

Decarbonizing Manufactured Housing: Lessons from Equity-Focused Projects Navigating Technical and Systemic Barriers

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ABSTRACT

This paper highlights key findings from a series of equity focused decarbonization projects and programs in Mobile and Manufactured Housing (M&MH) stock, with the goal of improving affordability and resilience. M&MH residents represent a disproportionately low-income and energy-burdened population, requiring tailored approaches to ensure inclusive access to decarbonization programs and measurable impact. Drawing on VEIC's experience in California and our national portfolio, the session shares lessons from market characterization and implementation efforts across the M&MH initiatives described.

Technical barriers, such as limited electrical capacity, home remediation needs, physical space constraints, and complicated utility metering configurations, pose significant challenges for electrifying and retrofitting M&MH. These limitations often make standard energy efficiency upgrades infeasible without substantial building modifications. Equally impactful are systemic barriers stemming from policy, regulatory, program, and market systems. Inconsistent permitting processes, restrictive regulations, limited contractor expertise, and insufficient program capacity all contribute to delays and missed opportunities. Even where state legislation supports decarbonization goals, these systemic issues, combined with a lack of community buy-in, can prevent services from effectively reaching M&MH residents.

Together, these technical and systemic barriers underscore the need for tailored, flexible approaches that address both the physical realities of M&MH and the institutional challenges that shape access to energy-efficient solutions. Through this series of projects, VEIC has developed an approach to holistic, resident-centered program design and implementation that addresses both technical and systemic challenges. This session demonstrates how inclusive and adaptive approaches can unlock energy savings and emissions reductions for a historically underserved housing stock.

Introduction: Mobile and Manufactured Housing

Serving a Market in Need

As many states face combined housing and energy affordability crises, it is increasingly important that energy and housing programs collaborate and find solutions to serve their most vulnerable communities and residents. One of these sectors is residents of mobile and manufactured housing (M&MH), a sector that faces disproportionately high rates of energy insecurity, energy burden (per square foot), and housing cost burdens. Nationally, M&MH made up only five percent of all occupied housing in 2021 but nine percent of households with annual incomes below \$35,000. M&MH residents often face additional compounding vulnerabilities as well. There are more Hispanic and Latino residents in M&MH (16 percent) than in single-family homes (12 percent) nationwide, and many residents aged 60 and over in M&MH report higher rates of housing insecurity (Ball-Pasht 2023). In California, M&MH units represent only three percent of the total building stock, but their energy burden is extreme at an estimated 40 percent higher than that of single-family detached homes.

While M&MH residents stand to benefit significantly from energy upgrades, including electrification, it can be a challenging building stock to serve. Looking at technical barriers, M&MH units tend to be old and outdated, requiring major repair or remediation investments to accommodate the types of retrofits that would achieve the most energy savings or decarbonization benefits, such as comprehensive weatherization or electrification. M&MH units often have limited existing electrical capacity or face significant space constraints for accommodating new electric appliances. From a systemic perspective, residents of mobile home parks face unique and challenging dynamics with park owners, many contractors are unfamiliar with the federal HUD Code, and more. As a result of these factors, M&MH residents are often deferred from or unable to participate in energy programs.

Designing Equitable Decarbonization Programs

Serving M&MH residents is possible and crucial for achieving equitable decarbonization and advancing clean energy and affordability goals. For policymakers, program administrators, and communities who want to serve M&MH residents in earnest, we need to apply the principles of Universal Design (Sheridan 2021). This means explicitly designing for those with the greatest barriers. A fortunate outcome of Universal Design is that we oftentimes see a “curb-cut effect”, whereby everyone benefits from those investments (Sheridan 2021). In clean energy programs, this means we can create programs and approaches that might support other objectives simultaneously- such as an income-qualified energy efficiency program that helps mitigate outages for medically vulnerable households or streamlined permitting processes that support all busy working families.

This paper highlights ten key buckets of technical and systemic challenges and opportunities for serving M&MH within decarbonization programs, including recommendations for designing programs to serve M&MH with a focus on decarbonization and electrification. This report is informed by the authors’ work serving M&MH nationally across several pilots and programs, including specifically the newly launched California Energy Commission (CEC) Equitable Building Decarbonization Program. We will start by covering key takeaways from recent market studies on M&MH that provide insight into building and energy characteristics.

Background: Energy and Building Characteristics of the Mobile and Manufactured Housing Market

Nationally, M&MH is an important piece of low- and moderate-income housing stock. Texas, Florida, California, North Carolina and Georgia lead the country in number of units while Mississippi, South Carolina, New Mexico, West Virginia, and Louisiana have the highest concentrations of M&MH, with 12-14% of all homes in these states falling into this category. The snapshot below shows key characteristics of M&MH nationwide (2022 U.S. Census Bureau American Community Survey (ACS)).

Table 1: National Manufactured Housing Building Stock.

National Building Stock	
Snapshot	6.6 million households live in M&MH, about five percent of all U.S. households.

Income	20 percent of M&MH residents have incomes below 100 percent of the federal poverty guideline. 48 percent have incomes below 60 percent of the state median income.
Homeownership	73 percent of M&MH residents own their homes (though many do not own the underlying land).
Vintage	24 percent of currently occupied units were built 1979 or earlier (pre-HUD Code). This period represents the time before federal codes were implemented to regulate the construction standards of manufactured housing, including efficiency standards. 46 percent were built 1980–1999 (roughly the 1976 HUD Code era).
Energy Use	Units built before 1979 use ~14 percent more energy than newer homes. When accounting for home size, older units can use up to 59 percent more energy. This varies significantly by region.
Primary Heating Fuel	63 percent use electric main heat, 19 percent use utility gas, 18 percent use other fuels (primarily propane or fuel oil, with some wood).

Data Sources: 2022 ACS (Census), 2020 RECS (EIA), DOE LEAD Tool

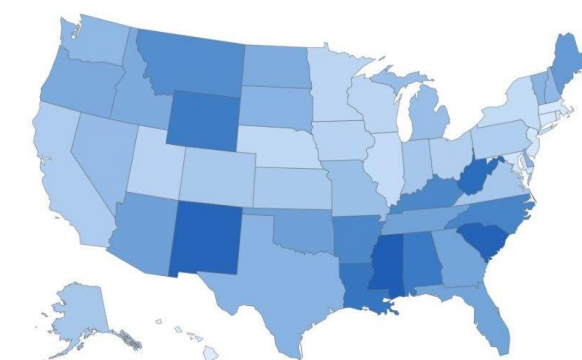


Figure 1. M&MH as a Share of Total Homes (darker shading = M&MH greater share). *Source:* U.S. Census Bureau 2022 ACS

Snapshot of the California Market

The snapshot below shows key characteristics of the market in California, the state with the third largest number of M&MH units.

Table 2: California Manufactured Housing Building Stock

California Building Stock	
Snapshot	500,000 units (approximately 440,000 occupied as primary residences) spread across over 4,200 parks.
Income	16 percent of California M&MH households have income at or below the Federal Health and Human Services Poverty Guidelines (HHSPG) level compared to seven percent of California single-family residences and 11 percent of all California households. M&MH households in California face energy costs roughly 39 percent higher than those of other housing types.

Homeownership	About 75 percent of M&MH residents own their home. In California resident-owned cooperatives are rare, so most lots are not owned by residents.
Vintage	Over 50 percent of units were built 1979 or earlier (pre-HUD Code).
Energy Use	Depending on the utility service territory, roughly half to more than 85 percent of parks are master-metered. 58 percent of lots report service of less than 100 amps, and another 30 percent have only 100-amp service.
Primary Heating Fuel	57 percent of M&MH units rely on natural gas as their primary heating fuel—lower than the 70 percent share among single-family homes—but a higher proportion (around 13 percent) depends on propane or wood.

Data Sources: 2022 ACS (Census), 2020 RECS (EIA), DOE LEAD Tool

Program Landscape

Most programs serving M&MH to date have focused on new construction, supporting new highly efficient manufactured and modular housing as an affordable housing solution. Programs providing retrofit or replacement support for existing M&MH have been limited, given many of the challenges that this paper outlines. The following sections capture a snapshot of the types of programs that do or have existed specifically to serve existing M&MH residences. This list is not fully comprehensive – and does not include state energy efficiency programs, many of which might serve some M&MH through single-family designations (though income-qualified M&MH are often underserved given high costs). It also does not include utility bill discount or rental assistance programs such as CARE, FERA, and LIHEAP, or other local home and rental assistance programs, though these are crucial for supporting all high energy and housing burdened households. It intends to capture potential case studies of programs that can be referenced for M&MH specific strategies and experience.

Table 3. Example Programs Serving Existing Mobile and Manufactured Housing

Manufactured Housing Replacement Programs	
California Wildfire and Natural Disaster Resiliency Rebuild	Provides incentives for customers who lose their homes to natural disasters to rebuild all-electric. Has served many predominantly M&MH communities.
Oregon Manufactured Home Replacement Program	Provides 0 percent interest loans to purchase replacements for older M&MH, alongside grants to cover cost of decommissioning the old home.
Energy Trust of Oregon Replacement Grant Program	Provides up to \$16,000 grants for replacement of pre-1994 HUD Code homes.
Repair and Rehabilitation Programs	
Pennsylvania Whole-Home Repairs Fund	Provides up to \$50,000 per owner-occupied unit for repairs to address habitability and safety concerns.
California HCD Manufactured Housing Opportunity and Revitalization Program	Local grant funding to support the conversion to resident ownership, rehabilitation, as well as remediation of health and safety items of both parks and individual M&MH.

CPUC Utility Conversion Program	Replaces aging utility systems in master-metered mobile home parks with direct public utility gas and electric service.
Minnesota Rehabilitation Loan Program	Provides low-cost, forgivable loans for both retrofits and replacements of M&MH.
Energy Efficiency and Decarbonization Programs	
Weatherization Assistance Program and California Low Income Weatherization Program	WAP is the primary federal low-income energy efficiency and weatherization program. California's LIWP program complements WAP and includes a set-aside for farmworker housing that often serves M&MH.
Entergy Manufactured Housing Retrofit Program	A set-aside for no-cost energy efficiency direct install measures for M&MH.
South Carolina Help My House On-Bill Financing	An accessible on-bill financing program to support customers with energy and bill saving weatherization and high-efficiency equipment.
California San Joaquin Valley DAC Pilot	Supported the transition of oil and propane dependent households, including many M&MH, to electric and gas service, combined with efficiency and electrification retrofits.
Energy Outreach Colorado Leadville Mobile Home Park Pilot	A community-driven and park-wide energy efficiency and weatherization direct install pilot program.
Efficiency Maine Hybrid Heating Electrification Pilot	A pilot program that supports efficient hybrid whole-home heat pump deployment in mobile homes.
California Equitable Building Decarbonization Direct Install Program	A low-income direct install efficiency and electrification program with a set-aside for M&MH.

Innovative Program Design: California Equitable Building Decarbonization Program

Legislatively mandated in 2022 and kicked off in 2025, California established the Equitable Building Decarbonization (EBD) Direct Install Program to reduce greenhouse gas emissions and advance energy equity in priority communities statewide. In the Program Guidelines, the CEC acknowledged that existing M&MH faces unique challenges to decarbonization, and required that all three regional administrators propose “an intentional approach to serve manufactured homes and mobile homes,” setting aside at least five percent of their budgets to serve this building stock and housing typology. Program guidelines cited factors such as low electrical capacity, limited space availability for decarbonization measures, higher remediation needs, and alignment with unique code requirements. In addition to requiring a five percent set-aside to serve M&MH, the program is also required to offer a higher Maximum Average Cost for Electrical and Remediation Measures of \$7,200, compared to \$6,000 per household or unit for Single Family or Multifamily (CEC 2023).

VEIC leads program design efforts for M&MH participants as part of the EBD Northern Region program administration team, alongside partners including Association for Energy Affordability and The Ortiz Group. This includes informing the strategy for serving individual M&MH residents through the programs' five percent set-aside, as well as a park-wide electrification and metering conversion pilot proposed by the California Public Utilities

Commission (CPUC), called the Electrification Pilot Initiative for Mobile Home Parks (CPUC 2025).

While the authors discuss VEIC's learnings from California's EBD program design and launch efforts in this report, our comments do not represent the California Energy Commission or the EBD program as a whole.

Challenges and Opportunities for Serving Mobile and Manufactured Housing

The following section captures 10 core challenges and solutions for serving M&MH that we have experienced firsthand through programs and drawn from national best practices. These cover both technical and systemic barriers and opportunities.

1. Extensive Home Remediation and Repair Needs

Challenges:

M&MH depreciates rapidly, and homes older than 30 years (the typical useful life of a mobile or manufactured home) are likely to need substantial repairs (Mobile Home Friend, 2026). Systems under the house (such as plumbing, electrical, and ductwork) are particularly vulnerable to damage and decay, and roofing, wall framing, and floors are also commonly damaged by water exposure. Other challenges can include an unstable foundation or chassis, which can cause a home to be out of level. To support electrification of M&MH, remediation and repair scopes might be extensive, including cladding replacement, structural repairs, plumbing or electrical repairs, duct replacement, and more.

In the CPUC San Joaquin Valley DAC Pilot, excessive remediation in mobile homes was often caused by the condition of the mobile home, moving the water heater to the exterior of the home, and/or trenching and running new electrical conduit/lines hundreds of feet to the nearest utility pole (Evergreen Economics, 2024). Expanding on the San Joaquin Valley DAC Pilot, the TECH Clean California Low Income Leveraging Pilot provided supplemental remediation and repair funding to households that were deferred. In that Pilot, the average supplemental remediation contribution for single-family homes was \$5,197 (median of \$4,071), compared with \$11,203 (median of \$9,074) for mobile homes (Etherington et al. 2025).

As examples of scopes supported by the TECH Low Income Leveraging Pilot, the project team found that some mobile homes or manufactured housing lacked the structural strength to support a Heat Pump Water Heater (HPWH), prompting relocation to reinforced areas. In one mobile home project, the pilot team encountered significant cost increases due to accessibility limitations: three- to five-foot setbacks between eight adjacent homes made it impossible to use trenching machinery to support panel replacements and rewiring. As a result, all trenching had to be performed manually, dramatically increasing labor costs. Finally, extensive duct sealing or replacement was a driver of high upfront costs where ducts were undersized, leaked, or inaccessible (e.g., in attics or under mobile homes).

Solutions:

A key strategy for creating flexibility to support high-cost projects while containing overall costs is to manage toward a program-wide average rather than a per-home cap, such as a per-household remediation and repair target. This is the approach that the California EBD program is taking, with a Maximum Average Cost for Electrical and Remediation Measures of \$7,200 per household. The TECH Low Income Leveraging Pilot also took this approach, aiming for an average of \$5,000 per home in supplemental remediation work, on top of the funding from the programs offered (\$5,000 per home provided by the San Joaquin Valley DAC Pilot, and

\$3,000 per home provided by the Energy Savings Assistance program). Because the TECH initiative was a Pilot, there was some added flexibility, though the team was able to get very close with an average of \$5,893 in supplemental funding across 520 single-family and manufactured households served (Etherington et al. 2025).

Another approach might be to phase program outreach based on potential drivers of high remediation needs. This could take the form of launching a program with fewer constraints, with the opportunity to pivot partway through to serving known lower-cost projects if the average remediation spend is running high, or a program could start with lower-cost projects and fold in high-cost ones as they go. An example of prioritizing lower remediation cost projects might involve outreach to mobile home parks based on their existing metering configurations. In many cases, mobile home parks that are already individually metered for both gas and electric might have more up to date electrical infrastructure, reducing some of the pressure for high-cost electric main panel upgrades. A program might also prioritize serving newer parks overall to help contain costs. One way to inform this type of prioritized outreach is to provide outreach leads with training on identifying these drivers, or to use utility data to inform target parks.

Overall, it is important to recognize that these variables are imperfect determinants of household condition and using them to de-prioritize certain communities will mean continuing to defer households that have been historically underserved. Where possible, programs should strive to be flexible in how they serve high-cost households, even when program budgets are tight. More on this topic is discussed in the following section, “ Insufficient Program Capacity”.

2. Insufficient Program Capacity

Challenge:

While M&MH is often technically eligible for programs that serve single-family households, most programs do not see significant (or any) participation from M&MH, given the challenges and high costs of serving and retrofitting the M&MH building stock. This historic underinvestment is part of the justification for several programs, such as the California EBD program, to have a carve-out specifically for this building stock. Similarly, in other income-qualified programs, excluding a carve-out and targeted investment likely results in they continued deferral of the “harder-to-reach” households.

Solution:

The best way to ensure that programs have the dedicated capacity to serve M&MH is to have a set-aside, whether within single-family programs, income-qualified programs, or both. The California EBD program, for example, has a five percent set-aside for M&MH that meets the program’s existing income and equity community qualifications. This includes identifying and dedicating contractor capacity to serve the program. Other energy retrofit programs with M&MH targeted funding have included Entergy’s Manufactured Home Retrofit Program in Louisiana, Efficiency Vermont’s Manufactured Home Improvement and Repair Program, and California Housing and Community Development’s (HCD) Manufactured Housing Opportunity & Revitalization Program (MORE) program.

Inter-program coordination, funding, and financing layering are also crucial for supporting higher-cost projects. This can include partnerships between programs constrained by cost-effectiveness (such as utility energy efficiency programs or the WAP) with those that are not (such as Direct Install programs) to set-aside layered funding and collaborate through a cross-referral process to maximize households served. Forming partnerships with housing programs can also provide support for home repairs, rehabilitation, and other high-cost needs.

Models such as the Clean Energy Initiative in New York, a multifamily affordable housing focused partnership between NYESRDA and Homes and Community Renewal (HCR), can provide a singular funding source for major upgrades and fill gaps within energy programs.

Where households continue to get deferred or exceed program budgets, programs and policymakers can get creative and tailored in providing interim relief or support. One solution might be to serve those households with interim solutions, even if they are small relative to a program's scope, such as electric cooking solutions (whether a cookstove or hot plate), an updated venting configuration for a current gas appliance, or new carbon monoxide or smoke detectors. Program staff can also ensure they refer households to other adjacent and complementary programs such as bill discount programs, utility bill assistance programs, and more, even when they cannot co-fund measures. This referral work has typically been the purview of CBOs and local community action agencies, but outreach staff can be educated in the basics of the additional resources available to residents to maximize benefits and build trust.

Finally, given the nature of mobile home parks and neighborhoods, there are unique opportunities to drive cost and outreach efficiencies through bundling of projects. Where possible, programs can aim to maximize participation within individual parks or neighborhoods. This creates opportunities to drive down costs and extend budgets through bulk purchases, bundling project scopes for contractors, coordinating audits and home assessments, and spreading any park infrastructure upgrade costs across multiple projects. Park-wide approaches offer several technical and cost benefits, including avoiding cost-shifting from participating to non-participating residents in a master-metered park. This is only avoided if the entire park participates, though, such that a dwindling number of non-participants aren't straddled with the fixed cost of gas service. A park-wide solution can also create opportunities to eliminate investment in gas infrastructure, thereby avoiding additional ratepayer investment into future stranded assets.

Finally, where possible, programs and policymakers should advocate for the creation of replacement programs that can source and fund a full home replacement when repair and remediation costs, or the cost to bring a home up to code, are simply too high. One threshold a program could use is a percentage of the cost of a new all-electric NEEM-certified or ZERH M&MH unit, estimated to be somewhere in the \$130,000 to \$200,000 range based on a general market scan. Keeping this number in mind can inform the appropriate level of investment for existing home retrofits. For example, individual counties implementing the HCD MORE program have suggested thresholds for transitioning from retrofits to replacement of between \$58,000 and \$75,000 (Nevada County 2025).

3. Limited Electrical Capacity

Challenges:

As highlighted in the market characterization section, it is common for mobile home park lots to have 100A electrical service or less serving each individual unit. Adding to the complications of upgrading electrical capacity is that, within a Mobile Home Park, it is common to have a main electrical panel mounted on a service pedestal, with feeder cables or conductors connecting the main panel to sub-panels inside individual homes.

Upgrades to electrical infrastructure, both the main electrical panel or a sub-panel, are expensive. For example, a smart panel pilot that VEIC is overseeing through the CalNEXT program in M&MH is seeing quotes for panel installation (labor-only) ranging from \$2,300 to \$6,000. The TECH Clean California Low Income Pilot, which supported high-cost M&MH households deferred from the CPUC San Joaquin Valley DAC Pilot, supported electrical

upgrades that ranged in cost from around \$4,000 to over \$16,000 (non-panel costs alone). Those costs covered vegetation management for panel access, trenching to run new electrical circuits from the pedestal to the home, upgrading electrical conduit, and more (Etherington et al., 2025).

Solutions:

While electrical infrastructure upgrades (main panel upgrades, sub-panel upgrades, or otherwise) will be needed in many instances, load management and low-power equipment (such as 120V solutions) should be the first-in-line solutions considered. This type of power-efficient design can reduce the need for a high-cost service upgrade, such as a smart panel or whole-park capacity increase. Where panel upgrades are required, enabling intelligent power management technologies such as smart panels and outlet splitters can prioritize electrical loads automatically based on homeowner settings, preventing concurrent use that could exceed amperage capacity and minimizing upgrade needs.

Additionally, whole-home weatherization and duct sealing (when ducts are retained) can eliminate the need for supplemental electric resistance heat and the electrical demand associated with electric space heat. Whole-home weatherization and duct sealing offer additional benefits, including reduced heating and cooling costs, improved comfort, and enhanced air quality.

4. Physical Space Constraints

Challenge:

M&MH units often face space constraints, which can be particularly challenging for retrofitting domestic hot water. Existing utility closets are often very small and cannot accommodate HPWH storage tanks, and most standard HPWHs will not fit without alteration (or by being placed in an alternative location). For heating and cooling, there is often minimal space to add ventilation. For the San Joaquin Valley DAC Pilot, common remediation needs for water heaters included relocating the existing water heater from inside the home (conditioned space) to outside the home into a new enclosure because they did not fit in existing water heater closets (Etherington et al. 2025).

Solution:

Programs should maintain flexibility to adapt to space constraints and to accommodate measures that might be the best fit for M&MH. This might include, for example, plug-in appliances, ductless solutions, non-induction electric cooking options, and more. Where possible, programs should also consider cataloging and exploring newer solutions, such as slim profile HPWHs entering the market. Programs will also need to work with HUD or the local HUD code lead enforcement agency to confirm eligibility and the permitting processes and flexibility between unitary systems, split systems, and plug-in solutions. That includes outdoor enclosures for HPWHs, HP HVAC systems, and split HPWHs, as well as 120V appliances.

Challenges with HCD coordination were highlighted in a TECH Clean California Quick Start Grant, where HCD (the California enforcement agency for HUD code) rejected applications for exterior heat pump water heater installations in conditioned outdoor enclosures (Valmiki et al. 2025). This topic was revisited in a recent HCD rulemaking, whereby the agency clarified that moving forward, it will accept both split systems for both HPWH and HP HVAC and will allow other water heating equipment (i.e., unitary HPWHs in an outdoor enclosure), as long as installations follow manufacturer guidelines (California Department of Housing and Community Development, 2026). However, program administrators working in California continue to cite challenges and inconsistent application or interpretation of code as barriers to projects. This is discussed further under “6. Inconsistent and Restrictive Regulations”.

5. Utility Metering Configurations

Challenge:

Anticipating the fuel switching cost (and bill) impacts on participating households is complex in mobile and manufactured housing parks. While utilities may be individually metered to each home at times, they are often master-metered for both electric and gas service at the park-wide level. Sometimes it is a mix (e.g., individually metered electricity and master-metered gas, or vice versa). Converting master-metered mobile home parks to individual metering to support energy savings goals is the explicit goal of the CPUC's Utility Conversion Program (UCP).

The metering configuration of a park directly affects energy upgrade utility bill impacts for both participants and non-participants. For example, we know that if all residents in a park are individually metered, we can treat a bill impact analysis the same as for another single-family home, comparing the reduction in gas usage with an increase in electric usage. We also know that when a handful of residents electrify in a fully master-metered park, the impacts on both electric and gas usage are spread across all residents in some manner, whether they participate or not. The additional challenge in mobile home parks is that, in any scenario where utilities are master-metered, there is no uniformity in how the park owner bills their residents. Some parks may include master-metered utilities in a lump sum per-lot rent. This is the least transparent arrangement, where residents who fully electrify, for example, might still be paying for gas delivery on behalf of others. Other parks may have a universal, fixed monthly bill line item for combined master-metered utilities, which is only marginally more transparent.

Unfortunately, this variation among master-metered parks creates significant uncertainty and risk for residents participating in programs who are unable to estimate how their monthly bills might be impacted. Additionally, in fully or partially master-metered parks, stakeholders have highlighted that bill discounts (such as CARE/FERA in California) are unlikely to be passed through to qualified residents, as discounting certain residents' bills would shift that cost to other residents or the park owner. These dynamics impact the economics and potential bill impacts of electrification work for residents.

Solution:

With the California UCP program as an example, utilities and regulators can invest in metering upgrade programs. Metering investments are valuable to utilities and regulators because they reduce the risk associated with aging infrastructure, enable utilities to better reach and serve customers (as households become their direct customers), and support stronger consumer protections through transparency in utility billing. Utilities and regulators can also work together to identify opportunities to and mechanisms for reinvesting the avoided costs of no longer maintaining gas infrastructure into energy efficiency and decarbonization upgrades (CPUC 2025).

To address concerns around billing transparency and bill impact estimates, programs might focus on already individually metered parks where participants realize the full benefits of energy efficiency investments in their homes and avoid cost-shifting higher electric loads to non-participants. Where a program is serving parks that might still be master-metered, it could work with utilities to target parks that might be due for upgrades and use that as an opportunity to partner on a comprehensive park-wide upgrade that includes converting to individual metering. If possible, programs and utilities could strive to convert the metering configuration for that park while simultaneously supporting park-wide electrification, thereby eliminating the need to upgrade gas metering and service. Additional solutions include referring participants directly into community solar programs and bill credit offerings. The San Joaquin Valley DAC Pilot in

California worked to ensure all households were enrolled already in CARE and FERA rates, and defaulted households into a Transitional Community Solar Discount (TCSD), which reduced electric bills by an additional 20 percent, for a total discount of 36 percent (Evergreen Economics 2024).

Call Out Box: Data Informed Approach to Serving Mobile Home Parks

Using public datasets such as the American Communities Survey (ACS-PUMS), RECS (EIA), DOE LEAD Too, and more, we can get a useful snapshot into mobile home park characteristics to support relevant outreach and education and inform home assessment protocols. In California, VEIC has combined public data with data from the CPUC Utility Conversion Program on metering configurations, for example, to differentiate between master-metered and individually metered parks. While this type of data tool should not pre-empt participation by certain homes, it can be used to help balance a portfolio. Data informed tools can support targeted outreach to income-qualified residents that might be in newer or already individually metered M&MH, for example, to balance a portfolio of potentially higher-cost projects.

6. Inconsistent and Restrictive Regulations

Challenge:

Programs across California have continued to face challenges with streamlined, efficient processes for working with M&MH. Stakeholders have highlighted that obtaining a permit from one of the two regional HCD permitting offices to support M&MH retrofits can be time-intensive and often delayed, and that projects often require multiple inspector visits that could be avoided with clearer alignment upfront. These inconsistencies and delays are particularly prominent for newer energy retrofit measures, such as electrification retrofits (Valmiki et al. 2025).

Solution:

Programs should work with their state HUD code LEA to give advanced notice about programs and align on the specific code requirements for expected installation scopes of work. This includes newer technologies such as heat pumps and appliances that might require unique installation approaches due to M&MH space or other constraints, as described in the above sections. Where possible, programs might consider developing a process for “batched” inspections at a park or neighborhood level to minimize project delays, or developing a shared list of common M&MH challenges or installation approaches that HUD implementing staff and program administrators can align on in advance.

7. Disproportionately High Energy and Housing Cost Burdens

Challenge:

As stated in the early market characterization sections, residents of M&MH typically face high energy and housing cost burdens. This places pressure on decarbonization programs to deliver real energy savings, but also real bill reductions. However, this can be challenging given the many technical constraints detailed, as well as the high cost of more comprehensive weatherization approaches. For example, wall insulation tends to be more expensive for M&MH than upgrading the underbelly insulation. In older homes built prior to the HUD Code, where there is very little insulation, there is theoretically a greater opportunity for savings. However,

this age of home typically has limited few inches of wall space, making it harder to accommodate the type of insulation needed (Bell-Pasht, 2023).

Additionally, in many states such as California where the cost of electricity is high, M&MH residents are particularly sensitive to increases in their utility bills resulting from fuel switching. M&MH residents might be more likely to be underusing their existing appliances and might be more likely to have deferred maintenance on existing appliances (i.e., have non-functioning appliances). This can make it harder to predict or estimate bill impacts for participants in electrification programs, especially within master-metered parks.

Solution:

Managing toward a program average can provide flexibility to support high-cost projects that deliver meaningful energy savings, as discussed. Other strategies already highlighted are all crucial strategies for supporting retrofits that reduce energy burden, such as effective funding layering, coordination with housing programs better able to fund high-cost repair needs, supporting conversion to individual metering, supporting referrals to Community Solar programs, and supporting replacement programs. Additionally, enabling programs to deliver energy savings unconstrained by traditional cost-effectiveness models can unlock deeper energy savings (and potentially enhancing utility bill savings).

Additionally, programs can simply gather data and inform policymakers of the need to support the ongoing affordability of M&MH, bill discounts or guarantees, and protections for M&MH residents against rent or site-lease fee increases. More on ownership and resident protections will be discussed under “9. Mobile Home Park Ownership and Site Lease Relationship”.

8. Limited Contractor Expertise and Familiarity

Challenge:

Contractors at large, particularly those working with income-qualified programs, remain unfamiliar with heat pumps, both as a new technology and due to the varied installation challenges in the field. This unfamiliarity is exacerbated for M&MH, because many contractors working on energy and decarbonization programs may not have served this housing stock before and therefore have limited familiarity with the HUD code. M&MH are often smaller-scale given the size of the household itself, which also creates disincentives for contractors to invest in understanding and serving that sector relative to other single-family market segments (Etherington et al., 2025).

Solution:

When programs kick off, they should ensure they are cataloguing and recruiting directly for contractors who already have experience working with M&MH, or who are willing to expand and learn this market and serve it moving forward. M&MH units have unique construction and technical challenges, as discussed.

Additionally, programs should strive to bundle projects where possible and offer participant contractors a minimum size or scale of projects (or of a project package), so that potentially smaller-scale M&MH projects can add up to a meaningful scope of work, particularly for projects in rural or geographically isolated areas. Bundling projects helps increase scale and profitability. If there are fewer options to support rural areas, programs could consider travel stipends, such as an hourly and mileage allowance for non-local contractors, or larger-scale bundling of projects to justify serving more remote areas. If the program is having trouble serving remote areas, another offering to support this could be to consider mobile workforce units and a Regional Hub model, including hiring a dedicated single point of contact or lead for a

region. This could also include a measure-based pricing framework where travel is an approved reimbursable item.

Finally, programs dedicated to serving M&MH should invest in developing or sourcing technical assistance materials, such as recommended installation guidance based on HUD code for contractors not yet familiar with that permitting process. Support for contractors can also include hands-on troubleshooting and a focus on common challenges such as electrical upgrades, panel sizing, airflow, and common remediation scopes. Program administrators might also consider ongoing technical support for contractors, such as electrification-specific on-site advisors, or the creation of peer learning and mentorship networks.

9. Mobile Home Park Ownership and Site Lease Relationship

Challenge:

While the classic split incentive—where renters pay energy costs but landlords control property improvements—applies to M&MH residents who rent their homes, most residents own their homes but lease the land from park owners. These homeowners typically have the authority to make improvements inside their units without the park owner's involvement. However, several factors introduce nuanced decision-making challenges that resemble, in part, the landlord-renter split incentive. First, mobile home parks often impose rules on exterior modifications, such as the placement of water heater closets or outdoor equipment. These rules, governed in California by HCD and the Mobile Home Residency Law, cannot be arbitrary but may still limit certain upgrades. While the practical impact is often uncertain, stakeholders have emphasized that park owners oftentimes do create friction for this type of work scope. Adding electrical loads at individual homes may also require park-wide electrical upgrades in master-metered parks. If park owners are unwilling to accommodate these changes, homeowners face barriers even though they own their units.

Finally, as parks improve and property values rise, park owners may increase the lot rents they charge park residents. For low-income residents, higher rents can make continued tenancy unaffordable. The CPUC MHP-UCP program includes a stabilization ordinance that prevents lot fees from increasing due to program participation, but in this program, the park owners themselves are receiving significant benefits (in the form of upgraded infrastructure they no longer must maintain). While some jurisdictions do have ordinances in place to stabilize lot rents through a maximum increase as a percentage of Consumer Price Index, a fixed annual increase, or a board/hearing/petition process requirement, we are not aware of a precedent for stabilization of park lot fees through something like a tenant protection agreement when individual households participate in a program. This dynamic creates financial pressure, like a split incentive, where residents hesitate to invest in upgrades that could indirectly lead to lot fee increases (GSMHOL, November 2025).

Solution:

These factors underscore that decision-making in mobile home parks is not a simple issue of owner versus renter. Instead, it involves layered relationships among homeowners, park owners, and regulatory frameworks, and program design should account for these complexities through tailored outreach, shared incentive structures, and building trust across stakeholders, including property owners and managers.

Programs could consider adapting typical tenant protection agreement language to capture the unique relationship between a manufactured homeowner and a park owner, as it relates to a site lease (as opposed to a housing rental). This may present insurmountable challenges to getting park owners to agree to participate in programs, and it can be challenging in

a master-metered park to determine cost attribution within lot fees. Regardless, programs should work with local jurisdictions and policymakers to highlight and amplify scenarios of rising and unaffordable site leases wherever possible, to encourage municipal- or state-level protections for M&MH residents (GSMHOL, November 2025).

10. Lack of Trust in Programs

Challenge:

As with many populations historically underserved by public programs, many M&MH residents are likely to be distrustful of new programs arriving at their door. This might also be further exacerbated by working in communities with intersecting and layered vulnerabilities that are common in M&MH, such as residents with language barriers, elderly residents, or residents with varied immigration statuses. These dynamics can create challenges in building trust with government agencies, program administrators, and program outreach leads.

Solution:

Directly funding outreach, education, and program recruitment by community-based organizations and trusted leaders is the most important first step. This is the approach that the California EBD program is taking through its Community Partner Network, a network of Community Based Organizations (CBOs) who are the “boots on the ground” resource to be the primary education, outreach, and initial onboarding arm of the program. This is also the approach that Energy Outreach Colorado took for its energy efficiency pilot focused on resident-owned M&MH in Leadville, Colorado. For that pilot, the Energy Outreach Colorado team partnered with local vendors to support culturally and language-relevant community outreach, including bilingual energy-monitoring dashboards and resourced contractors to spend adequate time in households discussing challenges and tailoring solutions to each household’s needs (Energy Outreach Colorado, 2026). Within a mobile home park context, “peer champions” are also powerful connectors to neighbors and to scaling opportunities within the park.

Discussion and Recommendations

Effectively supporting the M&MH sector requires a blend of programmatic flexibility, resident-centered planning, and regulatory coordination.

Recommendations for Program Administrators:

Program delivery must be tailored and adaptive, recognizing both the physical constraints of M&MH units and the systemic barriers that limit access to energy efficiency and decarbonization upgrades. This means designing technical solutions that accommodate smaller spaces, older construction, and atypical energy systems, while also focusing on affordability and navigating complex ownership arrangements and regulatory frameworks. Programs should also adopt a holistic approach—one that accounts for unique community dynamics, varied types of home and land ownership, cultural and linguistic diversity, and the disproportionate financial and community vulnerability of many M&MH residents. Engaging communities early and often ensures that solutions reflect resident needs and build trust in institutions that have not historically served them well.

Recommendations for State and Local Agencies:

Serving this sector will also require innovative service models. Because the M&MH sector has been historically underserved and is often difficult to reach with conventional energy programs, agencies and implementers should create intentional space for piloting new best practices. Those can include improved coordination and layering with housing programs,

streamlined processes with code enforcement agencies, supporting policymakers with enforcing resident and tenant protections, and more. Strong cross-agency coordination—across energy, housing, and code enforcement agencies—is essential for streamlining retrofit work and planning proactively among energy, housing, and code enforcement agencies—is essential for streamlining retrofit work and proactively planning for equitable access to electrification.

Recommendations for Policymakers:

Finally, policymakers and programs should incorporate dedicated set-asides for M&MH, distinct from broader income-qualified or disadvantaged-community categories. Because M&MH households face unique systemic challenges and higher barriers to decarbonization, many equity programs often fail to reach them. Targeted funding and prioritization help ensure that these high-need, hard-to-decarbonize homes are not repeatedly deferred.

Conclusion

The M&MH sector represents a critical yet underserved segment of the housing and energy landscape. By embracing tailored, resident-centered, and innovative program designs—and by aligning policy and regulatory structures through cross-agency collaboration and targeted resource allocation—state policymakers, program administrators, utilities, advocates, and communities can expand equitable access to energy efficiency and electrification.

Programs to date have focused on measure-led energy efficiency and whole-home replacement but have had limited reach given the high remediation and repair needs for retrofits and the higher cost of a full-home replacement. Moving forward, retrofit programs need to enable and support remediation and repair work, comprehensive energy upgrades that include electrification, and lead with weatherization to manage high energy burdens and mitigate energy cost increases from fuel switching. Simultaneously, policymakers should continue to support replacement programs as a cost-effective solution for homes with particularly high remediation and repair needs and energy burdens.

As innovative and emerging programs test new models – such as comprehensive direct install programs, on-bill financing, and deploying new technology solutions for constrained spaces – we can support this historically underserved building stock at scale.

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