Counting Homes, Not Heads: Weatherization's Hidden Opportunity

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ABSTRACT

Since the launch of major clean energy initiatives in the late 2000s, Massachusetts energy efficiency program administrators have positioned weatherization as a foundation for efficiency and decarbonization. As climate and equity goals accelerate, understanding not only what has been delivered but also what remains is essential. This paper introduces a premise-level approach that tracks homes, rather than accounts, to reveal true program reach and remaining opportunity.

A 5½-year analysis of eligible single-family homes (2020–mid-2025) finds that penetration remains in the single digits. Fewer than one in ten homes were weatherized during the study window, compared to account-based reporting that suggests roughly one in five accounts participated. Two structural dynamics explain this divergence: multiple accounts associated with a single home and repeat participation across years. Premise-level reconciliation avoids these overstatements and provides a clearer measure of cumulative home-level penetration.

Participation patterns reflect structural housing conditions. Mid-century homes (1946–1990) account for a majority of participants, consistent with retrofit feasibility. Certain large working-class municipalities demonstrate participation rates at or above the statewide benchmark, while others lag. At the same time, renters, lower-income households, Environmental Justice Communities, and very old homes remain underpenetrated relative to their structural presence in the eligible stock.

By linking household characteristics with premise-level tracking, this analysis reframes remaining opportunity as a structured landscape rather than an aggregate gap. The framework supports more targeted strategies for advancing equity and decarbonization within Massachusetts' single-family housing stock.

1. Introduction

Despite decades of investment in residential weatherization, how participation is measured continues to shape how remaining opportunity is interpreted. These programs have long been central to state energy strategies (York et al. 2012), and billing-based impact evaluations continue to assess the realized performance of residential weatherization measures across jurisdictions (Efficiency Maine Trust 2023). This study examines participation within the Massachusetts utility and energy efficiency service provider-administered efficiency portfolio, specifically the Mass Save® programs, using administrative and billing data to assess reach at the premise level. As climate and equity goals accelerate, understanding not only what has been delivered but also what remains is essential.

Participation metrics shape how programs assess progress, allocate resources, and plan future investments. Most commonly, participation is tracked annually at the account level, providing a

clear and operationally useful view of program activity. Measuring weatherization participation at the account level rather than the physical premise can overstate penetration within the housing stock and understate remaining program potential. Integrating both customer-level and premise-level characterization strengthens targeting precision and supports more effective program design. However, when applied to long-lived measures such as air sealing and insulation, annual account-based metrics can obscure how many distinct homes have actually been reached over time and where future opportunity resides.

This paper introduces a premise-level approach that shifts the unit of analysis from accounts to homes. By tracking participation at the home level over multiple years, this approach offers a complementary perspective on penetration and engagement. Throughout this paper, "remaining opportunity" refers to eligible single-family homes that have not completed a qualifying weatherization measure during the study window and would likely benefit from participation. Viewed through this lens, remaining opportunity reflects durable program design, sustained market engagement, and clearer signals about where future impact can be most effectively achieved.

2. How Remaining Opportunity Is Commonly Defined

Program administrators typically define remaining opportunity using annual participation metrics derived from customer accounts. These metrics are well suited for regulatory reporting, budgeting, and year-over-year performance tracking. Evaluation frameworks that distinguish between gross and net savings and rely on administrative tracking structures reinforce this account-based orientation (NMR and Research Into Action 2012). They provide a timely snapshot of program activity and help ensure that delivery targets are being met within a given program year.

For many measures, account-level participation is a reasonable proxy for market reach. However, weatherization presents a different measurement challenge. Measures such as air-sealing and insulation are long-lived, often delivered once per home, and designed to persist for decades. Over time, customers may change account numbers, hold multiple accounts at the same address, or participate in additional weatherization measures across multiple years. In these cases, annual account-based counts can overstate how many distinct homes have been reached.

When inferred directly from annual account-level participation, remaining opportunity can appear as a shortfall rather than a strategic planning signal. This framing risks conflating sustained engagement and repeat participation with unmet penetration. A complementary definition is needed, one that reflects how weatherization unfolds at the home level over time and supports more constructive program planning conversations.

3. Data and Premise-Level Methodology

This analysis applies a premise-level framework to examine weatherization participation over time. The objective is to align program reach with the physical unit of intervention, which is the home, rather than the customer account. The approach complements existing reporting practices while providing a clearer view of cumulative penetration and remaining opportunity.

3.1 Data Sources and Scope

The study draws on administrative billing records, program participation records, and household-level segmentation attributes. Participation and billing datasets were linked using a unique premise identifier to enable consistent tracking at the home level across multiple program years.

Billing and program participation records were supplemented with demographic and housing characteristic data obtained from a third-party demographic enrichment provider. Customer records were matched using name and service address and enriched with modeled household and property attributes. Housing variables used in this analysis include year built, dwelling type, and occupancy status (owner-occupied or renter-occupied). Customer-level variables include household size and State Median Income (SMI) Index. Because these attributes are derived through a third-party matching process, some records could not be matched or lacked sufficient information for classification. As a result, certain variables, particularly income segmentation, contain an "unknown" category that is retained throughout the analysis (Experian 2026)

The analysis is restricted to single-family homes. Multifamily properties are excluded due to differences in program design, building ownership structure, and reporting conventions. Eligible homes include single-family properties constructed prior to 2000 as well as homes for which construction year information is unavailable. Properties located in Cape Cod and the Islands are excluded to reflect program delivery boundaries.

Environmental Justice Community (EJC) designation in this analysis follows the Massachusetts program definition used within the Mass Save portfolio rather than federal environmental justice classifications. Under this framework, EJCs are identified using state-designated municipalities and zip codes associated with environmental justice communities in Massachusetts. This program-based definition reflects how equity targeting is operationalized within the Massachusetts efficiency portfolio and aligns with the geographic criteria used for program planning and reporting.

Participation metrics reflect activity occurring between 2020 and mid-2025. Historical participation records predating 2020 are excluded from the analytic dataset to ensure alignment with the study window and consistency with publicly reported account-level metrics.

3.2 Participation Definition and Premise Reconciliation

Participation is defined as completion of at least one qualifying weatherization measure at a given premise during the study period. Each eligible single-family home is counted once regardless of the number of accounts associated with that address or the number of years in which participation occurred between 2020 and 2025. A participating account refers to a customer billing account associated with at least one qualifying measure during the same period.

In instances where multiple accounts or service configurations are associated with a single physical home, premise identifiers are reconciled to prevent double counting. Repeat participation at the same premise within the study window is retained as a separate analytic indicator but is not treated as additional penetration.

With these definitions and scope established, the following section presents the premise-level penetration results and contrasts them with publicly reported account-level metrics.

3.3 Defining Remaining Opportunity

Remaining opportunity is defined as the set of eligible homes built before 2000 or with unknown construction years that have not completed a qualifying weatherization measure during the study period. This definition establishes a stable denominator for interpreting cumulative market reach.

By distinguishing between administrative account activity and building-level intervention, the premise-level framework provides a clearer basis for assessing penetration and identifying where future program activity may be most effectively directed.

4. Overall Penetration and Measurement Contrast

Over the 2020 through mid-2025 study period, publicly reported account-level participation for utility customers in Massachusetts indicates that approximately 22 percent of residential accounts engaged in weatherization during this period (Mass Save 2024). Using the same time window and eligibility criteria, premise-level reconciliation produces a cumulative penetration rate of approximately 7 percent of eligible homes.

This difference reflects how participation is defined and reported rather than a discrepancy in program delivery. Account-level reporting aligns with annual savings attribution and regulatory tracking conventions (NMR and Research Into Action 2012). However, for long-lived measures such as insulation and air sealing, administrative activity does not necessarily equate to distinct home-level penetration across the housing stock.

Two distinct mechanisms contribute to the divergence between account-level and premise-level penetration. First, repeat participation at the same physical home across multiple program years increases cumulative account counts without increasing the number of distinct homes reached. Second, account churn, including changes in ownership or tenancy, customer relocation, dual-fuel configurations, and billing system updates, can generate multiple account identifiers associated with a single physical premise over time. When participation is aggregated at the account level, these dynamics inflate administrative counts relative to distinct homes served.

Under a premise-level framework, participation is consolidated to the physical unit of intervention. The resulting 7 percent penetration rate reflects the share of eligible homes that have completed a qualifying weatherization measure during the study window. Because weatherization measures are durable and typically occur once per home, remaining opportunity represents homes that have not yet entered the retrofit cycle rather than a deficit relative to annual activity metrics.

4.1 Participation by Housing Vintage

Participation patterns differ meaningfully when evaluated relative to the eligible housing stock. Among all eligible single-family homes, 36 percent were constructed prior to 1945, 42 percent

between 1946 and 1990, 9 percent between 1991 and 1999, and 12 percent lack year-built information.

To clarify cohort-level differences among homes with known construction year, Figure 1 compares the share of eligible homes and the share of participating homes across vintage cohorts, excluding the unknown category from the visual for clarity.

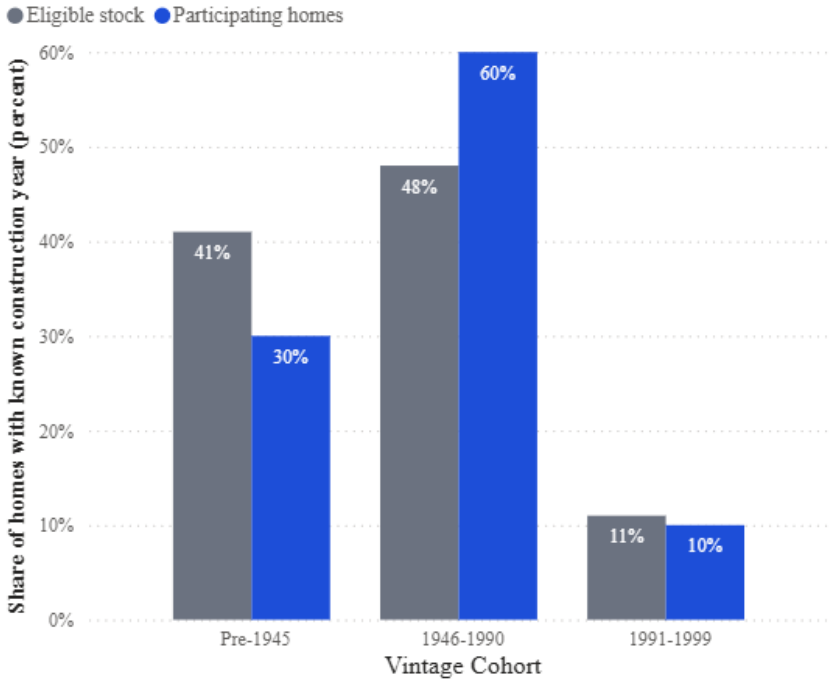

Figure 1. Eligible Share versus Participant Share by Housing Vintage (Known Year Built Only)

The mid-century cohort is visibly overrepresented among participating homes relative to its share of eligible homes with known construction year. Conversely, the oldest housing cohort is underrepresented relative to its structural presence in the denominator. The 1991–1999 cohort appears approximately proportional. Unknown year-built homes represent 12 percent of eligible homes but only 7 percent of participating homes.

Housing performance studies and baseline retrofit assessments indicate that construction era influences envelope condition, heating system configuration, and retrofit feasibility (MA22R48 2023; RES-1 2020).

These differences reflect how retrofit feasibility, building condition, and homeowner readiness interact with delivery conditions. Evaluating participation relative to baseline stock composition provides a clearer view of where uptake aligns with structural opportunity and where barriers may persist.

4.2 Participation by Income Segment

Income segmentation further differentiates participation patterns within the eligible housing stock. Among eligible single-family homes, 13 percent fall below 60 percent of state median

income, 6 percent fall between 60 and 80 percent, 42 percent exceed 80 percent, and 40 percent lack income classification.

Among participating homes, 9 percent fall below 60 percent of state median income, 5 percent fall between 60 and 80 percent, 43 percent exceed 80 percent, and 42 percent lack income classification.

These patterns indicate that lower-income households are modestly underrepresented among participants relative to their share of the eligible stock. Higher-income households appear proportionally represented, while homes without income classification constitute a substantial share of both the eligible and participating populations.

To further illustrate how income and housing vintage intersect within participating homes, Figure 2 presents the income composition of participating homes across construction year cohorts, restricted to homes with known income classification.

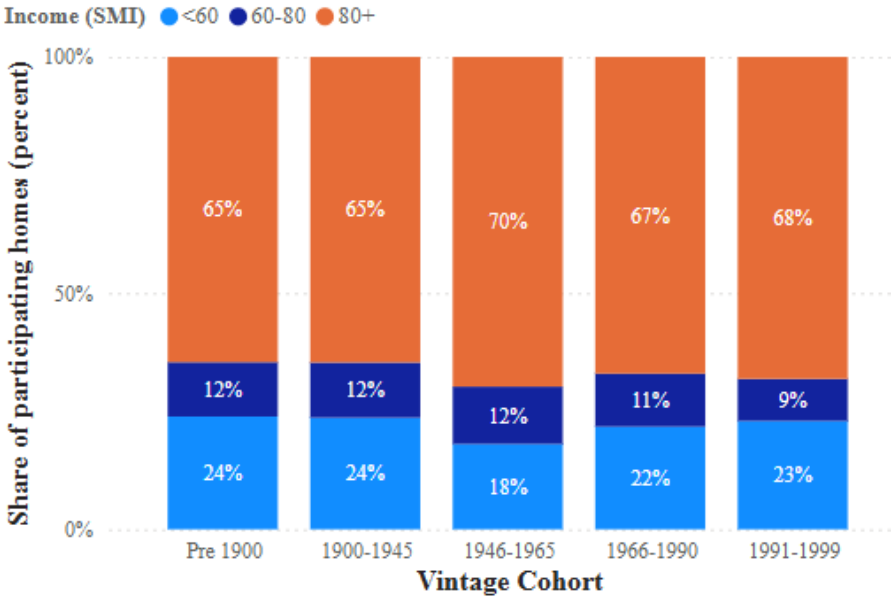

Figure 2. Income Composition of Participating Homes by Housing Vintage (Known Income Only)

Across all vintage cohorts, homes above 80 percent of state median income account for roughly two-thirds of participating homes with known income classification. Lower-income segments comprise a smaller share of participants within each cohort. While income composition varies modestly by construction year, the dominance of higher-income households among participating homes is consistent across vintage groups.

It is also important to note that a substantial portion of participating homes lack income classification in the underlying dataset. Although excluded from Figure 2 for clarity, these records remain part of the overall denominator and participation counts presented earlier.

Equity-focused program evaluations and low-income market studies have documented that financing constraints, pre-weatherization repair needs, and administrative complexity influence uptake among lower-income households (RCPS Equity Results Brief 2020; NYSERDA LMI Retrofit Evaluation 2025).

While income segmentation provides one lens through which participation can be evaluated, geographic and community characteristics offer an additional perspective on how structural conditions influence uptake.

4.3 Participation by Tenure

Participation rates differ meaningfully across tenure categories. Table 4 presents the distribution of eligible and participating homes by tenure status. Among eligible single-family homes, 65 percent are owner-occupied, 10 percent renter-occupied, and 26 percent lack reliable tenure classification.

Table 4. Participation Rate by Tenure

Tenure	Eligible Homes	Participating Homes	Participation Rate
Homeowner	640,304	42,486	7%
Renter	97,777	3,360	3%
Unknown	254,082	21,701	9%

Owner-occupied homes exhibit a 7 percent participation rate, while renter-occupied homes show approximately 3 percent participation. Homes without reliable tenure classification show a participation rate of 9 percent. This category likely reflects a mix of owner-occupied and renter-managed properties due to administrative coding limitations and therefore should be interpreted cautiously.

Tenure status in this dataset reflects the occupant classification associated with a billing account rather than the legal ownership of the property. In renter-occupied homes, weatherization decisions are often made by landlords rather than tenants. As a result, some participation in rental properties may be captured under owner classifications depending on how records are coded. Nevertheless, the lower participation rate among renter-occupied premises is consistent with documented split-incentive dynamics and coordination challenges between property owners and tenants (MA19R04 2020; ACEEE Weatherization Readiness Study 2025).

Given the substantial share of homes without tenure classification, these results should be interpreted cautiously. However, the observed disparity underscores the importance of considering tenure structure when assessing remaining opportunity and designing targeted interventions.

4.4 Participation by Community Characteristics

To examine how participation varies across large municipalities, participation rates were evaluated for cities and towns with at least 10,000 eligible single-family homes. The statewide premise-level participation rate over the study period is approximately 7 percent. This benchmark provides a reference point for interpreting municipal variation.

Table 5 presents participation rates for large municipalities, along with an indicator of whether each municipality contains EJC designated areas using the Massachusetts program definition described in Section 3.

Table 5. Participation Rates in Large Municipalities (Eligible Homes ≥ 10,000)

Municipality	Eligible Homes	Participating Homes	Participation Rate	EJC Present
Springfield	47,603	4,802	10.10%	Yes
Plymouth	20,175	1,913	9.50%	No
West Springfield	10,702	1,005	9.40%	No
Dedham	11,161	1,041	9.30%	No
Chicopee	10,240	902	8.80%	No
Natick	13,510	1,169	8.70%	No
New Bedford	32,242	2,777	8.60%	Yes
Methuen	10,030	860	8.60%	No
Brockton	16,139	1,278	7.90%	Yes
Worcester	33,123	2,591	7.80%	Yes

Among large municipalities, participation rates vary substantially across suburban and urban communities. Several large working-class cities demonstrate participation rates at or near the statewide average of 7 percent, while others fall below this benchmark. This variation suggests that participation outcomes are influenced not only by environmental justice designation but also by differences in housing stock composition, retrofit feasibility, and local program delivery conditions.

These findings indicate that community-level participation patterns are not uniform across EJCs. While some EJC municipalities exhibit lower-than-average participation rates, others demonstrate engagement levels comparable to or exceeding the statewide benchmark. This variation suggests that structural housing characteristics, program delivery design, and local implementation context influence outcomes alongside income and tenure dynamics. Massachusetts equity and impact evaluations have similarly documented heterogeneity in participation outcomes across communities, reflecting differences in housing stock composition, contractor availability, and outreach effectiveness rather than demographic designation alone (RCPS Equity Results Brief 2020; MA23R58 2024).

Evaluating participation within large municipalities provides additional context for interpreting remaining opportunity. It highlights that engagement in working-class communities is not

universally constrained and that program performance should be assessed relative to both structural conditions and statewide benchmarks.

5. Eligible Housing Stock in Massachusetts

To contextualize the premise-level penetration rate, it is necessary to examine the structural composition of the eligible single-family housing stock. The premise-level framework defines eligibility as single-family homes constructed prior to 2000, as well as homes for which construction year information is unavailable. Multifamily properties are excluded to maintain consistency with the study scope described in Section 3. Properties located in Cape Cod and the Islands are excluded to reflect program delivery boundaries.

Across the study territory, the total number of eligible single-family homes is 989,070. These homes form the denominator against which cumulative premise-level penetration is measured. Their distribution across construction year, income segmentation, and tenure provides structural context for interpreting participation patterns.

5.1 Housing Vintage Distribution

Housing vintage is one of the most important structural characteristics of the eligible stock. Construction year influences insulation levels, envelope condition, heating system type, and the presence of retrofit barriers. Table 1 presents the distribution of eligible single-family homes by construction year cohort.

Table 1. Eligible Single-Family Housing Stock by Construction Year Cohort

Construction year cohort	Homes	Share of eligible stock
Pre-1945	361,726	36%
1946–1990	419,215	42%
1991–1999	93,122	9%
Unknown year built	117,373	12%
Total	**989,070**	**100%**

Mid-century homes constructed between 1946 and 1990 represent the largest segment of the eligible single-family stock at 42 percent. Homes built prior to 1945 account for 36 percent, while more recent pre-2000 homes represent 9 percent. Only 12 percent of eligible homes lack construction year information, strengthening the reliability of vintage-based segmentation.

Market characterization studies and statewide baseline assessments demonstrate that housing vintage is associated with envelope condition, insulation levels, heating system type, and retrofit feasibility (MA EEAC 2023b; MA23R60 2024). Mid-century homes often combine older building standards with fewer structural constraints than pre-war housing stock.

If mid-century homes comprise a large share of the eligible stock, higher participation counts within that cohort may reflect proportional representation rather than program concentration.

Conversely, lower participation among older cohorts may signal structural barriers rather than outreach deficiencies.

5.2 Income Segmentation of Eligible Homes

Income composition provides another critical baseline for interpreting participation patterns. Using the state income index proxy, Table 2 shows the distribution of eligible homes by income category.

Table 2. Eligible Housing Stock by SMI Category

Income category (SMI)	Homes	Share of eligible stock
0–60% SMI	125,522	13%
60–80% SMI	59,885	6%
80+% SMI	414,632	42%
No income information available	392,373	40%
Total	**989,070**	**100%**

Higher-income households represent 42 percent of the eligible single-family stock, while 13 percent fall below 60 percent of state median income. Approximately 40 percent of eligible homes lack income classification within the dataset. This distribution underscores the importance of interpreting income-based participation patterns relative to both the known income segments and the substantial portion of homes without income classification.

These baseline proportions provide a reference point for evaluating participation equity. Nonparticipant research and barrier studies have documented that income constraints, financing limitations, and pre-weatherization repair needs influence uptake among lower-income households (MA19R04 2020; MA24X24 2025). Establishing the income composition of the eligible stock allows participation outcomes to be assessed relative to structural opportunity rather than isolated participation counts.

5.3 Heating Fuel and Tenure Characteristics

Tenure status shapes retrofit decision-making authority and potential split incentive challenges. Table 3 presents the tenure distribution of eligible single-family homes.

Table 3. Eligible Housing Stock by Tenure Status

Tenure status	Homes	Share of eligible stock
Homeowner	640,304	65%
Renter	97,777	10%
Unknown	254,082	26%
Total	**989,070**	**100%**

Approximately 65 percent of the eligible single-family homes are owner-occupied, while 10 percent are renter-occupied. A significant share of records lacks reliable tenure classification. This baseline tenure composition will inform interpretation of renter versus homeowner participation patterns in subsequent sections.

Heating fuel type influences both savings potential and retrofit sequencing. While fuel distribution is not presented as a baseline table in this section, it remains an important structural characteristic that will be considered in subsequent participation analysis.

By establishing the composition of the eligible housing stock before examining participation, the analysis avoids conflating program uptake patterns with underlying market structure. The next section evaluates participation relative to this baseline distribution.

6. Reframing Remaining Opportunity for Program Strategy

The premise-level analysis does more than adjust a penetration metric; it clarifies where untreated homes are concentrated and how opportunity segments differ structurally across the eligible stock.

At a statewide level, weatherization activity has reached a portion of the eligible single-family housing stock, while a substantial remainder represents future retrofit opportunity. That remaining opportunity is shaped by construction era, tenure status, income segmentation, and municipal context. Understanding where that opportunity is concentrated provides a clearer strategic roadmap than penetration metrics alone.

Figure 3 illustrates selected concentrations of untreated homes within the eligible single-family housing stock. Because these segments are not mutually exclusive, the figure is intended to highlight where large volumes of untreated homes remain rather than compare participation performance across groups.

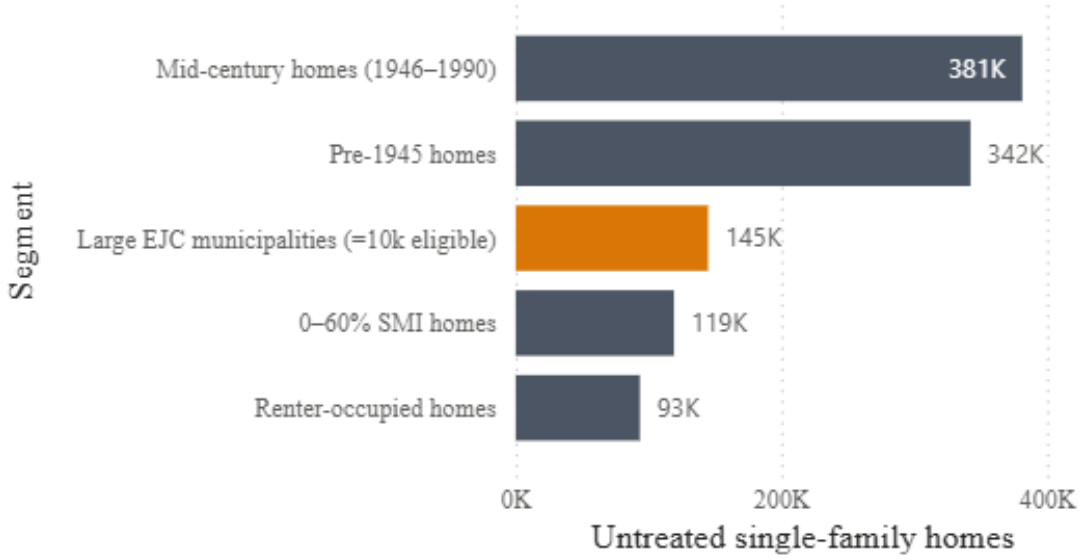

Figure 3. Largest Concentration of Untreated Homes Across Selected Structural and Community Segments (Single-Family, 2020–2025)

Several structural patterns emerge. Mid-century homes represent the largest absolute volume of untreated properties, reflecting their dominance within the eligible housing stock. Pre-1945 homes also comprise a substantial share of remaining opportunity, particularly given their envelope characteristics and retrofit complexity.

Community and equity-focused segments also represent meaningful concentrations of untreated homes. Large EJC municipalities collectively contain nearly 145,000 untreated single-family homes. While participation rates vary across these communities, their aggregate volume highlights the importance of sustained municipal engagement strategies.

Income and tenure segments reveal additional structural patterns. Approximately 119,000 untreated homes fall below 60 percent of state median income, and nearly 94,000 untreated homes are renter-occupied. Although these segments represent smaller absolute volumes than vintage cohorts, their lower participation rates signal implementation barriers that warrant targeted intervention.

Taken together, these findings suggest that remaining opportunity is unevenly concentrated across building cohorts, tenure structures, and community contexts that present distinct implementation dynamics. This framing shifts the central question from “How many accounts have participated?” to “Which homes remain untreated, and what structural conditions shape their likelihood of participation?”

For utility energy efficiency program administrators, this segmentation supports differentiated strategies:

- Sustain momentum within mid-century cohorts where retrofit feasibility is high.
- Develop targeted pathways for renter-occupied properties that address decision-making and coordination constraints.
- Prioritize structurally complex pre-1945 homes for integrated barrier mitigation and envelope-electrification sequencing.
- Tailor municipal engagement strategies based on local housing composition and delivery infrastructure.

By grounding participation in the physical unit of intervention, the premise-level framework presented here enables program administrators to interpret remaining opportunity not as a simple participation gap, but as a structured roadmap for advancing weatherization, equity, and decarbonization goals.

7. Conclusion

Redefining participation at the premise level changes how remaining opportunity is understood within residential weatherization portfolios. Account-based reporting captures administrative activity and annual engagement. Premise-level tracking captures cumulative home-level

penetration. This distinction is not merely technical; it reshapes how program progress, equity outcomes, and decarbonization potential are interpreted.

Within the eligible single-family housing stock, participation represents a portion of the market rather than its saturation. The analysis indicates that remaining opportunity is clustered within specific building cohorts, tenure structures, and community contexts. Mid-century and pre-1945 homes account for the largest absolute volumes of untreated properties. Renter-occupied homes and lower-income households exhibit lower participation rates relative to their structural presence in the denominator. Large EJC municipalities collectively contain substantial remaining opportunity, though outcomes vary across communities.

This structured perspective reframes the central question. Instead of asking how many accounts have participated, administrators can ask which homes remain untreated and what structural conditions shape their likelihood of participation. Such clarity supports differentiated strategies that align retrofit feasibility, equity considerations, and municipal context with program delivery. As climate goals intensify and building decarbonization accelerates, measurement precision becomes increasingly consequential. A premise-level approach does not replace existing reporting frameworks - it complements them. By grounding participation in the physical unit of intervention, this framework enables more strategic deployment of resources, more accurate assessment of equity outcomes, and clearer identification of the homes that remain at the center of the clean energy transition.

Future research will build on this premise-level framework by examining how housing vintage, income, tenure, and community characteristics intersect within the remaining opportunity population. While the present study evaluates these dimensions independently to establish a clear measure of cumulative home-level penetration, understanding their overlap may provide additional insight into where untreated homes are concentrated and how participation barriers vary across segments. Such analyses can help translate premise-level measurements into more targeted program design and delivery strategies while preserving the home-level perspective introduced here. This framework is further extended by linking premise-level participation with energy consumption data to evaluate savings potential across structural segments. Assessing not only how many homes remain untreated, but also where the greatest emissions reductions and bill savings are achievable, will further strengthen strategic program design and resource allocation.

References

American Council for an Energy-Efficient Economy (ACEEE). 2025. *Weatherization Readiness Study*. Washington, DC: ACEEE.

Efficiency Maine Trust. 2023. *Home Energy Savings Program Impact Evaluation*. Augusta, ME: Efficiency Maine Trust.

MA EEAC (Massachusetts Energy Efficiency Advisory Council). 2020a. *Residential Baseline Study Phase 4 Comprehensive Report (RES-1)*. Boston, MA: MA EEAC.

———. 2020b. *Residential Nonparticipant Market Barriers Study* (MA19R04). Boston, MA: MA EEAC.

———. 2023a. *HERS Scores and Savings Comparison Memo* (MA22R48). Boston, MA: MA EEAC.

———. 2023b. *Residential Building Use and Equipment Characterization Study Comprehensive Report*. Boston, MA: MA EEAC.

———. 2024a. *Residential Community Delivery Impact Report* (MA23R58). Boston, MA: MA EEAC.

———. 2024b. *Residential New Construction Baseline Report* (MA23R60). Boston, MA: MA EEAC.

———. 2025. *Residential Nonparticipant Study* (MA24X24). Boston, MA: MA EEAC.

Mass Save. 2024. Assessments and Weatherization Dashboard. masssavedata.com/assessments-weatherization.

NMR and Research Into Action. 2012. *Regional Net Savings Research, Phase 2: Definitions and Treatment of Net and Gross Savings in Energy and Environmental Policy*. Lexington, MA: Northeast Energy Efficiency Partnerships.

NYSERDA (New York State Energy Research and Development Authority). 2025. *Single-Family Low- and Moderate-Income Retrofit Programs Evaluation Repor*t. Albany, NY: NYSERDA.

RCPS (Residential Customer Profile Study). 2020. *Equity Results Brief*. Boston, MA: MA EEAC.

York, D., M. Kushler, S. Nowak, and S. Vaidyanathan. 2012. *Scaling Up: Building on the Success of Energy Efficiency Programs*. Washington, DC: ACEEE.

Experian Marketing Services. 2026. *ConsumerView and Demographic Data Solutions*. Costa Mesa, CA: Experian Marketing Services. https://www.experian.com/business/solutions/data-solutions

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