

Eradicating Substandard Manufactured Homes: Replacement Programs as a Strategy

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Introduction

Manufactured housing is perhaps the most maligned form of shelter in the United States. The media often portrays factory-built residences as ramshackle, poorly maintained “tornado magnets.”¹ Residents of manufactured housing are derided as “trailer trash” in popular culture. News reports about manufactured housing are dominated by accounts of drug arrests, fires, and violence.² For many years, these stereotypes, combined with a lack of solutions to quality issues associated with manufactured housing, encouraged affordable housing professionals to largely ignore manufactured housing.³ Nonprofit professionals have also been skeptical of manufactured housing’s potential to appreciate in value.⁴ Many scholars and policymakers have argued that manufactured housing is inferior to site-built housing in terms of both physical quality and its value as an asset for low- and moderate-income families.⁵

In recent years, however, especially in rural areas, manufactured housing has appeared to be a viable, affordable avenue to homeownership for low- and moderate-income households to several national nonprofits: among others, CFED (Corporation for Enterprise Development), the National Consumer Law Center (NCLC), the Housing Assistance Council (HAC) and NeighborWorks America. In 2009, the average price per square foot for a single-wide manufactured home was \$35, compared to \$89 for a site-built home.^{6,7} Furthermore, research suggests that under the right circumstances, manufactured housing can offer the same value-building benefits as a site-built home.⁸

This recent re-evaluation of manufactured housing reflects its evolution over time. Manufactured houses came into existence in the 1930s as recreational trailers that could be towed to campgrounds. Due to a lack of affordable housing during the Great Depression, an

¹ Burns 2001: 2.

² Bean 2004: 3-4.

³ Apgar et al. 2002: 1; George and Barr 2005: 35.

⁴ George and Bylund 2002: 6.

⁵ Jewell 2003a: 1.

⁶ B. Wilson 2012: 178.

⁷ Cost comparisons between site-built and factory-built houses are difficult to make because estimates, such as these figures, often do not include the site work required in order to utilize a factory-built home. The price differential between factory- and stick-built housing is generally believed to be much smaller than these figures suggest.

⁸ Jewell 2003a: 9-10.

increasing number of these trailers were utilized as year-round shelter. In the 1950s, these “mobile homes” expanded in size and became more permanently attached to the land.⁹ The federal government stepped into the manufactured housing sector in 1974 due to concerns that these movable homes could avoid complying with local building codes. The federal government promulgated the HUD code, which provides national building standards for manufactured housing. The HUD code has subsequently been revised to, among other purposes, increase energy efficiency requirements and establish standards for wind resistance, thermal capacity, and roof load.¹⁰ Since 1995, “double-wide” units of manufactured housing have becoming more common; in a double-wide house, two segments, each as large as a single, traditional manufactured home, are joined on site to create the equivalent of a traditional ranch house.¹¹ Aesthetic elements that mimic site-built housing, such as pitched roofs, have replaced the boxy, storage-container look that many people associate with manufactured housing. Today’s manufactured housing can fit seamlessly into a conventional sub-division of single-family, site-built homes. Innovative projects have even designed two-story manufactured homes.¹²

While contributing to the changing public perception of manufactured housing, these state-of-the-art models have also thrown older, substandard units into sharper relief.¹³ Energy Star-rated units on permanent foundations sit beside residences with crumbling walls and leaking roofs. Efforts aimed explicitly at removing from the housing stock older units, particularly those built prior to the HUD code, and replacing them with new housing, have emerged across the country. These programs vary: while some focus on pre-HUD code units, others fund replacement of any deteriorated mobile home, regardless of model year. They employ grants, loans, tax incentives, and rebates, among other financial tools. Most programs replace manufactured housing with newer manufactured housing, but some have allowed stick-built or modular homes to replace dilapidated manufactured housing. To date, there has been no systematic effort to identify best practices among these disparate program designs.

⁹ Klinefelter 2013: 3.

¹⁰ Burns 2001: 3.

¹¹ B. Wilson 2012: 179.

¹² Manufactured Housing Research Alliance 2003: 2.

¹³ Beamish and Goss 2000: 73.

The creation and administration of such programs is complicated by the paucity of data regarding manufactured housing (as compared to site-built homes). The U.S. Census Bureau provides information on manufactured housing in the American Community Survey and the American Housing Survey, but these data are based on relatively small samples that are weighted to reflect the entire population. Industry groups have focused their data collection capacity on market trends in new units sold, rather than on the existing housing stock. Local and county governments often possess records of manufactured housing, but the quality of this information varies significantly from jurisdiction to jurisdiction and is difficult to standardize. Both industry groups and academics have attempted to characterize manufactured housing via sampling, but often on a small geographic scale or with idiosyncratic methodologies.

This paper aims to make recommendations for the design of nonprofit-based programs for the replacement of older, substandard manufactured housing. It begins with an introduction to manufactured housing and its promise as a source of affordable housing, followed by an overview of the theoretical case for a national effort to replace older, substandard manufactured housing. The paper elaborates on this effort's scope by using Census Bureau data to describe the relevant housing stock and its occupants. On the basis of qualitative research, it then describes and analyzes previous and existing efforts to replace manufactured housing. Finally, the paper concludes by synthesizing its findings into recommendations for the design of manufactured housing replacement programs and future research.

Defining Manufactured Housing

“Manufactured housing” refers to a home built on a steel chassis in a factory after June 15, 1976 in accordance with the federal HUD code. Units built on a chassis in a factory prior to this date are considered “mobile homes.” For the purposes of this paper, however, “manufactured housing” is used as a catchall term for factory-built housing. “Trailers” are recreational vehicles that are neither considered a primary residence nor constructed to meet local, state, or federal building codes. This study does not consider them.¹⁴

Although built on a chassis, manufactured homes are typically moved only once – from the factory of origin to the building site. It can cost upwards of \$5,000 to move a manufactured

¹⁴ NeighborWorks America 2014: 1.

home, which is more than many households can afford.¹⁵ A majority of manufactured homes are not moved after they have been sited. The 2011 American Housing Survey (AHS) estimated that 79 percent of manufactured homes were located on their first site.

The difference between manufactured and modular housing is also important. While modular housing is composed of factory-built modules, it is not built to the HUD code. Modular housing units are assembled on-site and conform to local, regional, and state building codes. The Council of American Building Officials (CABO) and International Energy Conservation (IECC) codes are widely administered standards for site-built and modular housing.¹⁶ Thus, modular housing exists in the middle of a spectrum of construction methods that ranges from site-built homes constructed entirely on their own lot to factory-built housing.¹⁷

The Promise of Manufactured Housing

Manufactured housing deserves attention as an affordable housing resource for low- and moderate-income households. Due to economies of scale, the certainty of a nationwide building code, and reduction of costly site work, manufactured housing can be produced at a lower price per square foot than site-built housing.¹⁸ For Instance, seismic resistance requirements in California increase the time and cost involved with foundation construction, but HUD code foundations are pre-approved and demand no additional engineering expense. The Partnership for Advancing Technology in Housing (PATH), a private-public coalition sponsored by the U.S. Department of Housing and Urban Development (HUD), has argued that the performance-based, rather than prescriptive, nature of the HUD code allows manufactured housing producers to enhance energy efficiency in a cost-effective manner.¹⁹

According to the U.S. Census Bureau, the average cost of a new manufactured home in 2013 was \$64,000. A single-wide unit cost, on average, \$42,200; a double-wide unit, \$78,600.²⁰

¹⁵ Krajick 2003: 9.

¹⁶ B. Wilson 2012: 179.

¹⁷ NeighborWorks America 2014: 1; Lucas et al. 2007: 1.

¹⁸ Listokin and Hattis 2005: 36.

¹⁹ Manufactured Housing Research Alliance 2003: 17-27.

²⁰ U.S. Census Bureau 2014a: 1.

The administrator of one manufactured housing replacement program notes, however, that the expense of installing a permanent foundation can increase a unit's cost to over \$100,000.²¹

Manufactured housing has a lower average price per square foot than single-family housing. In 2013, the average price per square foot of a new manufactured home was \$43.54. For single-wide units, the figure was \$38.36; for double-wide units, \$45.70. The average price per square foot of a new single-family home during the same year was \$93.70.²² Unfortunately, there has not been a large-scale study of how the costs associated with preparing a site for a manufactured home placement and moving a home to that site impact the price difference between these housing types.

As a result of its relative affordability, manufactured housing represents a homeownership opportunity for low- and moderate income households. According to the 2011 AHS, 4.5 percent of all homeowners live in manufactured housing, but in the bottom income quartile, this share rises to 11.6 percent. Low-income manufactured housing residents are less cost-burdened than households living in apartments or single-family homes (Figure 1). One contributing factor may be the lower average monthly maintenance costs for manufactured as opposed to site-built housing.²³

As a result, some policymakers and scholars contend that manufactured housing represents a way to confront the nation's housing affordability gap.²⁴ A 2003 report produced by PATH argues that manufactured housing placements represented 72 percent of unsubsidized housing affordable to low-income homebuyers created between 1997 and 1999.²⁵ Despite concerns that affordability may come at the expense of quality, Boehm and Schlottmann (2008) find that manufactured housing tends to have higher quality ratings than rental housing on both structural and neighborhood characteristics in the AHS.²⁶ In 2011, the percentage of manufactured housing residents in the bottom income quartile whose residence was physically inadequate (9 percent) was less than the comparable figure for apartment-dwellers (12

²¹ Rice 2015.

²² U.S. Census Bureau 2014c: 1.

²³ B. Wilson 2012: 177-78.

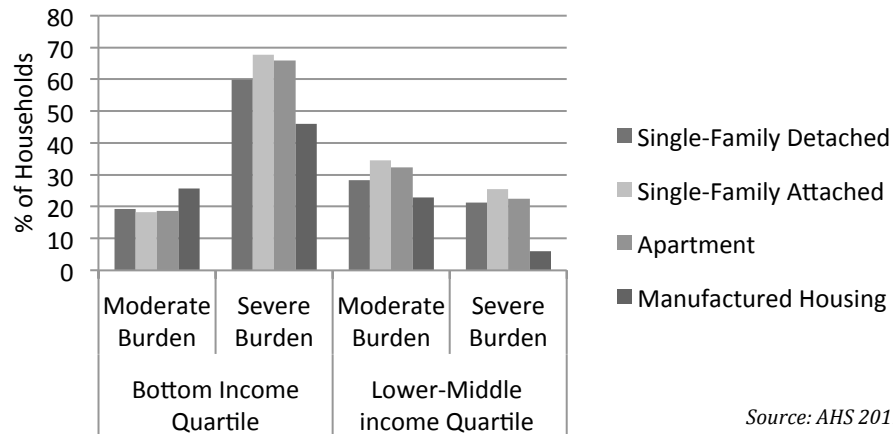
²⁴ Burkhart 2010: 428.

²⁵ Manufactured Housing Research Alliance 2003: 93.

²⁶ Boehm and Schlottmann 2008: 159.

percent).²⁷ This difference suggests that, as an affordable housing choice, manufactured housing is not the lowest-quality option.

Figure 1: Housing Cost Burden by Income Quartile
Among Owner-Occupied Housing Types



Source: AHS 2011

Schmitz (2004) and Haurin, Herbert, and Rosenthal (2007) contend that the affordability of manufactured housing is an especially intriguing opportunity for minority groups, who experience lower homeownership rates than whites.²⁸ In 2011, the homeownership rate for Hispanics was 42 percent, compared to 40 percent for blacks and 69 percent for whites. Manufactured housing accounted for similar shares of homeownership for Hispanics (8.8 percent), whites (7.6 percent), and blacks (7.2 percent).²⁹ The homeownership opportunities afforded to minority groups by manufactured housing are limited by industry lending practices, which include relatively high interest rates and large down-payments.³⁰

Although there is little precedent, it has been suggested that manufactured housing could be incorporated into affluent communities through inclusionary zoning ordinances. Since it has a lower per unit construction cost than site-built housing, manufactured housing offers communities a relatively cheap way to meet affordable housing goals articulated by

²⁷ U.S. Census Bureau 2011.

²⁸ Schmitz 2004: 386-87; Haurin, Herbert, and Rosenthal 2007: 39.

²⁹ U.S. Census Bureau 2011.

³⁰ Kolodinsky and Roche 2009: 592.

comprehensive plans and state or regional mandates.³¹ Modern manufactured housing can be designed in ways that integrate it seamlessly with existing communities. For instance, a developer can mimic the appearance of a subdivision of single-family homes by planting street trees and positioning manufactured homes so that their long sides face the street, with small yards separating the structures from the road.³² Manufactured homes can also be clustered to achieve the density necessary to support amenities, like public transportation, without creating unattractive communities. Such clustering can preserve open space and prevent environmental degradation.³³ Enforcement of neighborhood ordinances can alleviate concerns regarding clutter or maintenance. Responsibility for these concerns can even be shifted to a municipal staff member or homeowners association.³⁴

A Marginalized Form of Housing

Despite its affordability, manufactured housing has long been marginalized by policymakers and communities. Three core concerns have encouraged opposition to manufactured housing: durability, depreciation, and community animosity.

Durability

Questions have arisen about quality controls in both the construction and inspection processes; both the qualifications and impartiality of inspectors have been questioned.³⁵ The life-expectancy figures for manufactured housing have ranged from 15 to 30, 58, and 71 years.³⁶ While factors beyond an owner's control, such as climatic conditions, impact how long a manufactured home will last, maintenance is clearly important to realizing the benefit of the sales price differential between manufactured and site-built housing.³⁷ The consensus among housing professionals appears to be that, all else equal, today's manufactured houses are more durable than past models.

³¹ White 1996: 290.

³² Bean 2004: 108.

³³ White 1996: 290.

³⁴ Bean 2004: 109.

³⁵ Colvin 2011: 16.

³⁶ Krajick 2003: 7; Bean 2004: 8; Barewin 1990: 191.

³⁷ George and Bylund 2002: 6.

Depreciation

Consumers, housing professionals, and scholars have expressed belief that manufactured housing depreciates in value.³⁸ Land ownership plays a significant role in whether or not a homeowner is likely to see an increase in the value of her property. In general, the value of both site-built and factory-built homes decreases over time due to the wear and tear of aging. If the owner of a manufactured unit does not also own the land, she will generally see the value of her investment decrease. If she owns both the manufactured home and the land, however, then she would see the value of her property appreciate, provided that the land's value increases faster than the structure's value decreases.³⁹

According to surveys and anecdotal evidence, manufactured housing, absent land ownership, is a bad investment. A 1998 Consumers Union survey finds that two-thirds of respondents expect to sell their property for less than the purchase price. A non-profit administrator from Vermont characterized her organization's experience with manufactured housing by stating that "[t]ime and again, we find young families who rush into home ownership and find out later, when they want to sell their [manufactured] home, that they cannot sell it for enough to cover their mortgage. 'I wish I'd known' is a common phrase."⁴⁰ Genz's analysis (2001) of nonprofit perceptions of manufactured housing also reveals skepticism regarding its long-term value. Said one community development professional, "There is no wealth-building in owning a [manufactured home]. Purchase loans may outlive the unit. In short, [manufactured houses] are not an investment. They should not be considered owner-occupied housing since they have none of the benefits."⁴¹

Factors beyond whether or not a manufactured home is sited on owned land can affect its value. In a comprehensive analysis of manufactured housing appreciation, Jewell (2003) identifies five (of thirteen) studies that find factors negatively impacting home value. These factors include: length of ownership, clustering, classification as personal property, age of unit,

³⁸ Krajick 2003: 8; Burkhart 2010: 445-46; Lawrence, Smith, and Rhoades 1992: 306.

³⁹ Jewell 2003a: 5.

⁴⁰ Jewell 2003a: 2.

⁴¹ Genz 2001: 393-94.

cost of community site, and purchase price.⁴² Based on their own analysis of AHS data from 1985 to 1999, Consumers Union find that manufactured homes sited on leased land tend to depreciate in value, as do homes that have moved and that have depreciated in the past.⁴³

Community Animosity

Studies have generally revealed poor views of manufactured housing. Gross, Parrott, and Engeles-Eigles (1992) conclude that views of manufactured housing in Appalachian Virginia are negative for three reasons: general opposition to affordable housing, the appearance of older mobile homes, and perception that manufactured housing residents have different values than the rest of the community. Government leaders have opposed manufactured housing due to concerns regarding its fiscal impacts, such as increased spending on emergency and educational services.⁴⁴ Burns (2001) contends that community resistance to manufactured housing stems from fear that it will negatively impact the value of nearby properties and generate crime.⁴⁵ Bias against low-income individuals and “otherness” also play a role in the stigmatization of manufactured housing.⁴⁶

Perceptions regarding manufactured housing are not homogenous. Beamish and Goss (2000) determined that a sample of Virginia residents consistently viewed the placement of single-wide units in a neighborhood more negatively than the placement of double-wide units. Survey respondents, on average, indicated that they felt the placement of manufactured housing would not “increase neighborhood satisfaction, create a better social image, increase the quality of the neighborhood, create a stronger neighborhood character, [or] make the neighborhood more attractive.” Respondents also, on average, disagreed or strongly disagreed with the suggestion that their property values would increase if manufactured homes were placed in their neighborhoods.⁴⁷ Beamish et al. (2001) speculates, based on the difference between negative perceptions of double-wide foundations and observed conditions, that many

⁴² Jewell 2003a. The author of the Consumer Union study notes that the value of some studies is limited due to the fact they do not compare manufactured housing appreciation to site-built appreciation or account for external influences.

⁴³ Jewell 2003a: 7-10.

⁴⁴ Beamish and Goss 2000: 41-42.

⁴⁵ Mimura et al. 2010: 277; McCarty 2010: 127.

⁴⁶ Burns 2001: 3.

⁴⁷ Beamish and Goss 2000: 53

respondents may not be able to distinguish the units from modular housing.⁴⁸ Negative media attention might also explain gaps between opinions of the housing stock and actual conditions.⁴⁹

Nonprofits have viewed manufactured housing with skepticism for a variety of reasons. George and Barr (2005) suggest that many rural nonprofits consider manufactured housing substandard because a large proportion of the families that they have worked with live in units that are in fact substandard. Nonprofits may also view manufactured housing as a competitor for their affordable housing business.⁵⁰ Nonprofits' resistance to manufactured housing might be abetted by the lack of strong residents' associations in many states with large concentrations of the housing, particularly in the South.⁵¹ The high-pressure sales tactics and poor service offered by some manufactured housing retailers have also deterred nonprofits' interest.⁵²

A survey conducted by NeighborWorks in 2002 confirmed that some nonprofits viewed manufactured housing in a negative light. Over 70 percent of professionals rated their knowledge of manufactured housing as fair or low. Affordable housing advocates viewed stick-built housing in a more positive light than manufactured housing, which they tended to view negatively based on the legacy of older units. On the organizational level, few nonprofits were involved with manufactured housing; those that were feared criticism.⁵³

Communities have often codified the marginalization of manufactured housing through zoning. Although case law suggests that communities cannot completely exclude manufactured housing, they can enact policies that make it difficult to place units within their boundaries. Papke (2009) demonstrates that a community can exclude these homes by allowing them only in areas without available land, by requiring that proposals go through a planned unit development process with special restrictions, or by applying requirements that make

⁴⁸ Beamish and Goss 2000: 66-69

⁴⁹ Mimura et al. 2010: 277.

⁵⁰ George and Barr 2005: 35.

⁵¹ Genz 2001: 399.

⁵² Genz 2001: 404.

⁵³ Apgar et al. 2002: 25-26.

placement economically difficult.⁵⁴ Government officials avoid investments in public services for manufactured housing communities because the developments are regarded as temporary.⁵⁵

Such regulations have isolated manufactured housing. One survey found that wealthy communities that invest in their schools and are growing tend to restrict manufactured housing.⁵⁶ Another survey of manufactured housing community managers identified zoning restrictions as a major barrier to the expansion of manufactured home parks.⁵⁷ Shen (2005) finds that the manufactured housing in the Pitt-Greenville area of North Carolina tends to be located further away from useful amenities and employment centers than other housing. Manufactured housing tends to be located closer to problematic places, including flood zones, landfills, heavy industrial sites, and airports. Yankson (2011) determines that manufactured housing in Tuscaloosa County, Alabama tends to be in outlying areas, while banking facilities are in the central part of the county. Shunting manufactured housing to the edges has furthered what Wallis (1991) terms its “invisibility.”⁵⁸

Theoretical Case for Replacement of Older, Substandard Manufactured Housing

Prior to 2000, only a handful of academics recognized the potential of manufactured housing to promote affordable homeownership and stable communities. Drury (1972) advocated for manufactured housing as affordable housing for low-income families.⁵⁹ A key element of Drury’s work was contrasting the mobility of the American labor market with the public’s demand for permanence in housing. Wallis’s (1991) historical overview argued that the movement towards more socially acceptable forms of manufactured housing conflicted with its role as affordable housing.⁶⁰ Koebel, Cavell, and Saraphis (1995) determined that an increase in manufactured housing’s market share in Virginia in the 1980s was positively related to an increase in homeownership. Beamish and Goss (2000) recommended that nonprofits engage

⁵⁴ Papke 2009: 796-97.

⁵⁵ Wallis, quoted in Pickren 2008: 15.

⁵⁶ Papke 2009: 697.

⁵⁷ Manufactured Housing Research Alliance 2003: 12.

⁵⁸ Pickren 2008: 15.

⁵⁹ Drury 1972.

⁶⁰ Stolz 2011: 6-7.

more directly with manufactured housing concerns, including design, appearance, upkeep, and energy efficiency.⁶¹ During the 1990s and 2000s, the federal government also directed some attention to the potential of manufactured housing through the public-private Partnership for Advancing Technology in Housing (PATH). Administered by HUD until 2008, PATH sought to promote next-generation manufactured housing acceptable to communities.⁶²

During the 2000s, there was a larger movement towards acceptance of manufactured housing as a source of affordable housing. An increased amount of critical attention was directed towards the housing stock via advocacy and research by AARP, Consumers Union, and the National Consumer Law Center. Resident-owned community efforts gained traction in New Hampshire, Vermont, and California, among other states.⁶³ Apgar et al. (2002) observed that nonprofit developers of affordable housing were beginning to work with or advocate for manufactured housing in a piecemeal fashion.⁶⁴ George and Barr (2005) indicated that the improved quality of manufactured housing prompted rural nonprofits to experiment with utilizing it to provide sustainable, affordable homeownership.⁶⁵

The Innovations in Manufactured Housing (I'M HOME) project was pioneered by CFED, a national organization devoted to asset-building community development. In partnership with the Ford Foundation, Fannie Mae, NeighborWorks America, Opportunity Finance Network, and ROC USA, I'M HOME has sought to change the prevailing dialogue among nonprofit professionals regarding manufactured housing through grant-making, convening symposia, research, policy advocacy, and technical assistance.⁶⁶ A 2006 assessment of these efforts by George McCarthy, a program officer with the Ford Foundation, concluded that manufactured housing remained a “niche-y” form of affordable housing. McCarthy suggested that manufacturers had been slow to accept the possibility that nonprofits could be meaningful partners in the market.⁶⁷

⁶¹ Beamish and Goss 2000: 73.

⁶² Beamish et al. 2001: 375.

⁶³ Genz 2001: 399.

⁶⁴ Apgar et al. 2002, 26.

⁶⁵ George and Barr 2005: 20.

⁶⁶ Tremoulet 2010: 102.

⁶⁷ Tremoulet 2010: 103.

Advocacy for the replacement of older, substandard homes has been crucial to involving nonprofits in manufactured housing. Such replacement has been one of I'M HOME's central goals.⁶⁸ Frontier Housing, a Kentucky nonprofit, helped to formalize this goal by forging a partnership with Clayton Homes through the Manufactured Housing Done Right initiative. Next Step, a national organization devoted to promoting manufactured housing development and replacement of older units, grew out of this initiative and launched as a separate organization in 2010.⁶⁹ Today, the organizations, academics, and policymakers involved in the manufactured housing policy space generally employ three main arguments to support replacement of older, substandard units:

1. Older manufactured housing is deteriorated and unsafe.
2. New, efficient manufactured housing can reduce energy consumption and utility bills.
3. Low- and moderate-income families can build their assets by acquiring a new manufactured home because it will depreciate more slowly than existing units.

Beyond these major arguments, some policymakers and academics suggest that replacing older, well-worn manufactured housing is important because these units perpetuate negative opinions of the housing stock.⁷⁰ Several studies of opinions of manufactured housing suggest that removing older, substandard units from the housing stock may improve overall perception of factory-built housing. Focus groups with manufactured housing residents in Virginia indicate that negative views of manufactured housing are driven by the “boxes on wheels” aesthetic and poor upkeep of older units.⁷¹ Jeong, Syal, and Hastak (2009) identify the dilapidated condition of some older units as a negative determinant of demand for new manufactured housing.⁷² The industry's adoption of the term “manufactured housing” after 1980 was, itself, an effort to shake off the bad publicity associated with older “mobile homes.”⁷³

⁶⁸ Tremoulet 2010: 102.

⁶⁹ Lawton 2013.

⁷⁰ Burkhart 2010: 432; Yankson 2011: 8.

⁷¹ Beamish and Goss 2000: 41-42.

⁷² Jeong, Syal, and Hastak 2009: 23.

⁷³ B. Wilson 2012: 177.

Condition of Manufactured Housing Units

Advocates of manufactured housing replacement argue that some units are in such poor condition that they negatively impact the health and well-being of their occupants. Older units are often presumed to be in worse condition than newer ones. This perception is based largely on the anecdotal experiences of housing professionals and case study research.⁷⁴ However, some surveys have also found that older manufactured housing tends to be in worse condition than new manufactured housing.⁷⁵

One reason that older units would be in worse condition is simply because units deteriorate over time, and buildings constructed prior to the 1970s are nearing the end of their useful life.⁷⁶ But older units might also be in worse condition than newer units because federal building standards for manufactured housing were not adopted until the 1970s. In 1974, Congress passed the National Manufactured Housing Construction and Safety Standards Act of 1974, which created the Manufactured Home Construction and Safety Standards.⁷⁷ These standards went into effect on June 15, 1976.⁷⁸ Significant revisions were made to the HUD code in 1994 in response to Hurricane Andrew, as well as in 1999 in order to make manufactured home foundations safer and the units more resilient to high-speed winds.⁷⁹ Furthermore, the Manufactured Housing Improvement Act of 2000 created a mandate for regular updates to the HUD code and increased state involvement with manufactured housing installation standards.⁸⁰

These regulatory changes have certainly improved the quality of new housing. For instance, aluminum wiring is common among pre-HUD code units. The Consumer Protection Safety Commission determined in 1974 that such wiring creates “unreasonable risk of injury or death.” Copper wiring is used in modern manufactured housing.⁸¹ Post-HUD code homes have been shown to have lower rates of fires, as well as fire loss, than pre-HUD code units.⁸² Other

⁷⁴ Tamm 2014; Wiltse 2014; Landaverry 2013; Harrison and Popke 2011: 957.

⁷⁵ Aman and Yarnal 2010: 91.

⁷⁶ Jeong, Syal, and Hastak 2009: 26.

⁷⁷ Porter 2014.

⁷⁸ U.S. Department of Housing and Urban Development, “Manufactured Home – Consumer’s Guide.”

⁷⁹ Hernandez.

⁸⁰ Listokin and Hattis 2005: 28.

⁸¹ Kennedy and Flynn 2006: 13.

⁸² Manufactured Housing Association of Oklahoma.

concerns with pre-HUD code homes are the integrity of floors, roofs, and walls and lack of insulation.⁸³

A major improvement to manufactured home quality occurred when 1994 regulations established Wind Zones II and III for manufactured housing. In these areas, manufactured housing units must be rated to withstand winds of up to, respectively, 110 and 100 mph.⁸⁴ The wind rule also increased the required durability of various building components, including windows, roofs, wall coverings, framing, and sheathing, and allowed states to regulate manufactured housing anchoring.⁸⁵ A 2005 study conducted by the Institute for Building Technology and Safety in the wake of Hurricane Charley confirmed that these standards have had a positive impact on building strength. Homes built after 1994 performed significantly better than those built before that year. Homes built before 1994 but after the promulgation of the HUD code performed significantly better than pre-HUD code units.⁸⁶

There are also, however, reasons to expect that units produced after the advent of the HUD code might be in substandard condition. Low-quality building materials were employed in units produced in the late 1970s and 1980s, including particle board flooring, which loses structural integrity when wet. Polyvinyl chloride plumbing and Masonite paneling have also proven to be non-durable building materials.⁸⁷

Hazardous materials were used in construction of manufactured housing after the introduction of the HUD code. Asbestos, which is an effective fire-resistant insulator, was not phased out of use in the United States until the early 1980s. Used in flooring, insulation, ceiling tiles, plaster, and siding, asbestos has been linked to cancer. Formaldehyde, another problematic building material, was commonly used until the 1980s. The chemical was employed in resins and glues that were applied to interior features, such as cabinets, paneling, furniture, and subsurface boards.⁸⁸ Hodgson, Beal, and McIlvane (2002) demonstrates that concentrations of volatile organic compounds can be above acceptable thresholds in new, HUD

⁸³ Stolz 2011: 45.

⁸⁴ Manufactured Housing Association of Oklahoma.

⁸⁵ Alessi 1996: 132.

⁸⁶ Institute for Building Technology and Safety 2005: 1-6.

⁸⁷ Tremoulet 2010: 77.

⁸⁸ Kennedy and Flynn 2006: 14.

code manufactured housing.⁸⁹ Post-HUD code units may contain materials that include lead, which has a particularly negative impact on the health of children. Lead paint was banned in the United States in 1978 by the Consumer Product Safety Commission, but it remains present in millions of homes.⁹⁰

The design of post-HUD code units can contribute to physical problems. Moyer et al. (2001) highlights a number of reasons why a significant number of HUD code dwellings in the Southeast experience moisture problems, including soft walls, buckled floors, and mold growth. These reasons include poor site drainage, improperly located vapor retarders, and negative air pressure. Among the solutions recommended by Moyer et al. (2001) are increased tightness of seals on ducts and correctly sized moisture control equipment. A study by Burch and TenWolde (1993) of manufactured housing in four climatic conditions reveals that in roof sheathings made of plywood and oriented strand boards, moisture levels can rise to a degrading level. Burch and TenWolde (1993) attributes this finding to the fact that, while the contemporary HUD code required that the roof cavity be ventilated to the outside air, it did not mandate a vapor retarder in the cavity.⁹¹ Sterling and Lewis (1998) shows that without proper maintenance, the filters and media of air control systems can act as a place for fungi growth.⁹² AHS (2011) shows that mold was present in approximately 295,000 manufactured homes.⁹³

Aside from building materials and construction practices, there are concerns related to manufactured housing regulation. Consumer groups have complained that HUD's regulation of manufactured housing is driven too much by a desire to support the industry. Problems that do arise with manufactured housing units are often difficult to resolve due to limited warranties and a "blame game" that goes on between dealers, manufacturers, and installers.⁹⁴ HUD has indicated that its ability to conduct research, testing, and inspections is limited by its budget and staffing.⁹⁵ Fees from HUD code tags are used to finance some of these activities, but they

⁸⁹ Hodgson, Beal, and McIlvaine 2002: 241.

⁹⁰ Jacobs et al. 2002: 599.

⁹¹ Burch and TenWolde 1993: 175.

⁹² Sterling and Lewis 1998: 283-384.

⁹³ U.S. Census Bureau 2011.

⁹⁴ Schmitz 2004: 290.

⁹⁵ U.S. Government Accountability Office 2012: 14.

have been declining due to a decrease in manufactured home purchases. Between 2008 and 2011, fee income decreased from \$5.7 million to less than \$3 million.⁹⁶

Consumer satisfaction surveys provide some idea of the scale of the physical problems within manufactured housing. Consumers Union reported in 2002 that the vast majority of manufactured home buyers (79 percent) experience a problem with their residence. Common problems are ill-fitting doors and windows and plumbing malfunctions. In 2002, the Council of Better Business Bureaus reported that in 23 percent of cases involving manufactured housing, consumers were not satisfied with how their complaints had been resolved.⁹⁷ A 1999 survey by AARP found that 77 percent of manufactured home owners had a problem with their unit. Respondents highlighted the quality of interior amenities (37 percent), drafty doors and windows (35 percent), and structural failures, like cracks in the walls (31 percent).⁹⁸ Some of these problems might result from the installation of units rather than the manufacturing process.⁹⁹ Jeong, Syal, and Hastak (2009) contends that poor coordination, customer services, and follow-up among retailers contribute to customer dissatisfaction.¹⁰⁰

Energy-Efficiency

Many proponents of manufactured housing replacement lobby for their programs on the basis of energy efficiency. They contend that older manufactured housing units are “energy hogs” and that removing them from the market can save fuel and reduce consumers’ energy bills. Research has confirmed that older manufactured housing units are generally more inefficient. Using data from the 2005 Residential Electricity Consumption Survey, Wilson (2012) finds that newer manufactured housing tends to consume less electricity than older manufactured housing.¹⁰¹ Moyer et al. (2004) determines that the age of a home has a significant impact on electricity consumption. Older homes with less insulation are generally

⁹⁶ U.S. House of Representatives 2012: 5.

⁹⁷ Schmitz 2004: 298.

⁹⁸ George and Bylund 2002: 5.

⁹⁹ Krajick 2003: 7.

¹⁰⁰ Jeong, Syal, and Hastak 2009: 23.

¹⁰¹ B. Wilson 2012: 175

more inefficient.¹⁰² Larson's (1994) study of a sample of mobile homes in Central Oklahoma concludes that age, along with size, value, and outdoor temperature, predicts energy usage.¹⁰³

Increases in manufactured housing's energy efficiency can be attributed to several factors. From a regulatory point of view, the HUD code has been updated over time to include more stringent efficiency standards. Of particular importance, the thermal requirements for manufactured housing were adjusted in 1994. Leaky roofs, old appliances, poor window seals, and structural problems may also contribute to high energy usage. Units created since 2001 may be Energy Star certified. Energy Star is a voluntary program administered by the U.S. Environmental Protection Agency.¹⁰⁴ An Energy Star unit must be thirty percent more efficient than a home built to the 1993 Model Energy Code based on heating, cooling, and water heating. On the regional level, some states, utilities, and nonprofits have invested in energy efficient manufactured homes. The Bonneville Power Administration's efforts in the Pacific Northwest have been particularly extensive.

More efficient building materials, such as double-pane windows, have also come into increased use. Single-pane windows were more common among manufactured homes than site-built homes prior to 1993. Mastic (instead of tape) sealing of ducts, upgraded lights, and larger amounts of insulation have also improved efficiency.¹⁰⁵ A key feature of the HUD code is that it allows for a trade-off between high-efficiency heating and cooling systems and insulation. This allows manufacturers to pursue the lowest cost method of meeting energy efficiency goals.

A number of studies have shown that there is potential for further energy efficiency in manufactured housing. A compilation of studies from the 1990s suggests that investment in airtight ducts can reduce cooling energy use by 15 percent and heating energy use by 20 percent.¹⁰⁶ Model units located on the campus of North Carolina A&T State University demonstrate the feasibility of reducing energy usage 50 percent over the HUD code

¹⁰² Hattrup et al. 1993: 5.

¹⁰³ B. Wilson 2012: 181.

¹⁰⁴ Lucas et al. 2007: 2.

¹⁰⁵ Lucas et al. 2007: 1.

¹⁰⁶ Moyer et al. 2004: 2.

standard.¹⁰⁷ Use of incandescent, instead of florescent, lights and additional insulation of hot water heaters and pipes have been shown to have significant impacts on energy usage.¹⁰⁸

Some organizations, such as Next Step, argue that the energy savings realized over the life of a new manufactured home help to pay off the initial investment in such innovations. According to Next Step, energy savings from the initial Energy Star investment of \$2,000-\$4,000 (3-to-5 percent of the 2013 average price for a double-wide unit) pay off in five to ten years.¹⁰⁹ Lucas et al. (2007) contends that an Energy Star unit can save from \$190 to \$246 per year in energy costs relative to a minimum HUD code unit. This amounts to 13 to 30 percent of the annual electricity bill of a manufactured home in poor physical condition according to the 2011 AHS.¹¹⁰

But whether savings are realized from energy efficiency upgrades is contingent on a number of factors. Lee et al. (1995) shows that the cost-effectiveness of a utility-sponsored program providing financial incentives to manufacturers to produce energy-efficient homes depends on the extent to which units utilize back-up, non-electric heat.¹¹¹ Air leakage from improperly sealed ducts can also sap energy savings. B. Wilson (2012) demonstrates, based on Residential Electricity Consumption Survey data from 2005, that household size, size of structure, use of electric space heating, and rural location are among the significant predictors of electricity consumption.¹¹² Lubliner et al. (2004) finds that, even in a highly efficient manufactured home, net energy usage is impacted by residents' behavior, such as operating an inefficient freezer, always operating the air conditioning, or using an exhaust fan.¹¹³ A study by the National Institute of Standards and Technology notes that reductions in air infiltration into homes due to retrofits, which would reduce energy costs, depend on weather conditions.¹¹⁴

Any energy savings realized by upgrades can also be wiped out by regulatory and site concerns. Poor installation, particularly a weak seal between sections of a home, can erase

¹⁰⁷ McGinley et al. 2004: 18.

¹⁰⁸ McGinley et al. 2004: 18.

¹⁰⁹ Next Step, "Life-Cycle Pricing."

¹¹⁰ Lucas et al. 2007: 5.

¹¹¹ Lee et al. 1995: 9.

¹¹² B. Wilson 2012: 190.

¹¹³ Lubliner et al. 2004: 10.

¹¹⁴ Persily, Nabinger, and Dols 2010: 1.

energy savings.¹¹⁵ Poor code enforcement can also impair the energy efficiency of new manufactured housing units.¹¹⁶ Manufactured housing plants have had difficulty achieving Energy Star certification due to trouble consistently achieving tightly sealed ducts.¹¹⁷ The U.S. Government Accountability Office (GAO) has faulted HUD's energy efficiency efforts for being voluntary and seldom updated.¹¹⁸

Efforts to evaluate the cost-efficiency of energy savings programs are relatively uncommon. A U.S. Government Accountability Office evaluation (2013) of manufactured housing replacement programs in Maine, Montana, and Washington concludes that energy savings, while clearly present, do not fully offset the investment. On average, it cost \$56,119 to replace a manufactured home, and energy bills decreased by \$489 per year.¹¹⁹ Lee et al. (1995) determines that a Bonneville program that provided manufacturers with a \$2,500 per unit incentive to produce more efficient units was cost-effective at the level set by the sponsoring organization, which was 4.83¢ savings per kWh of energy used.¹²⁰ Moyer et al. (2004) positively assesses the feasibility of improved duct sealing and testing. The cost of modifying the production process could, however, be quite significant.¹²¹

Asset Building

Homeownership is generally regarded as a key to financial stability, and this underlines the third major argument in favor of manufactured housing replacement. Owning a home allows a household to build equity that they can borrow against for education or business opportunities. Homeownership has been shown to increase wealth, and it allows households to access tax benefits, such as the mortgage tax deduction. In 2010, the median family net worth of homeowners was \$173,000, while the comparable figure for renters was just \$5,000.¹²² Housing wealth makes up over 29 percent of family wealth.¹²³

¹¹⁵ Chasar et al. 2004: 4; McGinley et al. 2004: 18.

¹¹⁶ Harrison and Popke 2011: 957.

¹¹⁷ Chasar et al. 2004: 1.

¹¹⁸ B. Wilson 2012: 184.

¹¹⁹ U.S. Government Accountability Office 2013: 1.

¹²⁰ Lee et al. 1995: 6.

¹²¹ Moyer et al. 2004: 2.

¹²² Federal Reserve 2012: 18.

¹²³ Federal Reserve 2012: 47.

Homeownership has also been shown to increase housing and neighborhood satisfaction and produce beneficial social outcomes, such as educational attainment, reduced crime, and civic participation.¹²⁴ Studies suggest that holding assets reduces welfare usage and enhances well-being. The economic security provided by asset-holding decreases stress. These benefits are particularly important to groups that have fixed incomes, such as seniors.¹²⁵ A stable housing situation, regardless of tenure, contributes to an individual's ability to hold down steady employment.¹²⁶

Although debate regarding the long-term value of manufactured housing has been lively, an academic and policy consensus seems to be building that individuals who own both land and building will see their investment appreciate. Owning land is critical to the appreciation of manufactured housing. From a theoretical point of view, land is valuable because it is in scarce supply. The relatively slow process of home construction furthers property appreciation.¹²⁷ Boehm and Schlottmann's (2008) analysis of AHS data from 1993 to 2001 concludes that manufactured housing, when the land and unit are both owned by the occupant, appreciates at a rate similar to that of site-built housing.¹²⁸ Jewell's (2003a) examination of AHS data from 1985 to 1999 also finds that manufactured housing, when packaged with land, appreciates at a rate similar to that of site-built housing.¹²⁹ Apgar et al. (2002) agrees with Jewell's conclusion that ownership of land is key to appreciation. This conclusion is based on a study of data reported by Freddie Mac and NAHB. Apgar et al. (2002) notes that manufactured housing ownership benefits occupants even if they are leasing the land, for they can still access homeownership tax breaks. The sale of a unit might also allow a homeowner to recoup greater value than a security deposit.¹³⁰

Appreciation remains a complicated topic, with studies offering conflicting accounts of other factors that influence the appreciation of manufactured housing. One framework for

¹²⁴ Rivera 2006: 15-16.

¹²⁵ George and Bylund 2002: 6.

¹²⁶ Krajick 2003: 7.

¹²⁷ Jewell 2003a: 6.

¹²⁸ Boehm and Schlottmann 2008: 164.

¹²⁹ Jewell 2003a: 9-10.

¹³⁰ Apgar et al. 2002: 8-9.

analyzing manufactured housing appreciation advises: “A strong market helps manufactured-housing sales. . . . Good community, good resale prices. . . . Paying too much for a home hurts your return. . . . After 10 years, condition has a bigger effect than age. . . . New features on new models hurt resale value of old homes. . . . High inflation can lead to nominal appreciation.”¹³¹

For advocates of manufactured housing replacement, the available evidence suggests that properly designed and maintained manufactured homes offer an affordable path to the financial benefits of homeownership.

Scope of the Issue of Older, Substandard Manufactured Housing

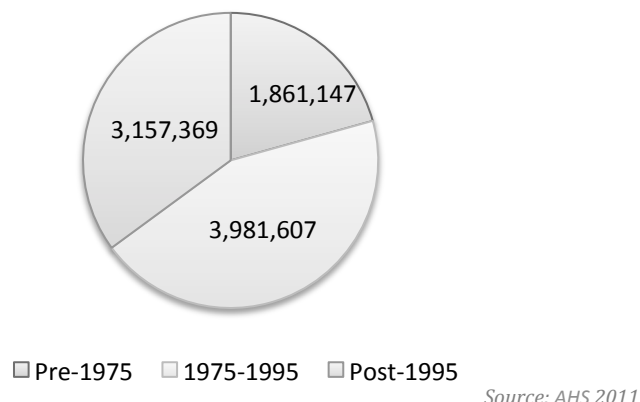
The number of older, substandard manufactured homes in the United States is a matter of some uncertainty. Recordkeeping with regards to manufactured housing is not standardized. States, counties, and localities have adopted radically different procedures. In some jurisdictions, units are recorded by tax officials, while in others there are essentially no records. National data sources, such as the American Housing Survey (AHS) and American Community Survey (ACS), do not have large enough samples of manufactured housing for accurate characterization of this type of housing at small geographic levels, such as the Census tract or block group.

The AHS and ACS do, however, provide reasonable estimates of the prevalence of manufactured housing across broad geographic areas. According to the 2011 AHS, there are approximately 9 million manufactured housing units in the United States. 26 percent of those homes (1.8 million units) were built prior to 1975 (Figure 2). This figure is the most accurate estimate available of the number of pre-HUD code (1976) units currently in the housing stock. 41 percent of manufactured homes (3.9 million units) were built between 1975 and 1995. This is a useful period to consider, since updates to the HUD code were adopted in 1994¹³²

¹³¹ Jewell 2003a: 8.

¹³² The AHS aggregates housing units across multiple years of construction prior to the 2000s.

Figure 2: Manufactured Housing by Time Period Built



For approximately 80 percent of the manufactured housing units in the United States, the AHS also provides a measure of physical adequacy. Units are deemed to be adequate, moderately inadequate, or severely inadequate based on a series of questions regarding plumbing, heating, structural integrity, and other factors.¹³³ The 2011 AHS indicates that roughly 485,000 manufactured housing units are in moderately or severely inadequate condition. For the remainder of this paper, moderately and severely inadequate units will be aggregated. This amounts to 6.7 percent of manufactured housing units for which the AHS provides a quality rating, and 5 percent of all manufactured housing.

Among all manufactured housing units, the most common physical problem appears to be heating (Table 1). AHS (2011) reports that 12.4 percent of households experienced more than twenty-four hours of cold during the last year, and 13.9 percent used a space heater to maintain warmth. Exterior water leaks, reported by almost 11 percent of households, were another major concern. Anecdotally attributed to the flat roofs of older manufactured housing,¹³⁴ water leaks can also be caused by poor seals between sections of manufactured housing.

¹³³ The complete definition of inadequacy is provided in Appendix 1.

¹³⁴ Wiltse 2014.

Table 1: Frequency of Physical Problems in Manufactured Housing

Physical Problem	Manufactured Homes	% of Manufactured Homes
Exterior Water Leak	775,050	10.9
Sewer Failure	113,561	1.6
Lost Running Water	503,276	7.1
Unit Cold 24+ Hours	863,725	12.4
Uneven Roof	351,307	4
Missing Shingles	315,902	3.6
Holes in Roof	293,877	3.4
Foundation Crumbling	409,748	4.7
Broken Windows	661,782	7.5
Space Heater Used	1,241,232	13.9

Source: Tabulation of AHS 2011

Note: Total number of units considered by quality question varies

Geographic Distribution of Older, Substandard Manufactured Housing

To focus their efforts, advocates for replacement of these older, substandard manufactured homes need to know their locations. Accurate counts of problematic homes within particular states, regions, counties, and cities are also essential for the creation of needs statements, grants, and program budgets. Unfortunately, it is beyond the scope of this project to provide detailed counts of manufactured housing at small geographic scales. Previous studies have shown that such efforts are labor-intensive and usually face methodological problems, including: incompatibility of data across jurisdictions, missing data, and low spatial resolution of satellite images used for identification of homes.¹³⁵ An exploratory effort to identify manufactured housing data sources in North Carolina generated little information. Data provided by a major private real estate analysis company regarding manufactured homes in New England proved to be incomplete and to contain many empty fields.¹³⁶ Interviews with the administrators and stakeholders of manufactured housing replacement programs did not bring to light any comprehensive databases for manufactured housing information.

The AHS 2011 can, however, be used to further understanding of the regions where manufactured housing replacement might be of most concern. As shown in Table 2, the largest

¹³⁵ Researchers interested in methodology for identifying or analyzing manufactured housing at a small scale might consult Jewell (2003a), Luciano et al. (2013), Fallsburg (2004), Wubneh and Shen (2004), Yankson (2011), and Yarnal and Aman (2009).

¹³⁶ Trentzsch 2014.

share of inadequate manufactured housing is located in the South Atlantic and East South Central regions: approximately 172,000 homes, or 35 percent of the national total. The West South Central (21 percent) and Mountain and Pacific (18 percent) regions also contain large shares. New England contains a small share of the national total (only 5 percent), but has the highest concentration: 15 percent of its manufactured housing is inadequate.

Across all Census divisions, pre-HUD code units are more prevalent than inadequate condition homes (Table 3). Again, the South Atlantic and East South Central region has the largest number of pre-1975 units: approximately 730,000, or 39 percent of the national total. The Mountain and Pacific region also contains a large share of pre-1975 homes (25 percent), and has the highest regional concentration (32 percent).

Table 2: Distribution of Manufactured Housing in Inadequate Condition in the U.S.

Census Division	Manufactured Homes	Inadequate Condition Manufactured Homes	% Inadequate Condition Manufactured Homes
New England	174,458	26,553	15.2
Middle Atlantic	431,468	13,253	3.1
East North Central	740,633	51,810	7.0
West North Central	356,558	33,507	9.4
West South Central	1,198,533	101,460	8.5
South Atlantic and East South Central	2,843,787	172,261	6.1
Mountain and Pacific	1,422,114	86,294	6.1
United States	7,167,551	485,138	6.8

Source: Tabulation of AHS 2011

Table 3: Distribution of Pre-1975 Manufactured Housing in the U.S.

Census Division	Manufactured Homes	Pre-1975 Manufactured	% Pre-1975 Manufactured Homes
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	Homes		
New England	174,458	42,691	24.5
Middle Atlantic	431,468	120,090	27.8
East North Central	740,633	231,103	31.2
West North Central	356,558	90,657	25.4
West South Central	1,198,533	177,830	14.8
South Atlantic and East South Central	2,843,787	732,881	25.8
Mountain and Pacific	1,422,114	465,894	32.8
United States	7,167,551	1,861,146	26.0

Source: Tabulation of AHS 2011

The ACS 2012 provides comprehensive counts of manufactured housing at smaller geographic levels than the AHS, including Personal Use Metadata Areas (PUMAs).¹³⁷ Built on Census Tracts and counties, each PUMA encompasses at least 100,000 people. Although PUMAs are an appealing option for representation of manufactured housing data, observed frequencies of inadequate and pre-1975 units are too low in many regions of the country to instill confidence in the ACS's estimates. As a compromise between PUMAs and Census divisions, the state level provides a more granular glimpse at manufactured housing built prior to 1980.¹³⁸

As shown in Table 4, five states contain more than 100,000 units of pre-1980 manufactured housing: Florida, California, Texas, North Carolina, and Arizona. The upper Midwest and Northeast are also home to many such units, with Michigan (7), Pennsylvania (8), and Ohio (10) all having more than 80,000. Figure 3 depicts the concentration of pre-1980 manufactured housing in each state.

Table 4: Top Ten States in Terms # of Pre-1980 Manufactured Housing

State	Pre-1980 Homes	% Pre-1980 Homes
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¹³⁷ While the AHS collects data at small geographic scales including the MSA and state level, it selects only a sample of those geographic divisions in any given sample year.

¹³⁸ The ACS records the year a structure was built differently than the AHS, preventing the use of 1975 as a cutoff point. The ACS also does not collect data on the physical adequacy of units.

Florida	288,246	34.6
California	282,249	56.3
Texas	176,885	22.8
North Carolina	119,807	20.2
Arizona	103,035	34.8
Georgia	91,272	22.8
Michigan	88,427	36.1
Pennsylvania	84,627	39.2
Washington	79,145	39.4
Ohio	77,910	39.4
United States	2,724,235	31.14

Source: ACS 2012

For the most part, the states with the highest concentrations of pre-1980 homes are different from those with the largest numbers. Table 5 displays the top ten states in terms of the percentage of pre-1980 manufactured housing. Alaska leads, with over 70 percent, but northeastern states, including Massachusetts and Connecticut, and plains states, including Nebraska, Utah, and Wyoming, dominate the list. Eight states (including Hawaii, which is otherwise excluded from analysis because the total number of manufactured homes in the state is less than the margin of error) have more than 50 percent pre-1980 manufactured housing.

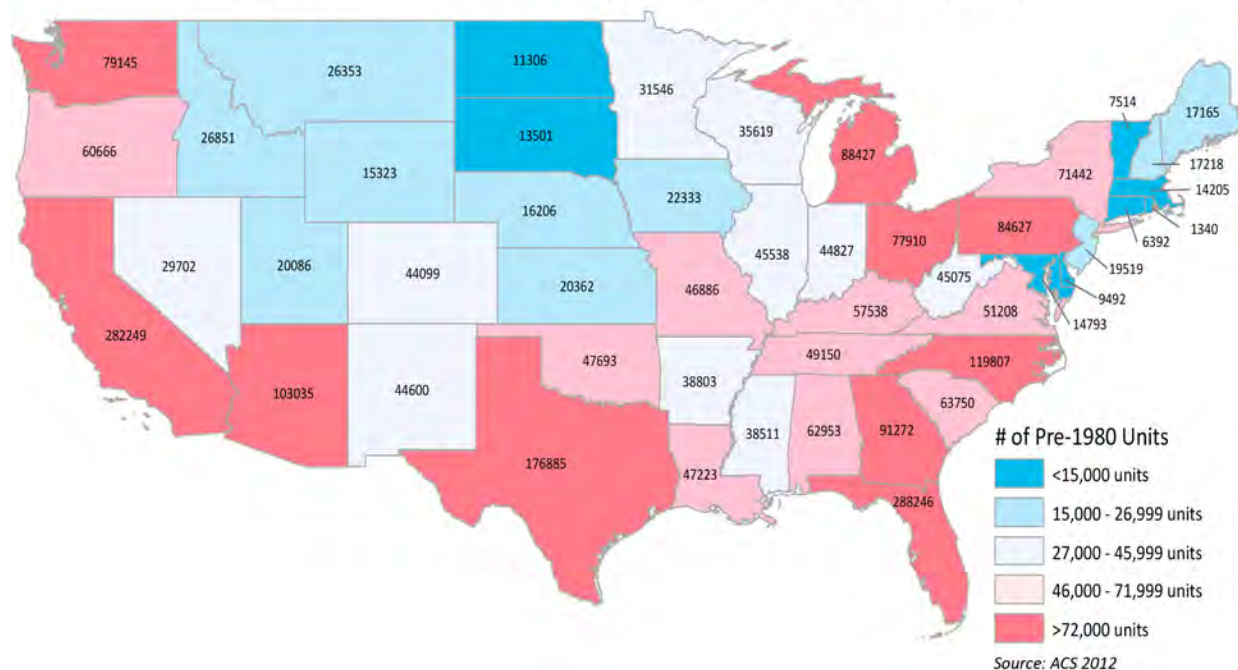
Table 5: Top Ten States in Terms % of Pre-1980 Manufactured Housing

State	Pre-1980 Homes	% Pre-1980 Homes
Alaska	10,154	70.0
Connecticut	6,392	59.3
Nebraska	16,206	57.9
Massachusetts	14,205	57.1
California	282,249	56.3
New Jersey	19,519	52.9
Utah	20,086	52.0
Wyoming	15,323	49.5
Colorado	44,099	47.9
Idaho	26,851	47.2
United States	2,724,235	31.14

Source: ACS 2012

Note: Hawaii excluded from analysis; would otherwise be 1

Figure 3: Number of Manufactured Homes Built Prior to 1980



Impacted Population

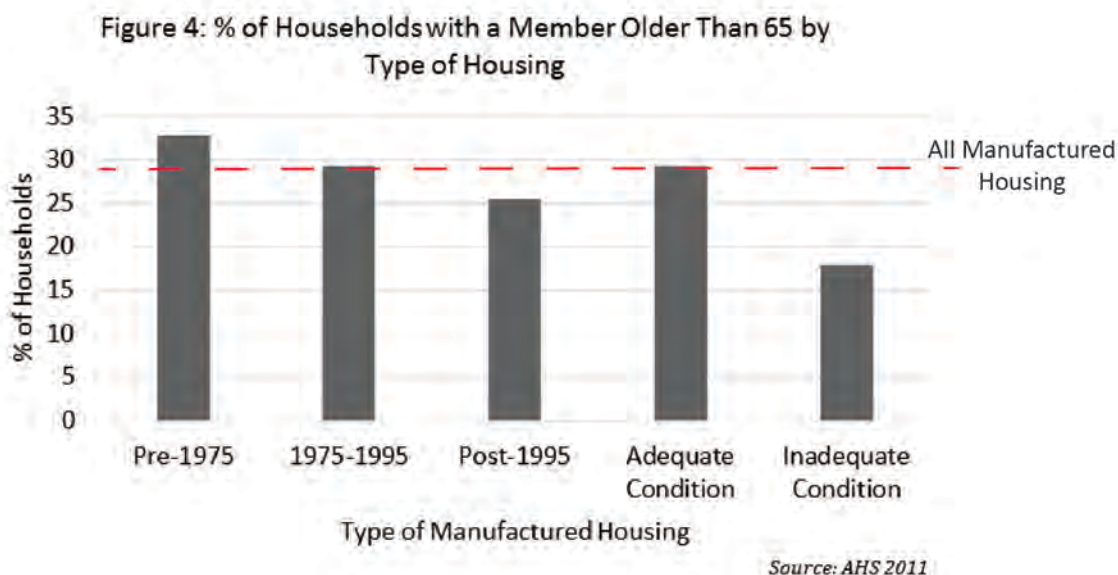
Policymakers and housing professionals seeking to replace these older, substandard manufactured homes should consider the impacted population. The 2011 AHS provides the data for a portrait of that population. 18.2 million individuals currently live in manufactured housing. Of those people, 1.2 million live in housing that is in inadequate condition, and 2.9 million live in pre-1975 homes.¹³⁹ Approximately 7.6 million people live in manufactured homes produced between 1975 and 1995. The characteristics of these people, including age, disability, income, tenure, and education, will impact the feasibility of manufactured housing replacement strategies.

Elders

George and Bylund (2002) suggest that elders might be concentrated in manufactured housing because “many older adults remain in their homes, or ‘age in place.’” Lack of access to rental housing and supportive care facilities in rural areas could also contribute to the

¹³⁹ Although discussed separately, the populations inhabiting inadequate and pre-1975 manufactured housing do overlap.

concentration of elderly individuals in substandard manufactured housing.¹⁴⁰ Seniors might seek out manufactured housing because it allows them access to a favorable neighborhood, family, or services. To this end, there are manufactured housing parks that cater exclusively to seniors. Wilden (2002) conducted a survey of eight owners of 143 senior-only manufactured housing parks. The owners' parks collectively contained 40,280 home pads. Key features of the parks included: support services, swimming pools, health clubs, common areas, and central dining.¹⁴¹



Approximately 429,000 pre-1975 units contain a household with a senior. This is the type of manufactured housing most likely to include a senior. 33 percent of pre-1975 manufactured homes contain a household with a senior, compared to 29 percent of 1975-1995 units and 17 percent of inadequate units. Only a small share (4 percent) of households with a senior who live in manufactured housing live in one of inadequate condition.

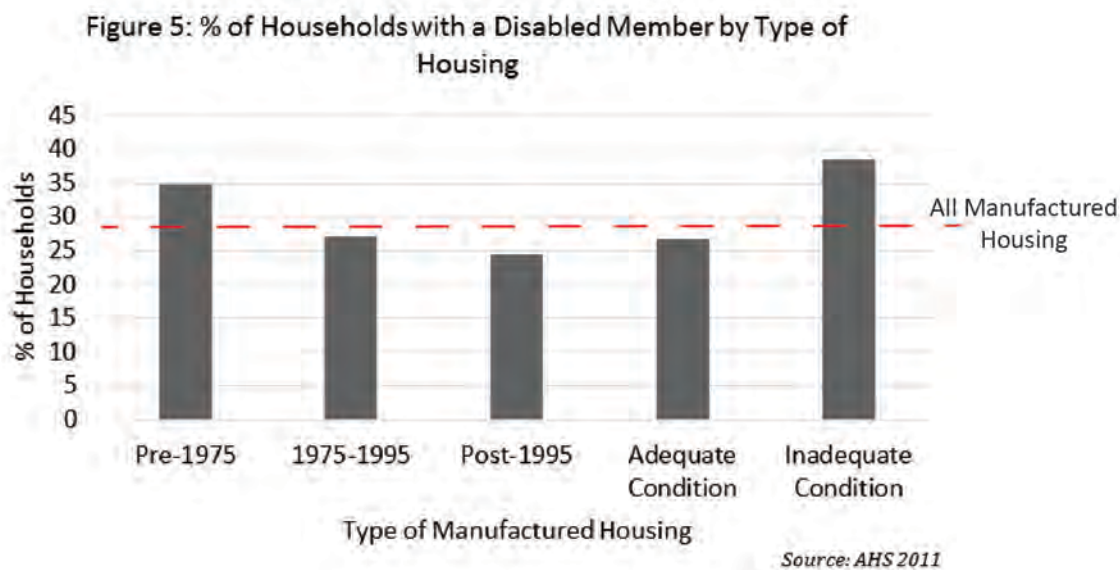
Disabled Individuals

There are also reasons to theorize that inadequate manufactured housing is home to a relatively large number of disabled individuals. Disability may limit an individual's income and housing choices. A constrained income can also prevent a householder from saving for major repairs and routine maintenance. The sensory, mobility, and cognitive difficulties that disability

¹⁴⁰ George and Bylund 2002: 2.

¹⁴¹ Wilden 2002: 17-18.

entails can limit the householder's ability to handle maintenance. Hoffman and Livermore (2012) find that disabled individuals tend to live in less desirable neighborhoods and homes.¹⁴²



Approximately 442,000 pre-1975 units, 832,000 units from 1975-1995, and 183,000 inadequate condition units contain a disabled individual. 38 percent of inadequate condition units contain a disabled individual.

Income

The residents of older, substandard manufactured housing units are often perceived to be among the poorest of the poor. Limited income might explain poor maintenance and inability to upgrade physically inadequate housing units. The affordability of manufactured housing across multiple parameters—total monthly housing cost, taxes, maintenance, mortgage payment—has been shown to attract low-income households.

Table 6: % of Manufactured Housing Type in Income Quartiles

Housing Type	% Households in Income Quartile			
	Bottom	Lower-Mid	Upper-Mid	Top
Pre-1975	48.8	31.6	14.2	5.5
1975-1995	42.3	32.7	20.5	4.6
Post-1995	28.8	40.6	22.3	8.1
Inadequate Condition	60.1	24.7	8.7%	6.5%
All Manufactured Housing	39.0	35.1	19.9	3.9

Source: Tabulation of AHS 2011

¹⁴² Hoffman and Livermore 2012: 5.

The 2011 AHS confirms these prior studies and suppositions. The median income of all households living in manufactured housing is \$26,000, compared to \$60,900 for households living in single-family, stick-built homes. The median incomes for households that occupy older and inadequate manufactured housing are even lower. For pre-1975, 1975-1995, and inadequate condition manufactured homes the figures are, respectively, \$24,000, \$25,000 and \$18,000. As shown in Table 6, this means that across all three of these types of manufactured housing, pluralities of households fall in the bottom income quartile.

Sources of income are also significant, for individuals who live on fixed incomes may be less likely to respond positively to initiatives that will increase their monthly housing costs. The 2012 ACS reports that 25 percent of manufactured home residents have not worked in the past week, considerably higher than the comparable figure for residents of single-family, site-built homes (14 percent). While 18 percent of households in a manufactured home built after 2000 have not worked in the last week, this measure rises to 26 percent among households in a 1960s home.

Table 7: Fixed Income by Type of Manufactured Housing

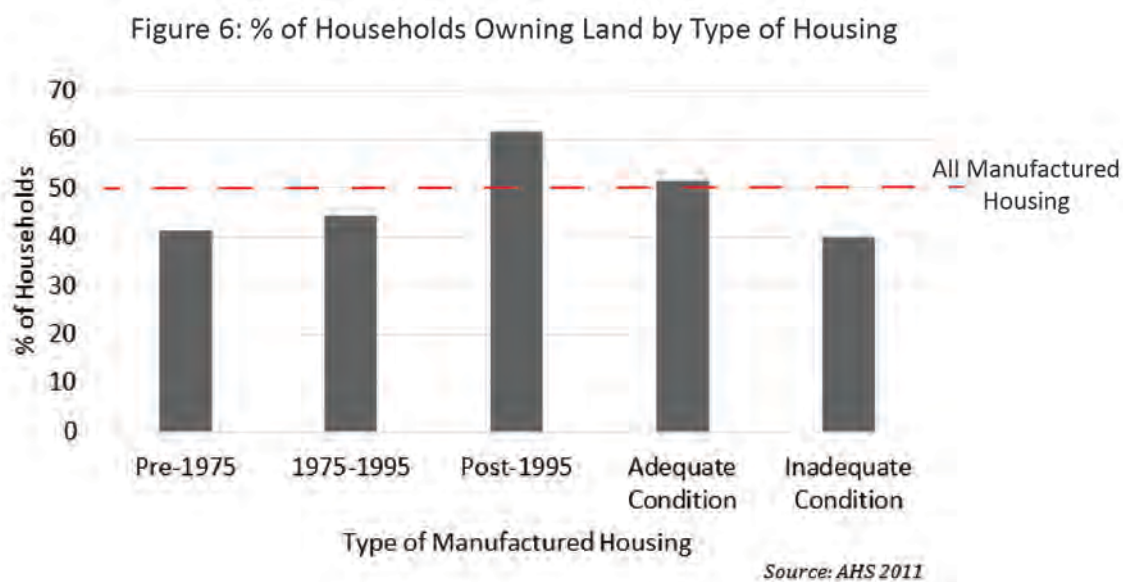
Type of Manufactured Housing	Social Security of Pension	Retirement or Survivor's Benefits
Pre-1975	38.9	12.7
1975-1995	30.2	12.1
Post-1995	25.0	9.9
Inadequate Condition	32.7	7.5
All Manufactured Housing	31.1	11.9

Source: Tabulation of AHS 2011

The AHS 2011 also estimates the number of households receiving fixed benefits, including pensions, Social Security, retirement benefits, or survivor's benefits; these figures may be still more illuminating than the data concerning residents' recent employment. While 25 percent of households living in single-family, site-built homes receive Social Security or a pension, this figure rises to as much as 38 percent for pre-1975 units. Although the AHS samples are generally too small to examine additional subgroups, it seems probable, given the high shares of elderly and disabled living in older, substandard manufactured housing, that dependence on fixed income is also higher among those living in such housing.

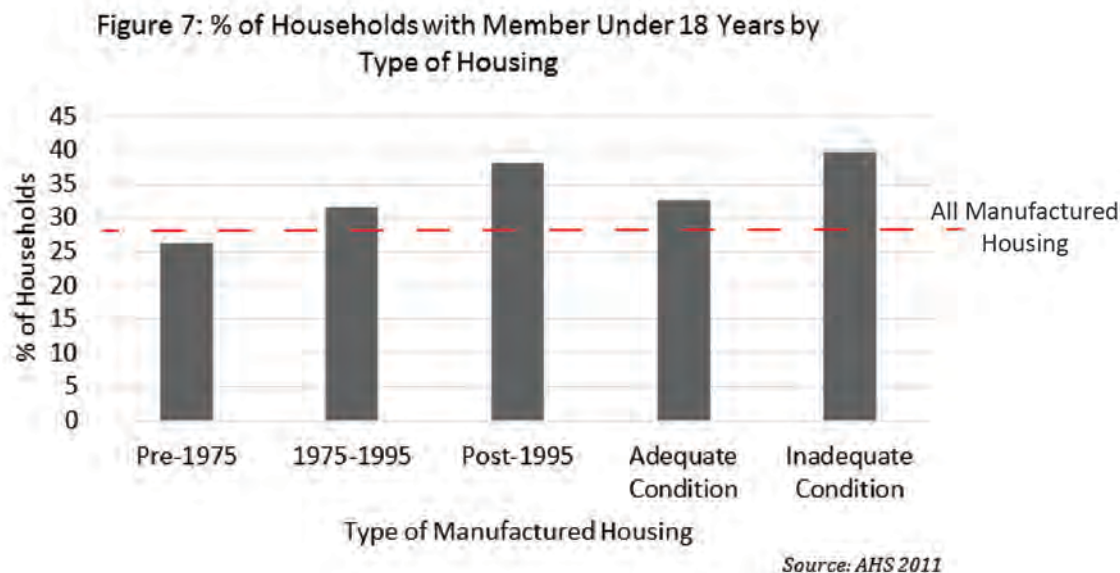
Tenure

For replacement program administrators, information about tenure status is critical because tenure affects eligibility for a number of funding sources. Approximately 50 percent of all manufactured housing units, 41 percent of pre-1975 units, and 40 percent of inadequate condition units sit on land owned by the occupant. Approximately 79 percent of all manufactured housing units, 69 percent of pre-1975 units, and 67 percent of inadequate conditions units are owned by their occupant.



Family Type

Manufactured housing is also sometimes thought of as a refuge for the “newly wed.” This perception is premised on the idea that, as a low-cost form of shelter, manufactured housing is a transitional option for new families. Before their incomes rise with age and the aggregation of assets, young families might find manufactured housing appealing.

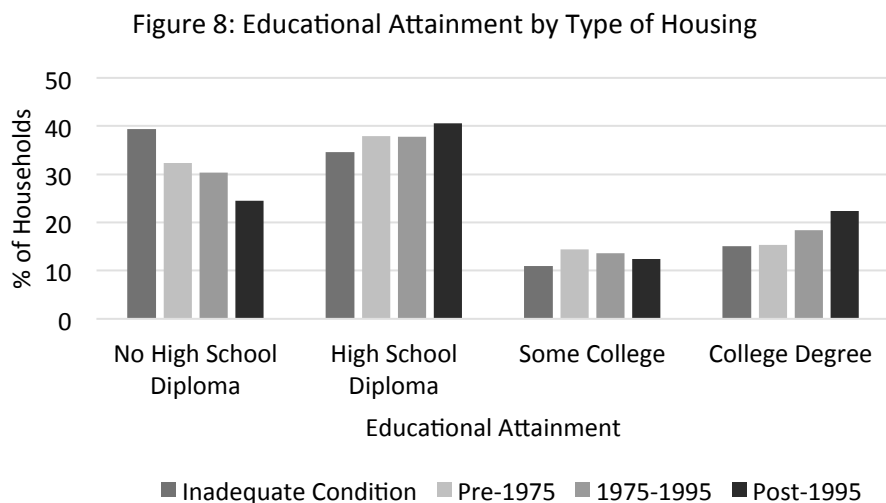


Households with children are in fact relatively uncommon among households living in manufactured housing. Approximately 33 percent of all manufactured homes (2.3 million units), 26 percent of pre-1975 units (342,000), and 39 percent of inadequate condition units (192,000) contain a member under the age of eighteen. These figures are considerably less than the comparable figure for single-family, site-built housing (65 percent).

Furthermore, the 2012 ACS estimates that 65 percent of households living in pre-1980 manufactured housing are couples. This figure includes roughly 600,000 single mothers. The ACS also estimates that 122,000 families living in pre-1980 manufactured housing (6 percent of pre-1980 households) do not include an adult over the age of fourteen who speaks English very well.

Education

Scholars and policymakers commonly contend that residents of manufactured housing have low levels of educational attainment. The educational level of residents of older, substandard manufactured housing should be of concern to replacement program administrators because it directly impacts the ability of potential clients to generate income for improvements.



The residents of inadequate condition manufactured housing do tend to have lower levels of education than residents of other types of housing. Approximately 39 percent of the residents of inadequate units (191,000 people), 32 percent of the residents of pre-1995 units (423,000 people) and 3.6 percent of the residents of single-family, site-built homes do not have a high school diploma.

Manufactured Housing Replacement Programs

Through a review of previous scholarly efforts, news reports, reports produced by advocacy programs, and recommendations made by housing professionals, over twenty-five manufactured housing replacements program in the United States were identified. These programs span fifteen states. Summarized in Table 8, these program do not represent all efforts to upgrade manufactured housing in the United States.¹⁴³ These programs do, however, represent the broad variety that has organically emerged in this policy area. Replacement programs have operated at almost every conceivable geographic scale: the town, the county, the region, and the state. They have employed a variety of funding mechanisms, from federal grants to conventional lending, in order to improve the housing stock.

Based on qualitative and quantitative research into these programs, the remainder of this paper seeks to illuminate the key policy questions that face housing professionals involved

¹⁴³ Excluded from consideration are programs that would fund manufactured home replacement but are not explicitly focused on that mission.

in manufactured housing replacement. Qualitative research into these programs involved review of programmatic documents, advertising materials, news reports, and pre-existing evaluations. Content analysis was supplemented by a series of semi-structured telephone interviews with program stakeholders. An effort was made to identify and contact the following stakeholders: program designers, program administrators, manufactured housing industry associations, manufactured housing tenant associations, and nonprofit partners. Additional interviews were conducted with national organizations active in the manufactured housing debate.

Table 8: Manufactured Housing Replacement Programs

State	Program Name	Administrating Organization
CA	Mobile Home Change-Out Program	Santa Cruz County, CA
CA	Mobile Home Rehabilitation and Replacement Program	City of West Sacramento, CA
CA	Mobile Home Tenant Loan Assistance Program	County of Riverside, CA
FL	Mobile Home Repair/Replacement Program	Town of Davie, FL
FL	-	County of Pasco, FL
KY	Manufactured Housing Done Right	Frontier Housing
ME	Pre-1976 Mobile Home Replacement	MaineHousing
ME	Housing Replacement Program	Penquis
MT	Manufactured Housing Replacement Program	NeighborWorks Montana
NH	Better Homes AHEAD	AHEAD, Inc.
NJ	-	Affordable Housing Alliance
NY	Manufactured Housing Replacement Program	Town of Fallsburg, NY
NY	Manufactured Home Replacement Initiative	New York State Dept. of Homes and Community Renewal
NY	Manufactured HOME Initiative II	Cattaraugus Community Action, Inc.
NY	RHOC Regional Mid-Hudson Rehabilitation	Rural Housing Opportunities Corp.
NY	HOME Program	Bishop Sheen Ecumenical Housing Foundation
NY	Mobile HOME Replacement for Cayuga County	Cayuga County Homesite Development Corp.
NY	Mobile Home Replacement Program	North County Affordable Housing
PA	-	CFED
OR	reHome Oregon	NeighborWorks Umpqua
RI	Western Rhode Island Home Repair Program	-
TN	-	Eastern Eight CDC

TN	Mobile and Manufactured Home Replacement Pilot Program	Tennessee Housing Development Agency
TX	-	El Paso Empowerment Zone
VT	Manufactured Housing Innovation Project	Vermont Housing and Conservation Board
VT	Manufactured Home Replacement Program / Down Payment Loan Program	Champlain Housing Trust
WA	-	Community Frameworks
WA	-	State of Washington

For each program an effort was made to aggregate information within seven categories:

- Impetus for the Program: Why was the program created? Who were its key proponents? What organizations contributed to the design of the program?
- Program Design: How were particular features of the program (eligible units, eligible individuals, type and amount of financial assistance, etc.) determined? How was the program funded? How did the program change over time?
- Program Outcomes: How many manufactured housing units have been replaced? What have been the costs of replacement?
- Partnerships and Collaborations: Were there partner organizations involved in the program? What roles were envisioned for local nonprofits?
- Program Clients: How were potential program participants identified? What are the characteristics (income, age, etc.) of these individuals? What outreach strategies were employed to advertise the program?
- External Influences: What local, state, or federal policies had a major impact on how the program functioned? What reforms would enable the program to work more effectively?
- Program Evaluation: What measures have been used to track the effectiveness of the program? Are energy savings, client housing costs, or health improvements tracked?

Stakeholders provided varying amounts of information relative to these questions. Their responses revealed that, while housing professionals have attempted to grapple with manufactured housing in different ways, they have all confronted similar issues. Synthesis of these experiences leads to the following broad conclusions regarding four key policy questions:

1. How should a replacement program be organized? Four major models, each with its advantages and disadvantages, emerged: government-driven, social enterprise-driven, resident-driven, and coalition-driven initiatives. The coalition-driven model affords significant opportunities for aggregation of resources under the stewardship of local nonprofits. Policymakers can enhance this model's potential for success by encouraging participating nonprofits to utilize elements of the social enterprise-driven and resident-driven models, which respond strongly to the fiscal constraints evident in the affordable housing sector.
2. What model-year manufactured homes should be targeted for replacement? While the popular narrative holds that pre-HUD code manufactured housing is the "worst of the worst," Census Bureau data suggests that a greater percentage and raw number of manufactured homes produced between 1975 and 1995 are in substandard condition. While limiting programs to pre-HUD code units simplifies administration and helps to conserve scarce funds, the practice should be replaced by a need-based system that prioritizes low-condition units.
3. Should manufactured housing replacement be subsidized? It has been argued that energy savings and conventional financing reduce the need for financial subsidies for manufactured housing replacement. Program experience suggests that ancillary cost increases due to replacement, such as higher taxes and insurance rates, may in fact make financial subsidies desirable. Low- and moderate-income homeowners have proven wary of taking on debt. Sustainable subsidies, such as tax increment financing and revolving-door loan funds, deserve additional attention.
4. What programmatic features are key to success? The experience to-date indicates that for any manufactured housing replacement program, flexibility is the key to successfully improving the housing stock. Responding to challenges creatively and altering a program over time are necessary because the "best" option may not always be feasible. Programs should be able to direct clients along several service tracks based on their unique conditions and needs, as well as local political and financial contexts.

Outcomes to Date

The manufactured housing replacement programs studied vary considerably in size, but none have operated at a large scale. Nationally, over the last decade, these programs have replaced between 500 and 1,000 units. On the higher end of the spectrum, Santa Cruz County, CA's Change Out Program conducted ninety-nine replacements for \$60,000-70,000 per unit.¹⁴⁴ Between 2009 and 2010, MaineHousing's Mobile Home Replacement Program served 52 households.¹⁴⁵ The average acquisition price has been \$79,000.¹⁴⁶

As of September 2014, the Next Step network had replaced 155 homes.¹⁴⁷ Among network members, NeighborWorks Montana reports replacing twenty-five homes, which is one-third of expectations.¹⁴⁸ Eastern Eight CDC has conducted eight replacements.¹⁴⁹ Eastern Eight was also involved with the Tennessee Housing Development Agency's program. This program underperformed relative to expectations, replacing only three units and utilizing a fraction of its \$856,000 budget allocation.¹⁵⁰ Vermont's Manufactured Housing Innovation Project, reHome Oregon, and Better Homes AHEAD are in the planning stages or have produced pilot units to-date.¹⁵¹

Table 9: Impact of Select Manufactured Housing Replacement Programs

Replacement Program	Units Replaced	Location
Next Step network of nonprofit program	155	National
Manufactured Housing Innovation Project	Pilot	VT
reHome Oregon	Pilot	OR
Better Homes AHEAD	Pilot	VT/NH
Champlain Housing Trust	19	VT
New York State Homes and Community Renewal	146*	NY
Washington statewide pilot program	27	WA
Montana statewide pilot program	19	MT
Mobile Home Replacement Program	52	ME
Santa Cruz County, CA's Change Out Program	99	CA

¹⁴⁴ Landaverry 2014.

¹⁴⁵ MaineHousing 2011.

¹⁴⁶ Roth 2014.

¹⁴⁷ Next Step, "Next Step's Impact."

¹⁴⁸ Rice 2014.

¹⁴⁹ Patton 2014.

¹⁵⁰ Stevens 2014; Tennessee Housing Development Agency.

¹⁵¹ Peltier 2014; Chaput 2014; Berg 2014.

*Estimated impact

Organization of Replacement Program

Policymakers have developed a number of different organizational models for replacing older, substandard manufactured housing with new dwelling units. For purposes of analysis, these models can be classified as government-driven, social enterprise-driven, resident-driven, and coalition-driven. These are not the only ways to organize an effort to replace manufactured housing, but they represent the most developed approaches to date. Not discussed within this paper are replacement efforts driven by subsidies to manufacturers, most disaster relief programs, or initiatives run solely by for-profit manufactured housing park owners.

Government-Driven Model

Government-driven programs, such as those operated by MaineHousing, the Tennessee Housing Development Agency, and New York Housing and Community Renewal, are planned by state, county, or local agencies. Based on either pass-through funding from a higher level of government or a dedicated source of revenue, the government agency makes a commitment to the replacement of manufactured housing. This commitment is generally constrained by an allocation and not open-ended. In some cases, the government agency sets standards for program administration and then allocates its funding to local nonprofits through grants. While a variety of different program designs are employed, most government-driven programs seek to subsidize the purchase of a new mobile home by the consumer.

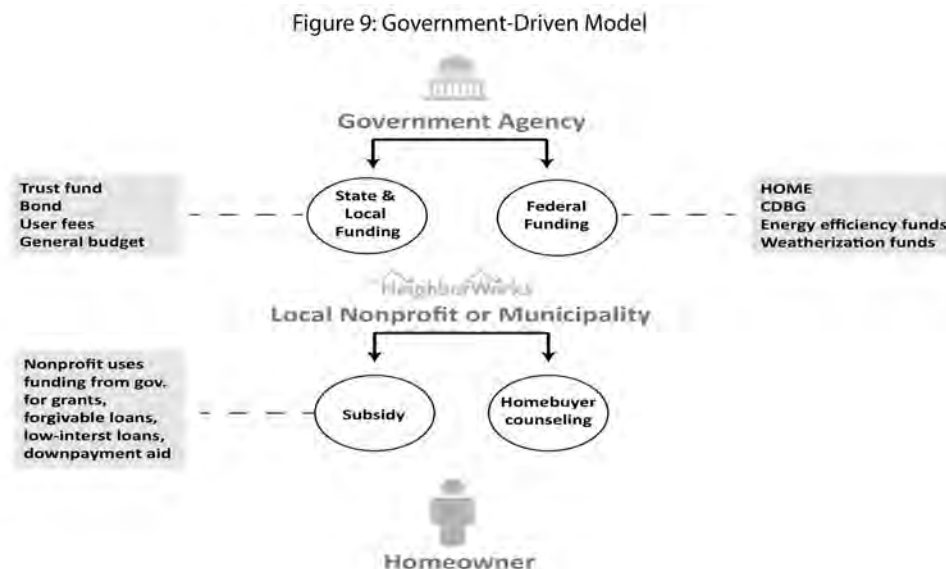
The primary advantage of the government model is access to program funding through public sources. Federal funds such as HOME and CDBG can be employed (with certain restrictions) for manufactured home replacement. But a variety of other funding sources can be tapped. The Tennessee Housing Development Agency's replacement program relied on a housing trust fund, which is largely funded by the agency's sale of revenue bonds on first-time homebuyers.¹⁵² Riverside County, California has relied on an affordable housing fund capitalized by an increment of taxes on new development in the state.¹⁵³ Santa Cruz County,

¹⁵² Stevens 2014.

¹⁵³ Riverside 2003.

California has utilized funds from a local redevelopment agency and the state-run CalHome loan program.¹⁵⁴ In Vermont, homeownership tax credits funded manufactured housing replacement. The Champlain Housing Trust reports that it sold the tax credits at a rate of 92 cents on the dollar.¹⁵⁵ Furthermore, some government programs not focused on manufactured housing, like the Arkansas Dream Downpayment Initiative, can be utilized for replacement.

The delegation of authority from a government agency to a nonprofit provides an opportunity to leverage additional funds. The Tennessee Housing Development Agency's Mobile and Manufactured Home Replacement Pilot Program required a 50 percent match for each project. In practice, acquiring this match for projects was a challenge. In one case, the match funds came from a charitable source through the state's manufactured housing association, and funds that the state housing development agency was recycling from another program provided the match for another replacement.¹⁵⁶ Experience suggests that when this delegation takes place, nonprofits need time – perhaps longer than a year – to develop the necessary administration systems.¹⁵⁷



¹⁵⁴ Landaverry 2014.

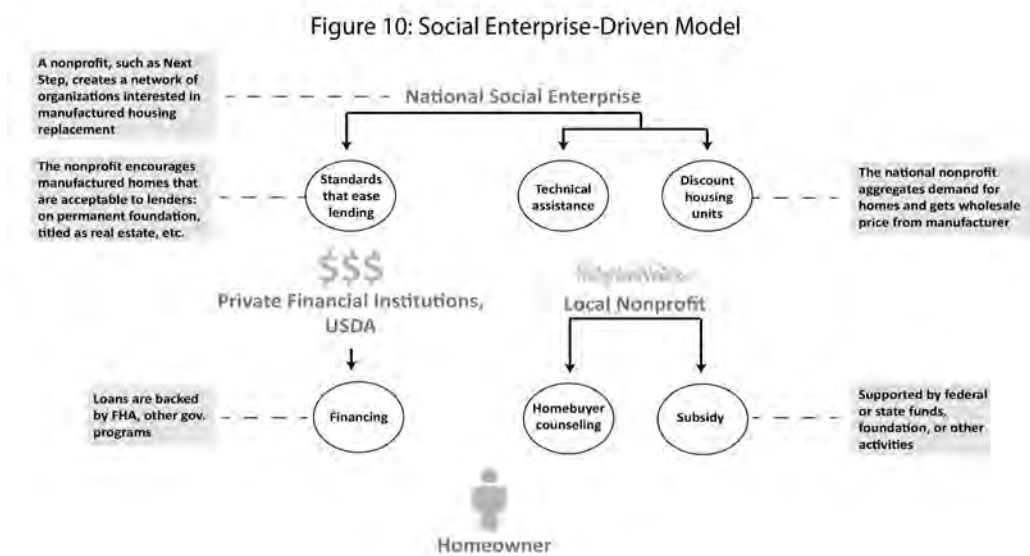
¹⁵⁵ Higgins 2014.

¹⁵⁶ Stevens 2014.

¹⁵⁷ Patton 2014.

Social Enterprise-Driven Model

The social enterprise-driven model is best represented by Next Step's efforts to make low-cost manufactured housing and conventional financing more accessible. The social enterprise—Next Step or a similar nonprofit—acts as a national or regional aid to local nonprofits engaged in manufactured housing replacement. By aggregating the demand of those local nonprofits for new homes, the social enterprise is able to obtain a cost-effective deal from a manufacturer. The social enterprise also sets standards for the construction of units, ensuring that they are both energy efficient and eligible for conventional financing. The local nonprofits guide clients through the replacement process and provide additional assistance, including financial subsidy and homebuyers' counseling.



The key advantage of the social enterprise-driven model is the ability to facilitate manufactured housing replacement without large government expenditures, primarily by opening up access to conventional financing. Manufactured homes have traditionally been financed by chattel loans, which usually have shorter terms, higher interest rates, and a less competitive market. A difficulty faced by the social enterprise-driven model is that conventional financing is often hard to obtain for units not on owned land.¹⁵⁸ Next Step's system ensures that manufactured housing residents have access to mortgages backed by FHA, USDA-RA, or the GSEs by promoting certain practices, including installation of an FHA Title II foundations and

¹⁵⁸ Cunha 2013: 8.

titling the property as real estate. However, a drawback of this approach is that absent subsidies, it does require that homeowners take on additional debt – a step that low-income homeowners are often wary of taking.¹⁵⁹

Resident-Driven Model

The resident-driven initiative model grows out of the resident-owned community (ROC) movement. In a manufactured home park owned by an association of residents, residents are better able to improve their housing situations. Change in land tenure, positioning of homes on permanent foundations, and classification of homes as real property all make conventional financing and other affordable housing resources easier to obtain.¹⁶⁰ The key feature of this model is that residents make these decisions on their own, with technical assistance from a nonprofit.

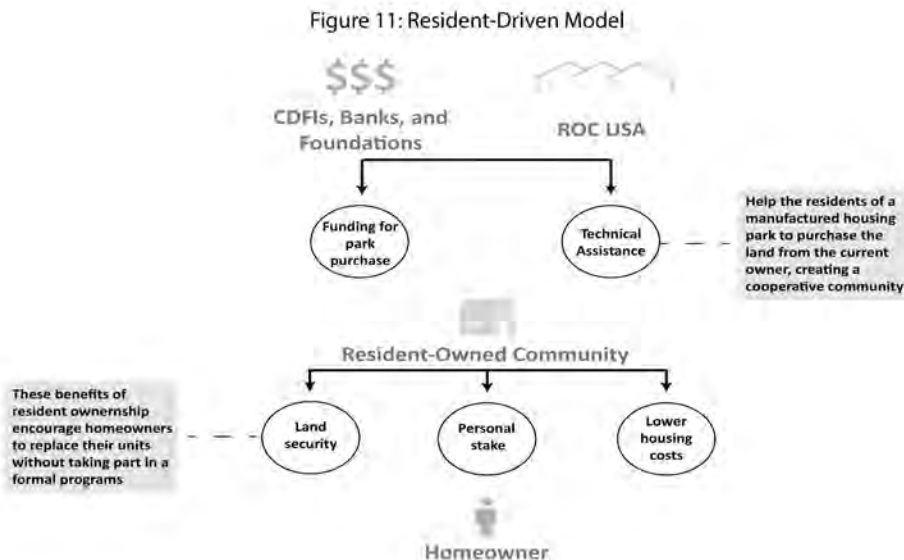
Research on the resident-ownership model's impact on homeowners' ability to upgrade their units has been limited. French, Giraud, and Ward (2008) found that resident-owned communities (ROC) in New Hampshire obtained more loans than investor-owned communities (IOC) between 1995 and 2005. At the peak in 2004, twelve mortgages went to IOCs and thirty-one to ROCs. The latter figure represents a significant increase over the four mortgages issued to ROCs in 1995.

However, the purposes of these mortgages are not specified: they may be for the replacement of existing substandard units, but they might also be for refinancing or infill or replacement of units in fair condition. Paul Bradley of ROC USA and John Wiltse of PathStone both indicated that within resident-owned communities, they had not observed any self-driven replacement of substandard units. Ward et al. (2008) suggests that such behavior is unlikely because it is doubtful that "many tenants of mobile home parks would be able to finance both a mobile home park communal purchase and a replacement home at the same time."¹⁶¹

¹⁵⁹ Rice 2014; Patton 2014.

¹⁶⁰ Kennedy and Flynn 2006: 22.

¹⁶¹ Ward et al. 2008: 12.



Coalition-Driven Model

Coalition-driven models are created and/or administrated by a diverse group of stakeholders. These stakeholders might include government agencies, affordable housing developers, social service agencies, medical institutions, educational institutions, power companies, and financial institutions. Generally, these organizations come together due to the initiative of one government or nonprofit agency who has identified substandard manufactured housing as an issue. The coalition may then form a committee or a panel of experts to generate policy recommendations. After major policy decisions have been made, administration of the program is typically delegated to a local nonprofit. This nonprofit aggregates funding sources and expertise to help clients replace substandard homes. Examples of the coalition-driven model are only nascent. ReHome Oregon and Vermont's Manufactured Housing Innovation Project have completed pilots and are working to find permanent funding. A coalition effort is currently forming in southwestern Pennsylvania.

There are reasons for both optimism and caution about these emerging coalitions. The model's benefits will be discussed first. Koebel, Steinberg, and Dyck (1998) suggests that a benefit of public-private partnerships is their ability to secure commitments from important institutions by fostering a sense of mutual benefit. The support of these institutions can, in turn, insulate a project from political instability and provide multiple avenues of funding. The enhanced legitimacy of a project with multiple sponsors can also be a useful wedge against

NIMBYism, an acute problem with regard to affordable housing development. Public coalition partners can reduce regulation so as to smooth the path to affordable housing creation. Finally, the coalition can aggregate resources and thus realize economies of scale.¹⁶²

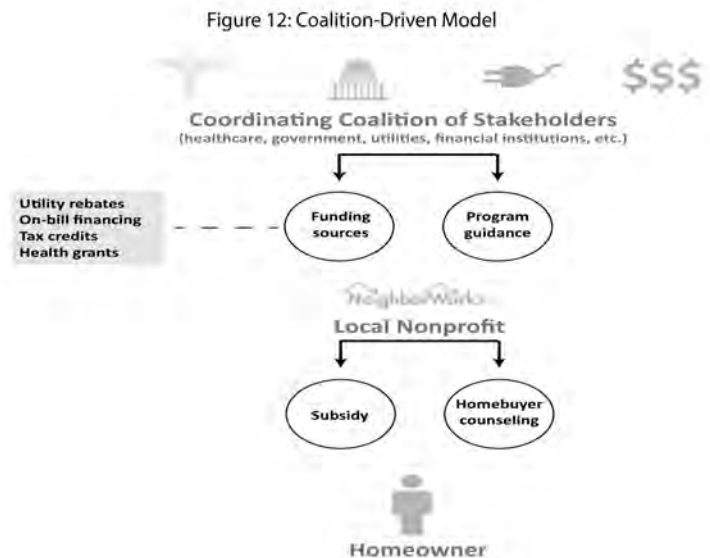
The coalition-driven model has found concrete form in reHome Oregon. Bolstered by a health-impact assessment that identified older manufactured housing as a health risk in a rural county, regional leaders convened a working group to create a manufactured housing replacement program. This effort was coordinated by Oregon Solutions, a state-funded effort operated out of Portland State University. Oregon Solutions staff researched stakeholders, and recommended that a replacement initiative be designated an official project by the governor. The governor then appointed co-conveners, who invited stakeholders to join a committee. This process helped to legitimize the effort and brought to the table a wide array of stakeholders, along with their funds and expertise.

Oregon Solutions staff supported the committee by maintaining information, sharing information, and helping to facilitate meetings. After several committee meetings, Oregon Solutions created a declaration of collaboration that all of the parties signed. This document is not legally binding, but it is a “good faith handshake” that helps to keep people from falling off or not following through on commitments. To build on this effort, the committee meets again in six months to evaluate results.¹⁶³ A co-convenor of reHome Oregon argues that this coalition effort helped to bring diverse resources to the table and educate stakeholders about various opportunities for replacement.¹⁶⁴

¹⁶² Koebel, Steinberg, and Dyck 1998: 44-46.

¹⁶³ Mills 2014.

¹⁶⁴ Stallard 2014.



At the same time, administering a project through a partnership can be unwieldy. The presence of multiple leaders can confuse accountability, while the need to satisfy multiple partners can lead to wasteful expenditures or unclear accountability for performance.¹⁶⁵ In the context of reHome Oregon, a co-convener indicates that having resources and administrative responsibility channeled to a single nonprofit helped to alleviate some of these concerns.¹⁶⁶

Model Years Targeted for Replacement

Some replacement programs exclusively target manufactured housing built prior to the advent of the HUD code in 1976. Policymakers indicate three primary reasons for this focus: (1) conditions of units, (2) prioritization of resources, and (3) administrative ease.

Anecdotal evidence suggests that well-maintained older units do exist, but that they are the exception. A favorable climate can contribute to preservation of older units.¹⁶⁷ Certain design features, including a flat roof, play a large role in determining the rate at which a unit will deteriorate. Data that compares quality of manufactured housing by year built is, however, relatively scarce. Koebel and Daniels (1997) find that older manufactured housing in work camps for migrant farm workers has the highest rate of physical inadequacy.¹⁶⁸

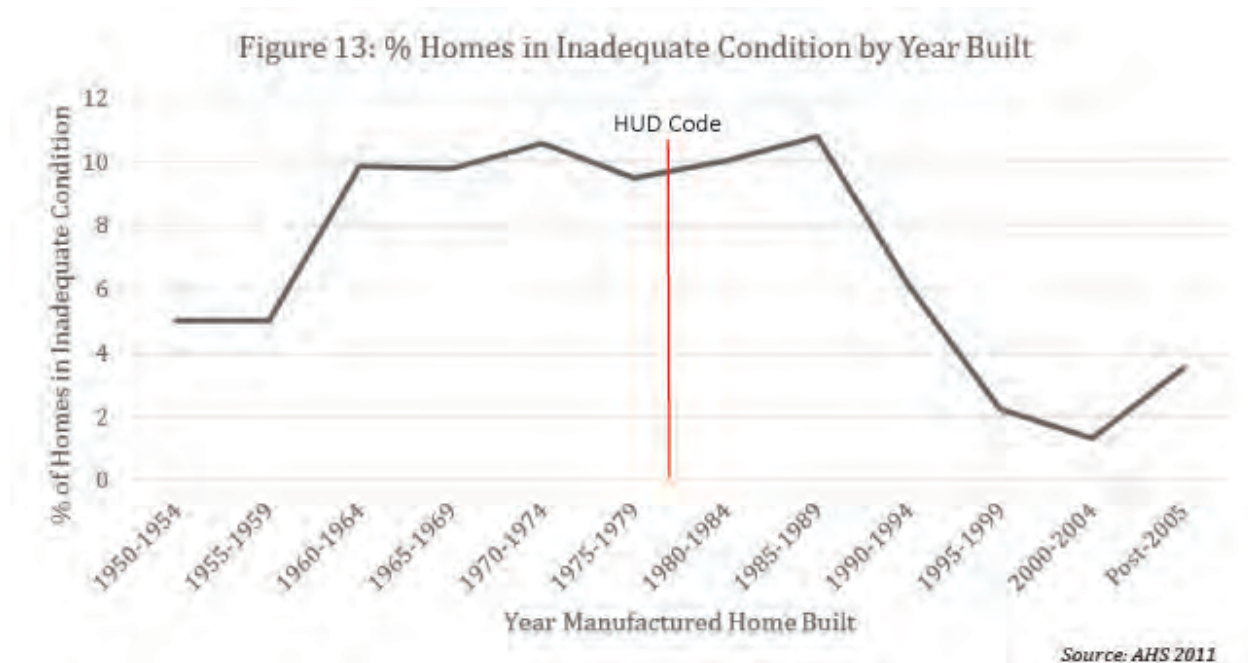
¹⁶⁵ Koebel, Steinberg, and Dyck 1998: 48.

¹⁶⁶ Stallard 2014.

¹⁶⁷ Apgar et al. 2002: 19.

¹⁶⁸ Dawkins et al. 2011: 2.

Surprisingly, the 2011 AHS suggests that units built prior to the introduction of the HUD code are not the most likely to be inadequate. In fact, while 10.6 percent of units built between 1970 and 1975 are in inadequate condition, the figure is 10.8 percent of those built between 1985 and 1990. More manufactured homes in inadequate condition were built after the HUD code but prior to the code's 1994 update (approximately 280,000 homes) than were built prior to the HUD code (144,000 homes).



As shown in Table 10, older units do not demonstrate significantly higher levels of physical inadequacy than new units across a range of features. There are several plausible explanations for this phenomenon. First, the construction standards enacted after the HUD code might not have ushered in an epochal shift. Second, the worst conditioned manufactured homes built prior to the 1976 code might have already fallen out of the market. The units that remain are those that have benefited from weatherization or maintenance.

Table 10: Frequency of Physical Problems in Manufactured Housing by Year Built

Physical Problem	% of Pre-1975 Homes	% of 1975-1994 Homes	% of Post-1995 Homes
Exterior Water Leak	14	12	8
Sewer Failure	2	2	1
Lost Running Water	8	9	5
Unit Cold 24+ Hours	17	14	8
Uneven Roof	6	6	1

Missing Shingles	3	4	4
Holes in Roof	4	4	2
Foundation Crumbling	6	6	2
Broken Windows	8	6	5
Space Heater Used	1	2	11

Source: AHS 2011

Roughly 10 percent of homes may also represent a natural level of inadequacy for manufactured housing after twenty years in use. Table 11 compares 2011's stock of inadequate manufactured housing by year built with the inadequate stock from 2001. A relatively small uptick in the percentage in inadequate condition is evident among units older than twenty-five years. Particularly striking is the sharp decline during the 2000s in the number of inadequate units from 1960-1975: these units are leaving the housing stock. Meanwhile, the number of units from the 1980s in inadequate condition has risen sharply. What policymakers must consider is whether units built in the 1980s will soon leave the market at the same rate as 1960-1970s units did during the 2000s.

Table 11: Inadequate Conditions in Manufactured Housing by Year Built, 2001 vs. 2011

Period Home Built	2001 AHS		2011 AHS		
	# Inadequate Homes	% Inadequate Homes	# Inadequate Homes	% Inadequate Homes	% Change
Pre-1950	9,619	12	22,040	24	129
1950-1959	2,891	3	3,380	5	17
1960-1969	71,908	12	40,711	10	-43
1970-1974	94,969	9	78,133	11	-18
1975-1979	66,516	6	69,831	9	5
1980-1984	45,947	6	74,686	10	63
1985-1989	45,451	6	82,393	11	81
1990-1994	45,624	5	53,201	6	17
1995-1999	15,663	1	33,248	2	112

Source: AHS 2001 and 2011

Required Subsidy

Programs can assist homeowners in replacing substandard manufactured housing in a number of different ways. Loans at generous terms are a common approach. NeighborWorks Umpqua plans to use 30-year loans at 3 percent interest through a partner financial institution; NeighborWorks will further subsidize the loan by providing a zero interest loan with deferrable

payment to help cover the down-payment.¹⁶⁹ The Tennessee Housing Development Agency's program granted funds to nonprofits to use as grants or loans, and it required that loans have a maximum term of 30 years and 3 percent interest.¹⁷⁰ Riverside County, California offered a fully-forgivable 45-year loan of up to \$40,000 at zero percent interest with deferred payment.¹⁷¹ Santa Cruz County, California offered 20 years at 3 percent interest, with 10 percent of interest being forgiven during each of the last ten years of the term. This loan carried an innovative provision: the county shared in any appreciated value on the property realized upon resale, allowing it to recapture some of the subsidy for future use.¹⁷²

Many programs also include grants. MaineHousing's replacement program combines an affordable loan with a \$30,000 grant. A program in the El Paso Empowerment Zone that replaced manufactured housing with site-built units utilized grants to cover mortgage closing costs, removal of the old units, and resolution of outstanding liens.¹⁷³ The Town of Fallsburg, New York's Manufactured Housing Replacement Program, a recipient of state HOME funds, offered homeowners a \$50,000 grant, with self-funding or low-interest loans covering excess costs.¹⁷⁴

Program designers face considerable uncertainty when they determine levels of subsidies. Their goals include ensuring affordability for households, encouraging households to leave substandard units, and spreading out available funds as much as possible. Administrators attempt to set any subsidy at a level that is sufficient but not excessive. For example, MaineHousing first determined that a new home would cost approximately \$100,000 and added \$8,000 to this figure in order to cover the cost of demolishing the old unit. The organization then examined the characteristics of their target population. The goal was to determine the amount of subsidy that would generally be required to help this population handle a 20 percent downpayment on a loan to cover the replacement cost. (20 percent was

¹⁶⁹ Chaput 2014.

¹⁷⁰ Stevens 2014.

¹⁷¹ Riverside 2014.

¹⁷² Landaverry 2014..

¹⁷³ Kennedy and Flynn 2006: 3B.

¹⁷⁴ Fallsburg 2012.

the target because below that amount, mortgage insurance would be required.) The result of these calculations was a \$30,000 grant, coupled with a loan.¹⁷⁵

Replacement programs expect increased energy efficiency will lead to savings that help offset the cost of the new unit. Lucas et al. (2007) contend that an Energy Star unit can save up to \$246 per year over a basic HUD code home.¹⁷⁶ A major weakness of all replacement programs is that they have not actually tracked energy savings and compared them with the cost increases associated with replacement. Investment in energy efficiency is itself a double-edged sword. While it improves the home's operating cost, it may also raise the initial purchase price beyond what a low-income household can afford.¹⁷⁷

New taxes can also lead to higher costs when a home is replaced. When an older, substandard unit is replaced by a modern one, property taxes will likely increase. If the old home was classified as personal property and the new one as real property, then the impact may be particularly acute (taxes on the former are generally lower than on the latter).¹⁷⁸ Insurance can also be a significant new cost: rates for manufactured homes are typically higher than for site-built homes.¹⁷⁹

Housing cost data from the 2011 AHS provides a starting point for discussion of the financial impact of replacement. The median monthly housing cost for an inadequate condition unit is \$86 less than for an adequate condition unit. However, lower maintenance costs can lead to significant savings. While the median maintenance costs for inadequate and adequate condition units are the same (\$200), the mean cost for inadequate units is \$162 greater. This discrepancy suggests that the cost of repair projects for inadequate homes sometimes spirals out of control. This hypothesis is supported by an AARP survey from 1999 that indicated that the average out-of-pocket cost for major repairs on existing units was \$1,140, with costs ranging from \$420 to \$2,240.¹⁸⁰ On the other hand, the median tax and insurance bills both increase by significant amounts when an inadequate condition unit is replaced by a new home.

¹⁷⁵ Roth 2014.

¹⁷⁶ Lucas et al. 2007: 5.

¹⁷⁷ Koebel, Steinberg, and Dyck 1998: 40.

¹⁷⁸ Burkhart 2010: 452.

¹⁷⁹ Atilas and Vanderford 2006: 4.

¹⁸⁰ Fisher 1996: 6.

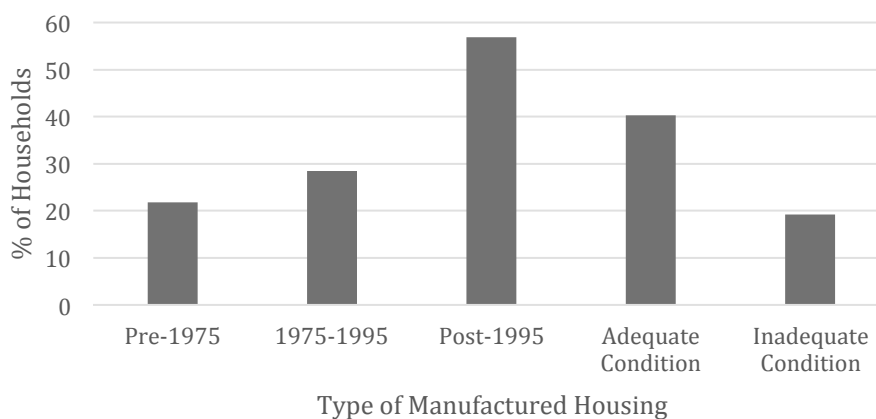
Table 12: Housing Costs for Adequate and Inadequate Condition Manufactured Homes

Cost	Inadequate Manufactured Home (\$)	Adequate Manufactured Home (\$)	% Change
Median Monthly Housing Cost	512	598	16.8
Median Tax Bill	150	250	66.7
Median Insurance Bill	307	441	43.6
Median Water and Sewage Bill	360	360	0.0
Mean Maintenance	572	412	-28.0
Median Electric Bill	120	125	4.2

Source: AHS 2011

In all likelihood, the most significant cost increase due to replacement will be a homeowner's new mortgage. Only 19 percent of inadequate condition homes and 22 percent of pre-1975 homes currently have a mortgage, compared to 40 percent of adequate condition homes. This means that Table 12 likely underestimates the increase in total monthly housing cost due to replacement, for a majority of the units in the sample of adequate homes do not have a mortgage.

Figure 14: % of Homes with a Mortgage by Type of Manufactured Housing



Source: AHS 2011

Such comparisons are important for manufactured housing administrators, for it is unclear how sensitive prospective buyers of manufactured homes are to price changes. Studies of manufactured housing have consistently found that affordability is a key feature of the

housing stock.¹⁸¹ Hatstrup et al. (1993) suggests that affordability has the largest impact on the purchase decision for a manufactured home, especially for young people and lower-income households. Buyers are, however, also influenced by the energy efficiency of homes.¹⁸² These impressions are generally corroborated by the experiences of replacement program stakeholders, who cite participants' concerns regarding higher housing costs and mortgages as problems.¹⁸³

In recent years, savings from energy efficiency have appeared less probable to homebuyers as energy prices have escalated.¹⁸⁴ Between 1980 and 2008, the price per unit of retail electricity increased 110 percent.¹⁸⁵ Consumers are also often unaware of the potential benefits of energy efficiency.¹⁸⁶ Berg and Taylor (1994) contends that consumers need additional information, especially from retailers, about the pay-back periods for energy efficiency upgrades.¹⁸⁷ Barley (2002) reaches a similar conclusion with regards to indoor air quality: since homebuyers are unaware of the problem, they are unwilling to spend to correct it.¹⁸⁸ Wilson suggests that energy education and access to real-time data about energy bills would help consumers to make more informed decisions.¹⁸⁹

These recent studies imply that, at least in the short-term, consumers will likely demand subsidies in order to replace substandard manufactured housing at a significant volume. Housing professionals should work with government partners to explore new sources of funding beyond existing sources, which include HOME funds, energy efficiency grants, and discretionary spending programs specifically for manufactured housing replacement. For instance, one source of funding that has not yet been deeply considered is the revenue generated by new development. The California Redevelopment Law requires the creation of Low- and Moderate-Income Housing Set-Aside Funds. 20 percent of all new taxes generated by

¹⁸¹ Rivenbank 2003: 6; Gorbach 2011: 16; George and Bylund 2002: 6; Aman and Yarnal 2010: 90; Yu 2013.

¹⁸² Hatstrup et al. 1993: 5.

¹⁸³ Rice 2014; Chaput 2014; Albert 2014.

¹⁸⁴ Kennedy and Flynn 2006: 12.

¹⁸⁵ B. Wilson 2012: 175.

¹⁸⁶ Rivenbank 2003: 56-67.

¹⁸⁷ Berg and Taylor 1994: 61.

¹⁸⁸ Barley 2002: 5.

¹⁸⁹ B. Wilson 2012: 196.

new development enters this fund and can be used to finance projects that benefit low- and moderate-income communities. Riverside County has used its Set-Aside Fund to support replacement of substandard manufactured housing.¹⁹⁰ Similarly, programs targeting manufactured housing in Florida can utilize funds from the State Housing Initiative Project, which is funded by a fee on real estate transactions.¹⁹¹ An even more targeted and proactive approach would be to designate a manufactured housing park, or another area with many manufactured homes, as a Tax-Increment Financing District. After an initial allocation of funds to support replacement, new tax revenue generated by this activity (the increment) would be used to pay back that allocation and capitalize a fund for future replacement work.¹⁹²

Program Flexibility

Most programs operate based on set eligibility standards and an established process for determining eligibility. They function as a pipeline, with clients entering for evaluation and leaving if they fail to meet standards. The parameters are often dictated by funding sources, which (for new homes) generally require that participants have less than 80 percent of area median income.¹⁹³ There are exceptions: NeighborWorks Montana does not have a set income limit for program participants. The upper end of the income spectrum appears to be around 125 percent of AMI, which Santa Cruz County selected in order to include working families.¹⁹⁴ Property ownership, acceptable credit, freedom from liens on the property, and first-time homebuyer status are requirements in most programs.

These requirements become problematic when they prevent programs from engaging with clients in need. Said one reHome Oregon participant, “It can’t be a one-size-fits-all. What works for a consumer who replaced her home, might not work for someone else. Why limit it to ‘you either qualify or you don’t’ when you could improve their health or make it slightly more energy efficient?”¹⁹⁵ One program administrator indicated that the difficulty of finding financially qualified homeowners with an eligible manufactured home was so great that the

¹⁹⁰ County of Riverside 2013.

¹⁹¹ Taylor 2013.

¹⁹² Dye and Merriman 2006.

¹⁹³ Rice 2014.

¹⁹⁴ Landaverry 2014.

¹⁹⁵ Stallard 2014.

program is sun-setting with hundreds of thousands of dollars unspent.¹⁹⁶ In total, the program was able to assist only two homeowners.

Flexibility can be introduced through a web of assistance linking replacement programs to other services within an organization or region. When a client comes to the attention of a nonprofit, he should be considered for housing improvement solutions in a defined waterfall. For instance, if a client approaches a nonprofit about rehabbing a manufactured home, but it is determined that the unit is too damaged, then the client should be directed to the replacement program. If the client cannot qualify for the replacement program due to outstanding liens on the property, then the client should be directed to a savings program that helps to resolve financial issues, with the understanding that she will eventually be able to circle back to the replacement program.

Replacement programs can also become more flexible if they remain unconstrained by relatively inflexible standards, such as an Energy Star label. There are numerous sustainability rating systems, and they emphasize different factors. For instance, manufactured housing's environmental impact might be diminished by adopting a standard that analyzes the site, as well as the structure. Sustainability is impacted greatly by local conditions, and so a system must have the flexibility to respond to the constraints of a particular climate, site, or market.¹⁹⁷ Similarly, a program might not want to focus exclusively on replacing manufactured housing with manufactured housing. A New York State housing advocate suggests that the ability to replace manufactured homes with modular housing in certain circumstances helps contain community concerns.¹⁹⁸

This holistic approach to improving the housing conditions of individuals living in manufactured housing strikes the correct note, for repair is clearly still a viable route for some manufactured homes. Studies have shown that weatherization and energy efficiency retrofits have the potential to greatly reduce energy usage and bills. Persily, Nabinger, and Dols (2010) finds that enhanced sealing of a home's envelope reduces air leakage by 18 percent.¹⁹⁹ Siegel

¹⁹⁶ Stevens 2014.

¹⁹⁷ Retzlaff 2008: 517.

¹⁹⁸ McKnight 2014.

¹⁹⁹ Persily, Nabinger, and Dols 2010:

and Davis (1997) demonstrates that conventional air sealing of a manufactured home improves efficiency by 17 percent. Based on median annual energy savings of \$57-88, they conclude that such retrofits have a payback period of one to five years.²⁰⁰ Concerns regarding “wasting” precious funds on improving the energy efficiency of homes that could be replaced might be allayed by the use of energy savings calculators and consumer education.

Program flexibility can also be realized by implementing novel ideas that open new funding sources or reduce regulatory barriers. A program administrator from Oregon, for example indicates that one successful strategy for financing loan downpayment requirements has been to argue that clients are first-time homebuyers.²⁰¹ To date, the legitimacy of such a claim seems to have been debated only on the local level. Regulatory barriers should also be addressed by program administrators seeking flexibility. Multiple stakeholders note that environmental review can absorb a large share of a program’s funding, reducing its ability to provide support to homeowners.²⁰²

Next Steps for Manufactured Housing Replacement

This paper has sought to aggregate knowledge regarding older, substandard manufactured housing in the United States and efforts to upgrade those units. It has outlined the primary arguments for manufactured housing replacement, quantified the issue of older, substandard manufactured housing, and illustrated regional variation in the issue. An analysis of previous and current manufactured housing replacement programs revealed four key policy questions for housing professionals:

- How should a replacement program be organized?
- What model year manufactured homes should a replacement program target?
- Should a replacement program include a subsidy?
- What are key features of a successful program?

The paper makes several policy recommendations for housing professionals. Foremost, manufactured housing built after the introduction of the HUD code should be eligible for replacement. These units represent a large amount of the stock of substandard condition

²⁰⁰ Siegel and Davis 1997: 2.

²⁰¹ Chaput 2014.

²⁰² McKnight 2014.

manufactured housing. Housing professionals should also consider creating new, dedicated sources of revenue in order to provide an upfront consumer subsidy for manufactured housing replacement. Practitioner experiences suggest that without such a financial incentive, it is difficult to operate a successful program. One way to secure adequate funding for subsidies is to design replacement programs through a coalition of government, nonprofit, and private-sector stakeholders.

The exact size of any given subsidy must be determined by additional research. Unfortunately, manufactured housing programs have not to date collected a large amount of information about post-upgrade outcomes. To determine the optimal size of a subsidy, policymakers need a more detailed understanding of how homeowners' monthly housing costs, including taxes, insurance, energy bills, and maintenance, change after the replacement of a manufactured home. Collection of this data should be prioritized for several reasons. First, a convincing case must be made to homeowners that they will be better off financially after replacing an older manufactured homes. Second, detailed energy savings information could be used to convince financial institutions to stretch the terms of loans, providing increased affordability at no extra cost. Finally, without such outcome measures, it is impossible to determine whether nonprofits are making a sound investment with their limited community development dollars.

Outcome data is especially important, for nonprofits should integrate manufactured housing replacement with their other business streams. Experience in the field suggests that obstacles, such as limited client finances or community opposition to manufactured housing, can stymie replacement plans. An effective replacement program will respond to such challenges by offering clients several options, based on needs and context, for improving their housing situations. An effective program should not, therefore, be driven simply by a desire to create manufactured housing. Rather, the goal of these programs should be to improve the living conditions of the individuals living in substandard manufactured housing.

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Appendix 1: American Housing Survey Definition of Housing Inadequacy²⁰³

If the unit meets just one of the following conditions:

- o Unit has less than 2 full bathrooms (BATHS < 2) and the unit has at least one of the following:

²⁰³ *Econometrica*, 325-326.

- Unit does not have hot and cold running water (HOTPIP='2')
- Unit does not have a bathtub or shower (TUB='2')
- Unit does not have a flush toilet (TOILET='2')
- Unit shares plumbing facilities (SHARPF='1')
- Unit was cold for 24 hours or more (FREEZE = '1') and there have been more than 2 breakdowns of the heating equipment that lasted longer than 6 hours (NUMCOLD is '3', '4','5','6','7',or '8')
- Electricity is not used (BUYE = '1')
- Unit has exposed wiring (NOWIRE = '2') and not every room has working electrical plugs (PLUGS = '2') and the fuses have blown more than twice (NUMBLOW is '3', '4','5','6','7',or '8')

Then assign ZADEQ as severely inadequate (ZADEQ='3')

Determine how many of the following conditions the unit meets:

Unit has had outside water leaks in the last 12 months (LEAK = '1')

Unit has had inside water leaks in the last 12 months (ILEAK = '1')

Unit has holes in the floor (HOLES = '1')

Unit has open cracks wider than a dime (CRACKS='1')

Unit has an area of peeling paint larger than 8 x 11 (BIGP = '1')

Rats have been seen recently in the unit (RATS = '1')

- If the unit meets 5 or 6 of the conditions, then assign ZADEQ as severely inadequate (ZADEQ='3')
- If the unit meets 3 or 4 of the conditions and has not been identified as being severely inadequate (ZADEQ='3'), then assign ZADEQ as moderately inadequate (ZADEQ='2')

If the unit has not been identified as being severely inadequate (ZADEQ='3') and meets one of the following conditions:

- There have been more than 2 breakdowns of the toilet that lasted longer than 6 hours (NUMTLT is '3', '4','5','6','7',or '8')
- The main heating equipment is unvented room heaters burning kerosene, gas, or oil (HEQUIP = '7')
- The unit is lacking complete kitchen facilities (KITCHEN = '2')

Then assign ZADEQ as moderately inadequate (ZADEQ='2')