

Eva White Apartments

Boston, MA

Massachusetts Decarbonization Retrofit Case Study

PLANNED

Built in 1966, Eva White Apartments consists of two seven-story buildings (440 and 450 Tremont), providing 102 apartments for low-income seniors. The buildings are undergoing a deep energy retrofit starting in mid-2025.



Building overview

Building typology **Mid-rise residential**

Stories **7**

Units **102 (combined)**

Floor area **76,684 square feet (combined)**

Performance target **49% and 67% EUI reduction***

Retrofit approach **All at once**

Construction completion **2026**

Enclosure approach **Exterior prefabricated overclad**

Building team

Building owner **Winn Development & Castle Square Tenant Organization (CSTO)**

Architect **Reisen Design Associates**

MEP & Structural engineer **Petersen Engineering**

General contractor **Keith Construction Inc.**

Building science firm **Building Enclosure Associates & Petersen Engineering**

Decarbonization scope of work

	Existing	Post-retrofit
Walls	Uninsulated concrete block and brick veneer	R-29 Kingspan fully engineered insulated metal panel over cladding U-0.21 Peerless triple-glazed casement windows
Roof	R-9 roof with ~3" of insulation and a roofing membrane	R-40 Polyisocyanurate insulation and new roofing membrane
Heating & cooling	Central gas boiler with hydronic baseboard radiators (often supplemented with electric space heating)	Central Mitsubishi Y-Series Variable Refrigerant Flow (VRF)
Ventilation	Exhaust-only ventilation	Central Annexair Energy Recovery Ventilation (ERV) system
Domestic hot water (DHW)	Gas DHW system	At 440 Tremont: Central Mitsubishi QAHV CO2-based air-to-water heat pump At 450 Tremont: Existing gas DHW system maintained
Lighting, appliances, & other	Gas kitchen appliances	Energy Star appliances and LED lighting
Renewable energy	No existing renewable energy sources	None planned due to minimal rooftop space and shading concerns

Decarbonization narrative

The retrofit approach at Eva White Apartments features an innovative prefabricated envelope system designed to minimize disruption and construction timelines while drastically improving energy efficiency on site.

These panels arrive as a complete assembly at the site, installed on exterior metal framing with a crane. Refrigerant lines and ductwork will run within the air gap between the existing building face and new exterior panels from rooftop equipment into each apartment (see rendering below).



*EUI refers to Energy Use Intensity, a metric used to measure a building's relative energy efficiency. See more on building performance on the next page.

Emissions & energy

Project stage	Approximate annual energy costs (\$/yr)	EUI (kBtu/sf/yr)
Pre-retrofit (projected)	\$232,600 (Combined 440 and 450 Tremont)	96
Post-retrofit (projected)	\$202,900 (Combined 440 and 450 Tremont)	29 (440 Tremont)
		36 (450 Tremont)

Building Emissions Reduction and Disclosure Ordinance (BERDO) is a local law requiring large buildings in Boston to report annual energy and water use, and to meet emissions standards starting in 2025 or 2030 that decline over time toward net-zero by 2050.

By targeting air pollution and GHG emissions, BERDO offers a strong baseline for assessing project emissions and planning long-term decarbonization in Boston and statewide.

Emissions timeline	440 Tremont Emissions (kgCO2e/sf/yr)	450 Tremont Emissions (kgCO2e/sf/yr)	BERDO standard (multi-family) (kgCO2e/sf/yr)
Baseline (using 2025 emissions factors)	10.2		4.1
2030	1.1	1.7	2.4
2035	0.9	1.5	1.8
2040	0.6	1.3	1.1
2045	0.4	1.2	0.6
2050	0.3	1.0	0

The GHG emissions factors used in this case study align with those established for the City of Boston’s BERDO policy, as outlined in the [Boston Buildings Emissions Performance Standard](#) prepared for the City by Synapse Energy Economics Inc.

Sources & uses

Source type	Source	Total	Per unit
Performance-based sources	Mass Save Income-Eligible Deep Energy Retrofit Incentive	\$1,560,000	\$15,294
Various grants and tax credits	Federal Low-Income Housing Tax Credits	\$25,089,200	\$245,973
	Housing Stabilization Fund	\$2,525,000	\$24,755
	Affordable Housing Trust	\$2,275,000	\$22,304
	Non-Federal Investment Trust	\$1,000,000	\$9,804
Loans, fees, reserves	First Mortgage	\$18,850,000	\$184,804
	BHA Seller Note	\$5,333,000	\$52,284
	Castle Square Tenants Organization Loan	\$2,500,000	\$24,510
	Deferred Developer Fee & Overhead	\$1,294,700	\$12,693
	Federal Home Loan Bank Affordable Housing Program	\$650,000	\$6,373
	Mass Housing Capital Magnet Fund	\$600,000	\$5,882
	Net operating income during construction	\$318,100	\$3,119

Uses	Notes	Total	Per unit
Enclosure	Including prefabricated panels, roof, etc.	\$16,765,000	\$164,363
Mechanical	Including HVAC and residential appliances	\$15,007,700	\$147,134
Other scope	Including hazardous materials abatement, elevators, bathroom & kitchen work, etc.	\$8,346,400	\$81,827
Soft costs	Design & other soft costs	\$11,975,900	\$117,410
Acquisition		\$6,000,000	\$58,824
Developer costs	Developer fee & overhead	\$3,900,000	\$38,235
Total development costs		\$61,995,000	\$607,794

Sources and uses are based on final construction budget estimates from June 2024 and are rounded to the nearest \$100. All costs represent actual or estimated hard construction pricing and are site-specific. Variations may occur based on scope, site conditions, wage requirements, and cost escalation. Estimates include general conditions, overhead and profit, and a contingency if applicable. Figures are for preliminary guidance only and not intended for final planning.



Project features

Comparing DHW performance: The property upgraded its gas domestic hot water systems in 2018 and will now electrify only 440 Tremont using low-GWP CO₂ heat pumps to compare its operational performance against the existing gas system at 450 Tremont. The gas system at 450 Tremont will remain until end-of-life, with future electrical upgrades planned to support future electrification.

Continuing a legacy: Next door to Eva White is Castle Square Apartments, the first-ever deep energy retrofit in the US, completed by CSTO and Winn in 2012. Today, the Eva White project builds on this pioneering work, pushing the envelope further with a high-performing, pre-fabricated solution and significant advances in ventilation and electrification.