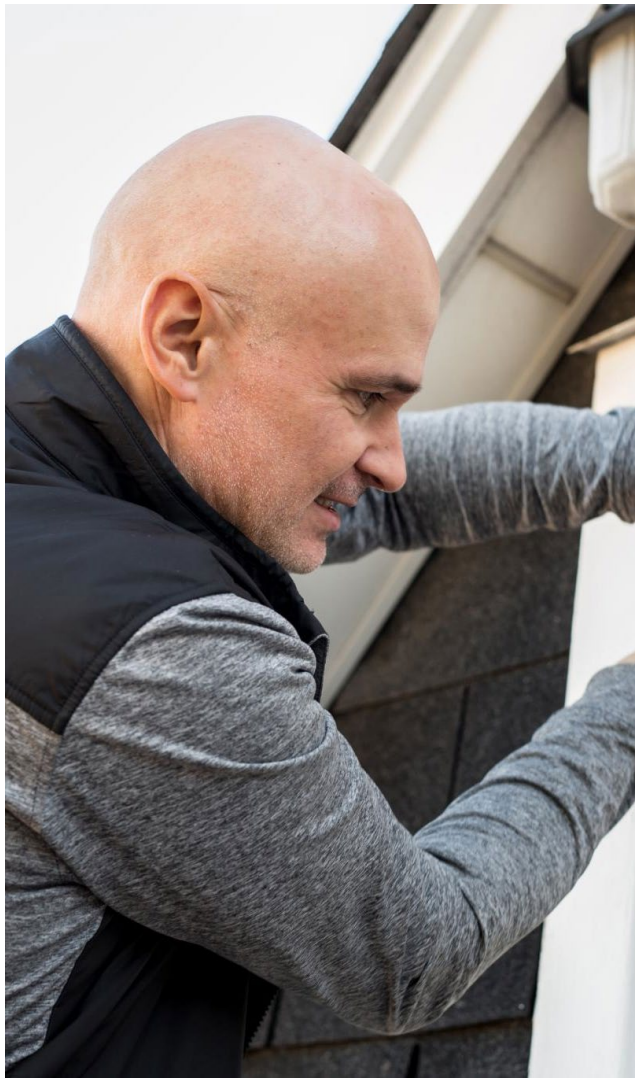
Testing at early, mid-point, and final stages helps identify issues and verify compliance with design targets.

Benefits of Improved Airtightness

Enhanced comfort, reduced energy load, moisture control, and better indoor air quality result from airtight building envelopes.

Integration into Project Schedule

Embedding testing in the construction timeline ensures accountability, quality control, and continuous improvement.



Commissioning and Functional Performance Validation

Purpose of Commissioning

Commissioning ensures building systems are installed, calibrated, and operating according to design for long-term performance.

Functional Testing Activities

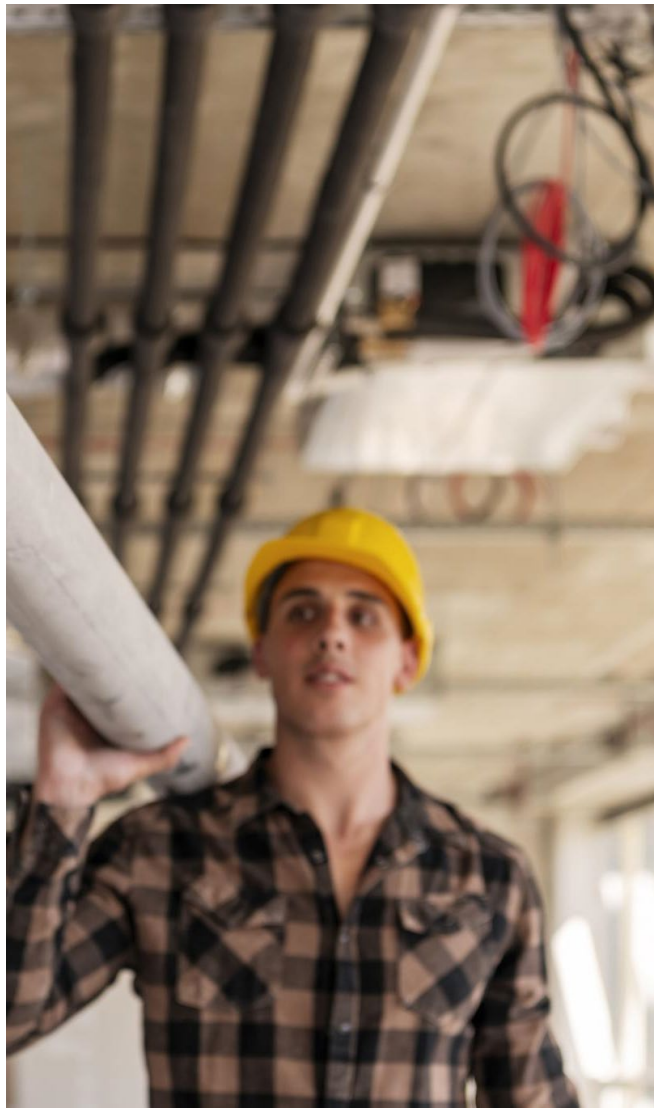
Verification of heat pumps, control operations, ventilation airflow, and system integration identifies performance issues early.

Post-Occupancy Review

A 10-month post-occupancy evaluation assesses system performance under real conditions and updates commissioning report.

Long-Term Commitment

Extended commissioning engagement ensures reliable performance and provides confidence in decarbonization investments.



Long-Term Impact, Resilience, and Replicability

Sustainable Building Design

Deep envelope retrofits, full electrification, balanced ventilation, and onsite renewables reduce operational carbon emissions and enhance resilience.

Enhanced Resilience Features

Improved insulation and high-performance windows provide thermal stability during outages and extreme weather events.

Replicable Project Model

Phased implementation, occupant focus, and rigorous testing enable replication across affordable and market-rate multifamily housing.

Long-Term Benefits

Reduced emissions and energy use improve comfort, health, and confidence in low-carbon building strategies over time.

Before and After

System or Metric	Before	After
Energy Use Intensity (EUI)	71 kBtu/square foot	35.6 kBtu/square foot (~50% reduction)
Air Tightness	5 to 6 Air Changes per Hour Measured (ACH)	2 Air Changes per Hour (Expected)
Roof	R-22	R-49 or better
Walls	R-15	R-28
Windows	Double Pane, U-value 0.40	Triple Pane, U-value 0.25 or better
Heating/Cooling	Gas Heating / Electric Cooling	Air Source Heat Pump
Water Heating	1 Gas Fired Tank per Unit	1 Electric Resistance Tank per Unit
Ventilation	On Demand Bathroom Fans	Energy Recovery Ventilation (Constant)
Solar Photovoltaics	None	Yes! On Community Building

Costs and Funding

Costs

- **Total Development Costs:** $32.4 million
- **Hard Costs:** $15.5 million ($258,000/unit)

Funding

- **MassHousing:** Climate Bank ($5 million), Capital Magnet Funds ($1.3 million)
- **EOHLC:** State LIHTC ($13.2 million), Climate Ready Housing ($750,000), Soft Debt ($3.4 million)
- **DOER Affordable Housing Decarbonization Grant Program:** $3 million
- **MassSave LEAN Electrification Rebate:** $714,000
- **City of Easthampton Community Preservation Act (CPA) Grant:** $200,000

Project Team and Partners

BEACON communities®

TREEHOUSE FOUNDATION

EXECUTIVE OFFICE OF HOUSING AND LIVABLE COMMUNITIES

MCCB
MASSACHUSETTS COMMUNITY CLIMATE BANK™
POWERED BY MASSHOUSING

MASSACHUSETTS DEPARTMENT OF ENERGY RESOURCES

MHP Massachusetts Housing Partnership
Moving affordable housing forward

LISC

DAVIS SQUARE ARCHITECTS

KEITH CONSTRUCTION INC.

NEW ECOLOGY
Community-Based Sustainable Development