

July 18, 2024



BE+ Energy & Carbon Roundtable

Massachusetts 2025-2027 Energy Efficiency and Decarbonization Plan

WE ARE MASS SAVE®:



Agenda

Mass Save[®]: Looking Back and Ahead

Deep Dive Topics

Discussion

Mass Save: Looking Back and Ahead

**In 2008, MA
Legislature had the
foresight to pass
the Green
Communities Act**

- Made energy efficiency the first fuel
- Provided the legal and regulatory frameworks for Mass Save[®]
- Challenged the Massachusetts Program Administrators to scale energy efficiency program development and delivery

**The Program
Administrators responded
and delivered**



We saved over

15 TWh

from 2010-2022

**Equivalent to the average annual output
of five Brayton Point power plants**

We Continue to Refocus Our Offerings to Emphasize GHG Reductions

Residential

Heat Pumps	Weatherization	Heating Equipment	Home Assessments
Online Assessment	Demand Response	Countless Product Promotions	Integrated Controls
Renter Information	Income Eligible	Enhanced incentives	Dehumidifier Recycling Events
Multi-Family Offers	Refrigerator/ Freezer Recycling	HEAT Loan	Renovations/ Additions
Landlord Information	Webinars	Online Marketplace	New Construction
Windows	CFP	Community Grants	Education

Business

Heat Pumps	Weatherization	Mechanical Insulation	HVAC Upgrades
Lighting and Controls	Retro-Commissioning	Building Management Systems	Demand Response
Water Heating	Refrigeration	Variable Frequency Drives and Motors	Compressed Air
Industrial Process	Lawn Equipment	New Construction and Major Renovations	Financing
Comprehensive Incentives	Main Streets	Workforce Development	Facility Assessments

We have begun transforming the heating market ...

- Established Heat Pump Installer Network with **1,500+ qualified HVAC companies** in Massachusetts.
- Promoted network at approximately **100 in-person industry events**.
- **4,000 + contractor trainings** through our eLearning Centers
- **1,500+ heat pump quality inspections** completed (mostly residential).
- New buildings and homes must be **all-electric** to participate



2025-27 Plan: Themes & Priorities



Decarbonization

- EE + Electrification
- Gas equipment phaseout
- Non-energy GHG measures
- Workforce development

Customer Experience

- Statewide vendor procurement & management
- Simplified technical review

Equity

- Main Streets
- Schools
- Supplier diversity

2022-2024 Plan



Weatherize approximately **186,000 homes**, including **20,000 low-income households**.



Supported the installation of heat pumps in over **63,000 homes**, including **6,600 low-income households**.



Invest **\$550 million in incentives** for low- and moderate-income households.



Reduce greenhouse gas (GHG) emissions by **845,000 metric tons** of carbon dioxide equivalent (CO₂e).

The Next Three Years



Weatherize **174,000 homes**, including **48,000** low- and moderate-income households.



Support the installation of heat pumps in over **115,000 households**, including **22,000** low- and moderate-income households.



Invest **\$1 billion in incentives** for low- and moderate-income customers and renters and over **\$1.4 billion** in equity-related efforts.



Reduce GHG emissions by **1.0 million metric tons of CO₂e**.

Deep Dive Topics



Approach To Decarbonization



**Understanding and Addressing Cost
and Other Barriers**



**The Sponsors of Mass Save & Embodied
Carbon**

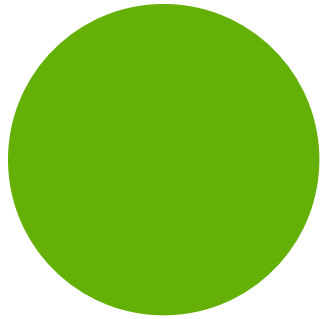


Relaunching the Mass Save Multi-Family Program

Approach to Decarbonization

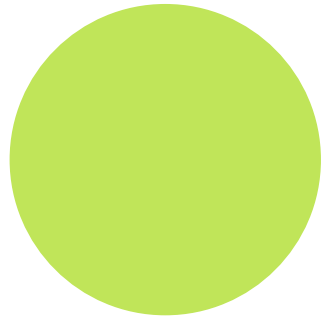


Installation Incentives



Energy Efficiency

Amongst highest incentives in nation



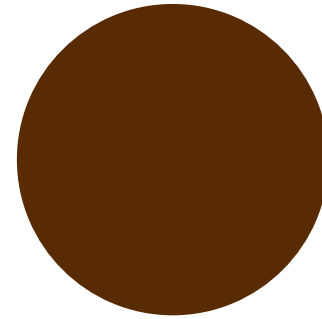
Heat Pumps

ASHP: \$2,500/ton

VRF: \$3,500/ton

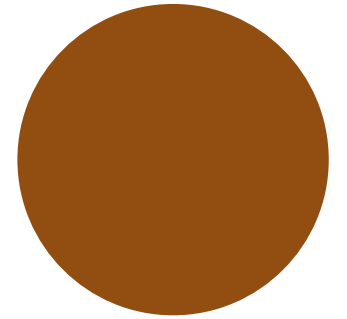
GSHP: \$4,500/ton

*Custom: up to \$54/net lifetime MMBTU



Deep Energy Retrofit

\$1.00/sq ft adder



New Construction

Up to \$3.50/sq ft plus heat pump adders

Decarbonization Planning

Energy assessments will explore both efficiency and electrification by default

Enhanced support for in-depth **decarbonization studies** to assist with BERDO/BEUDO compliance

Offer **prioritization studies** to help building portfolio owners identify facilities and systems for near-term electrification



Existing Building Commissioning

Intensive process to **optimize performance** of building systems

Pathway under development

- Replace existing ESPO pathway

Flexible pathway envisioned for all systems with focus on HVAC

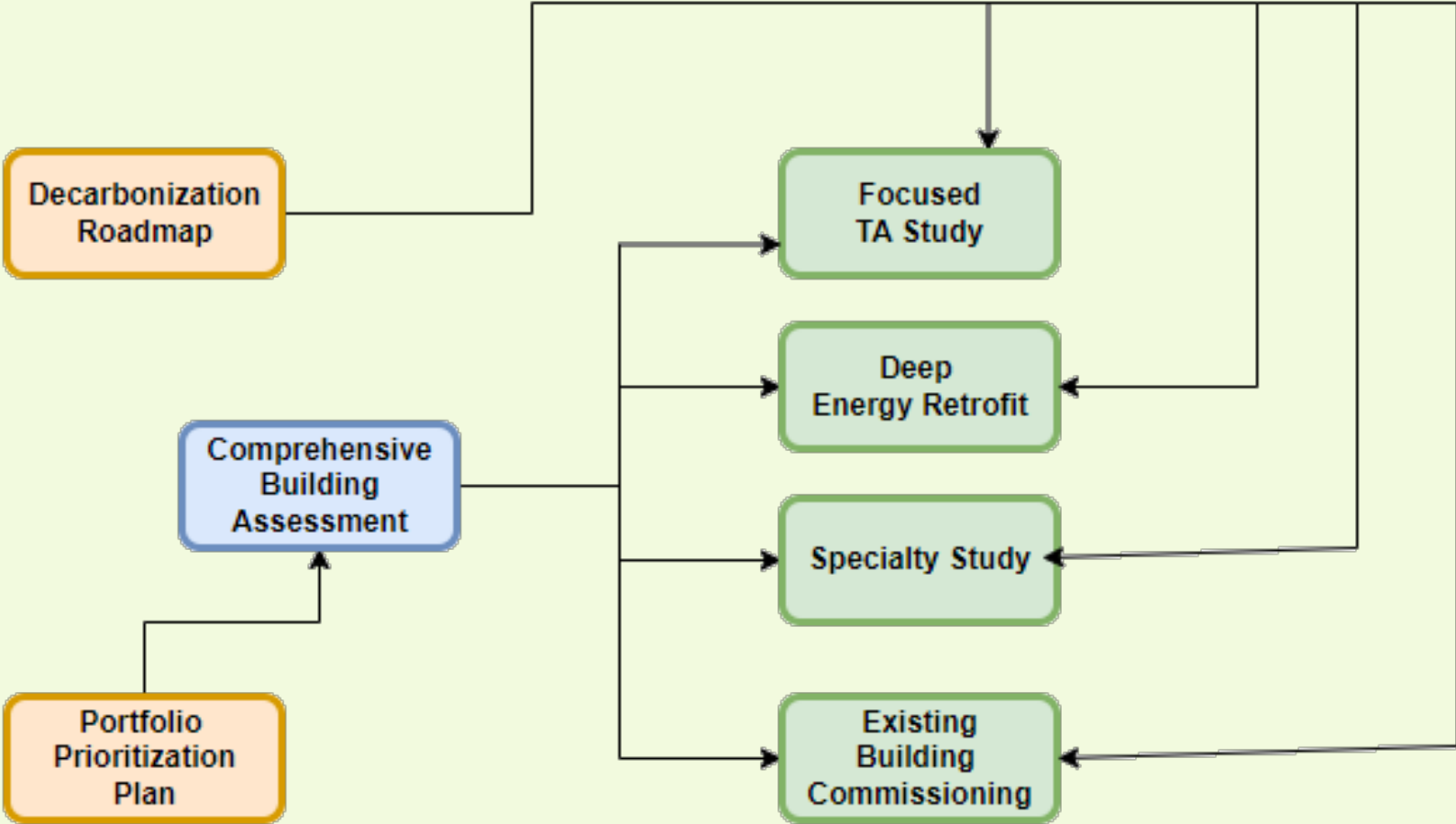
Service providers to be preapproved

Budgeted for 1,000 facilities at **average study cost of \$75,000**



Study	Description
Comprehensive Building Assessment	Scoping level assessment of Energy Efficiency and Electrification.
Portfolio Prioritization	Leverage equipment lists, EUI benchmarking, and virtual audits to prioritize buildings for further study.
Decarbonization Roadmap (Portfolio)	In-depth exploration of decarbonization strategies with detailed long-term implementation plan. Support ad hoc and BERDO/BEUDO requests.
Existing Building Commissioning (EBCx)	Optimize building operations. Focus on HVAC controls; modular approach. Replacing ESPO. May incorporate MBCx.
Focus TA Study	Necessary to calculate claimable savings and develop MRDs
Specialty Study	Steam Traps, compressed air, electric capacity, others
Deep Energy Retrofit	Additional incentive for project packages yielding at least 40% GHG reduction

Technical Assistance Offerings



Discussion

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Costs and Barriers



Customer Feedback

- Curious interest in **municipal, higher education and property management** sectors
- **Exploratory activities** and a long pause due to funding, lack of drop in technology, complexity, and higher operational and maintenance costs
- Concerns about the cleanliness of grid, the **capacity of the grid**, capacity at customer site, and large backup/emergency generator
- Majority of buildings will **meet BERDO/BUEDO compliance requirements** till 2030
- Focus on **getting buildings electrification ready** and potentially implementing a 'showcase' building
- Higher Education customers engaged in **multi-year decarbonization plans**

Large C&I Electrification- Industry Feedback

Technology

- OEMs indicate at least 2-3 years for 1-1 equipment replacement to be commercially available
- No cold climate RTUs on market – hybrid solutions only
- Currently, technology demonstrations planned and scalability still an issue
- Currently, the cost to fully electrify ranges from \$25/sqft- \$100/sqft (just for electrification and minimal distribution upgrades)
- Costs increase to up to \$200/sqft with HVAC distribution upgrades and geothermal

Large C&I Electrification- Industry Feedback

A/M/E/P/OPMs Community

- Focus on prioritization and master planning studies
- Targeting end-of-life equipment (still up to \$40-50/sqft)
- Industry comfort with hybrid/phased electrification
- Lack of trained implementation trades
- Commissioning and training mandatory for facilities staff

Discussion

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Approach to Embodied Carbon

Drivers

High savings impact

- Focus on top materials for GWP/CO2e savings
- Reputable savings attribution
- All commercial building types
- Integration with design process and sophistication level of industry

Ease of implementation

- Simple design
- Integration with existing programs
- Address challenges related to:
 - Baseline determination
 - Verification of savings
 - Product specific EPDs

Support of market transformation

- Serves middle market and early adopters
- Flexible overtime
- Policy alignment:
 - Nation programs
 - Local policy and initiatives
 - Existing resources
 - Stakeholder drivers

Support Options

Materials- Based Approach

Focuses on selecting low GWP alternatives to standard materials on a like for like basis

Pros

- Easy to follow and verify
- Baselines well documented and reliable
- Clear focus on the most impactful building components
- Lots of examples from Buy Clean programs

Cons

- Limited, doesn't reward design changes
- Savings rely in industry-wide averages

Whole Building Approach

Requires Whole Building LCA and compares design with a baseline level of embodied carbon performance

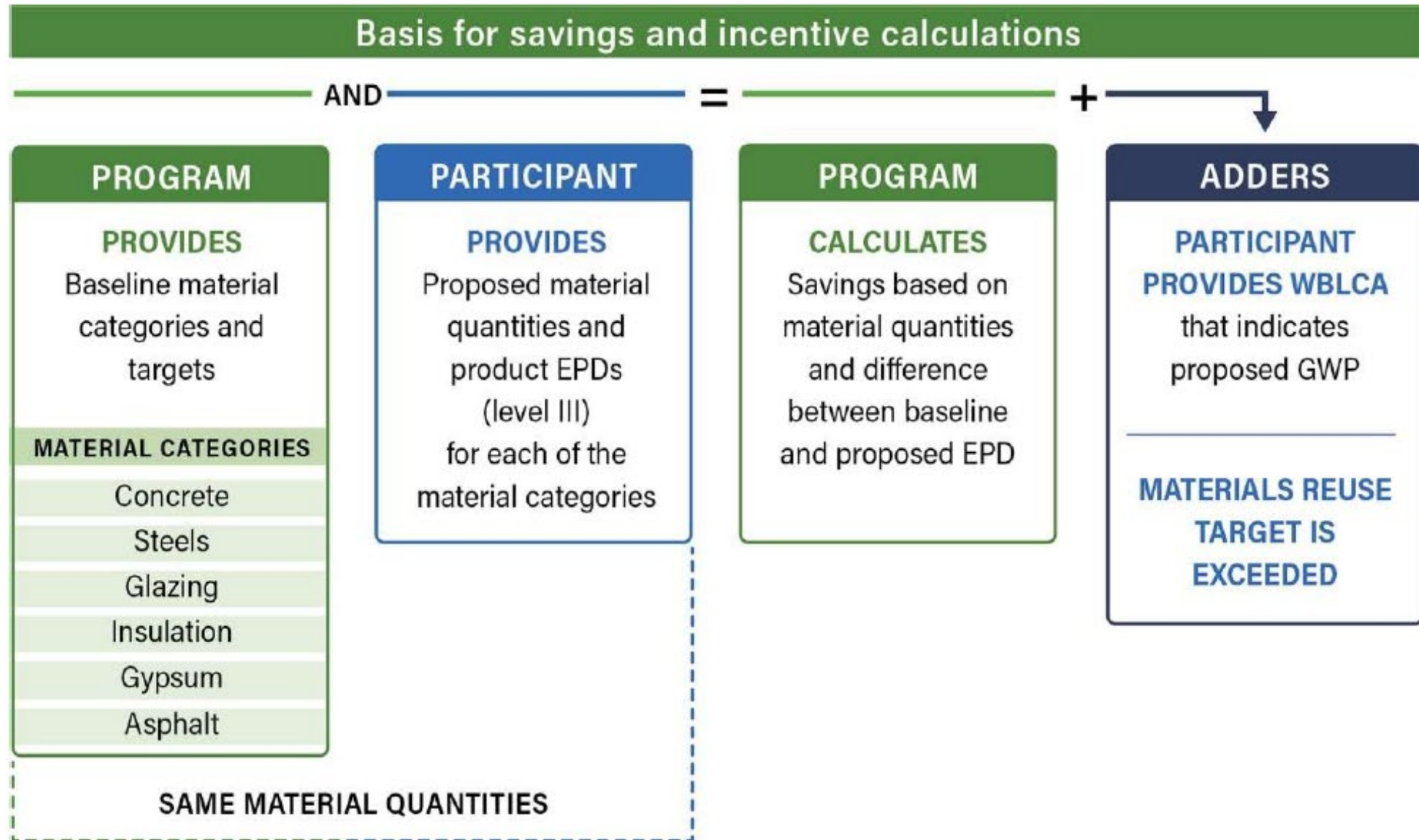
Pros

- Industry best practice for reducing EC
- EC reduction potential is greater
- Drives design decisions and not just product selection

Cons

- More complex approach for participants, means less participation
- Lack of standardization in defining baselines
- Requires product specific EPDs that might not be available

Proposing Hybrid Approach



Baselines and Savings

Mass Save Sponsors propose using the materials reduction approach to calculate all emissions reductions and incentive amounts.

- GSA released a set of Low Embodied Carbon Material requirements based on a 15-building pilot program – useful baselines for **concrete, steel, glass, and asphalt**
- LEED v5 references the GSA data but adds a benchmark for **insulation** that could be a suitable baseline.
- Industry-wide EPDs can set the baseline for **gypsum board**

Incentives

- Still much to be fleshed out
- Project cost data needed
- **Owner Incentive**: recommendation is to offer incentives on a \$/kgCO₂e basis
 - Consider adders for WBLCA and materials reuse
- **Design firm incentives** (could vary if team is pursuing WBLCA or just materials-based approach)

Notes:

- Incremental costs for low GWP materials are ill-defined and estimates vary widely

Discussion

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Multi-Family

Multifamily New Construction (5+ Units)

- New buildings must be all-electric to participate
 - Exception: program allows fossil fuels for DHW for a limited time
- Three-tiered incentive structure
- Inclusion of market transformation adders



Multi-family (5+ units)			
Tier	Base	ENERGY STAR	Passive House
Overview	All-electric heating, cooking & clothes drying. Fossil fuel DHW is allowable	ENERGY STAR Multi-Family New Construction (MFNC) v1.2	Passive House
Performance Specifications	Low-Rise: $\geq 15\%$ savings above baseline or HERS: ≤ 45 High-Rise: Exceed baseline	ENERGY STAR MFNC v1.2	Passive House certification (Phius or PHI)
Incentives	Low-Rise: \$1,500/Unit High-Rise: \$1,000/Unit	Low-Rise: \$2,500/Unit High-Rise: \$1,750/Unit	Both: \$3,750/unit (\$750 Pre-Cert, \$3,000 Final Cert)
Passive House Adders	\$5,000 Feasibility Study Incentive Up to 75% Energy Modeling Costs (\$500/Unit or \$20,000/Project max)		
Market Transformation Adders*	Wi-Fi Connected Thermostat: \$100/unit Induction Cooktop: \$250/unit In-Unit Heat Pump Water Heater: \$250/unit Centralized and Split-System Heat Pump Water Heater: \$750/unit ENERGY STAR Certified Ground Source Heat Pump: \$1,000/unit ENERGY STAR NextGen certification (ENERGY STAR tier only): \$250/unit DOE Zero Energy Ready Homes certification (ENERGY STAR tier only): \$250/unit High-Rise Whole Building Infiltration Testing (Base and ENERGY STAR tier only): ASTM E779 test results - 0.4 CFM/sf @75pa: \$300/unit ASTM E779 test results - 0.25 CFM/sf @75pa: \$400/unit		

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