

# **Assessment of the market for energy-efficient factory-built homes sold in Vermont**



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## List of Acronyms

|        |   |
|--------|---|
| CHT    | Champlain Housing Trust                                   |
| DMV    | Department of Motor Vehicles                              |
| HPMH   | High Performance Modular Home                             |
| HUD    | United States Department of Housing and Urban Development |
| LIHEAP | Low Income Home Energy Assistance Program                 |
| MSA    | Metropolitan Statistical Area                             |
| OEO    | Office of Economic Opportunity                            |
| SWOT   | Strengths, Weakness, Opportunities & Threats              |
| VOC    | Volatile Organic Compound                                 |

## Executive Summary

Following Tropical Storm Irene, where many manufactured homes in Vermont were damaged or destroyed, stakeholders from government agencies, the non-profit sector, research institutions and private business worked together to find alternative designs for manufactured homes as part of the effort to “build back better.” Increasing energy efficiency has been a central strategy in this effort, guided by the understanding that reducing the energy of housing provides financial and environmental benefits to homeowners and society. Making this housing affordable to a wide range of incomes, including lower income families, increases resilience across the spectrum of homeowners.

The high performance modular home (HPMH) has become the first model to emerge from this initiative. The HPMH was designed as a Net Zero home that uses no fossil fuels in its operation and provides healthy air quality and abundant natural light to its inhabitants. The size and shape of the HPMH was initially designed to address the need for replacement manufactured homes. Over time, understanding about the potential market for these homes has expanded. As of January 2016, when this study began, 30 HPMH units had been built by Vermod Homes and installed in Vermont.

The objective of this research was to understand how a cross-section of stakeholders serving the affordable housing market in Vermont view high performance modular homes, and to hear from residents of the Vermod-brand HPMH, in particular, about their experiences living in the home. To offer perspective, owners of ENERGY STAR® rated modular homes, which are similar in size and shape to the Vermod, were also interviewed.

This report includes a review of relevant literature, the methods used to collect and analyze the data, key findings and recommendations. Findings are presented using a Strengths, Weaknesses, Opportunities and Threats (SWOT) framework, with each section discussing those elements from both stakeholder and resident perspectives. Complete results for all questions are included in the Appendix to this report.

### **Stakeholder Interviews**

Twenty stakeholders with expertise in affordable housing, sustainability, Net Zero, and factory-built homes were interviewed using a semi-structured interview guide. A total of 21 participants from 19 different organizations were interviewed. The initial list of stakeholders was developed in consultation with Vermont Housing Conservation Board, Vermont Energy Investment Corporation and faculty from the University of Vermont Department of Community Development and Applied Economics (CDAE).

#### *Strengths*

Stakeholders identified major strengths of the HPMH program in Vermont including the Vermod brand name, positive health impacts, and relative cost. The Vermod brand was frequently cited, with  $\frac{3}{4}$  of the stakeholders mentioning it a total of 37 times without prompts. The health aspect of HPMHs was viewed positively by stakeholders, who noted that many existing manufactured homes, both those built before and after the 1976 HUD standards, had poor ventilation.

The relative cost of HPMHs was an important strength of HPMH's for two reasons: (1) preferred financing opportunities and (2) lower overall cost compared with retrofitting existing manufactured homes to the same energy efficient and health specifications. The financing for the Vermod includes 25-30 year first priority mortgages, similar to those offered for stick-built homes, with 4% interest as opposed to 15-20 year secured transactions at an 8% interest rate. Special subsidies include Be Green loans, state grants, and the USDA rural development loan.

### *Weaknesses*

Price and appearance were the most frequently mentioned weaknesses of HPMHs. According to a number of the stakeholders, the high price of the HPMHs in Vermont limited their use in affordable housing programs. Both individual purchasers and non-profit landlords that provide affordable housing in the state made this point. One of the perceptions is the higher fixed costs limit residents' payment options relative to less expensive housing that has lower fixed costs and presents more opportunities for residents to manage their variable costs. For example, it is easier to control utility expenditures than mortgage payments. Another common weakness cited by stakeholders was the appearance of HPMHs, which look similar to a manufactured home.

### *Opportunities*

Opportunities for HPMHs in Vermont focused around the widespread housing shortage in Vermont, experience with manufactured homes in rural areas, and the potential for HPMHs to address the needs of both middle-income and fixed-income groups.

### *Threats*

From the perspective of stakeholders, threats faced by HPMHs in Vermont are primarily financial, educational, and perception-based. Financial threats include a belief that the homes will not only depreciate in value but further will receive lower appraisal values if they are placed next to manufactured homes. This is a challenge for HPMHs sited in mobile home parks and co-ops. A second threat is the potential loss of subsidies that currently lower the price of HPMH's. This is especially relevant given uncertainty about the direction of policies supporting photovoltaic energy credits and affordable housing subsidies.

Both stakeholders and prospective residents would benefit from improved education. If stakeholders, particularly lenders, had a better understanding of the value of high performance and Net Zero energy consumption, then they may be more willing to provide financing to serve this market. A general lack of understanding about the language of HPMHs compared with mobile, manufactured, modular, and high performance stick-built homes creates confusion around product differentiation.

The expansion barriers that HPMHs face are higher initial cost and preference in rental subsidies for more conventional stick-built homes. Residents of cooperatively owned mobile home parks have been a good initial market for the HPMH in Vermont, but the number of these types of co-ops is limited.

### **Resident Interviews**

To obtain first-hand information about the experience of living in HPMHs or lower cost, manufactured home alternatives, residents of both Vermod HPMHs and ENERGY STAR manufactured homes were interviewed. Comprehensive, hour-long, semi-structured interviews were conducted with residents of 16 Vermod HPMHS and six ENERGY STAR manufactured homes. Closed-ended questions were analyzed directly and open-ended questions were coded and analyzed. The results are summarized using the SWOT format and are presented in this paper following the stakeholder findings. Complete results are included in the appendix. Recommendations for both Vermod and ENERGY STAR, based on the resident interviews, conclude this report.

### *Strengths*

The primary strengths of Vermod homes related to the overall comfort and livability of the homes. Vermod homeowners noted improved air quality in Vermod homes, especially compared to their previous housing situations. Many residents mentioned improvement of their health or the health of family members thanks to the better air quality in their new homes. The amount of natural lighting, the quiet and privacy from the outside, overall comfort and warmth, and easy maintenance were all perceived as benefits of living in Vermods.

Energy savings were substantial for Vermod residents, especially for the 14 of 16 residents using solar panels as their home's energy resource. Many of the Vermod residents interviewed had been living in their homes for at least a year, and had thus experienced a full annual cycle of energy use and the associated cost savings garnered from solar electricity; those in the homes less than a full year were optimistic about future energy cost savings.

Another strength of the Vermods perceived by the residents was the personal attention and service they received from key individuals at Efficiency Vermont and Vermod. Most residents that experienced a need for either energy system updates or fixes or home construction improvements felt that Vermod and Efficiency Vermont representatives were able to effectively take care of these issues.

A final strength voiced by Vermod residents lay in the home-buying process. Many homeowners received financial assistance from Champlain Housing Trust (CHT). For homeowners receiving financial help, CHT mandates financial education courses that many Vermod homebuyers originally found challenging, but found very helpful once they were completed.

The primary strength revealed in the interviews with ENERGY STAR homeowners was the ability to achieve homeownership. Many of the ENERGY STAR residents were first-time homeowners, and were able to achieve this primarily because of the relatively low cost of ENERGY STAR homes. The sense of independence and stability awarded by home ownership was valued above all else for many ENERGY STAR residents. Many residents also stated that their homes now were more spacious than their previous housing situation, which was overall a strong selling point. Finally, many ENERGY STAR buyers mentioned getting support and great service from the dealer who sold them their home.

### *Weaknesses*

The most frequent criticisms of Vermod homes by their residents involved minor issues that were apparent on a daily basis. Many residents noticed some cracks beginning to form in the sheet rock along the seams where the walls met the ceilings in some parts of their home, likely a result of truss uplift. While these blemishes were largely aesthetic and had little effect on the integrity of the homes, many residents could readily see these issues and were clearly bothered by them. Some residents also expressed dissatisfaction with the "curb appeal" of the home, which they thought looked too similar to less energy efficient, and less expensive, manufactured homes. Vermod homeowners also expressed the opinion that given the substantial difference between Vermod and more conventional manufactured homes, they favored a more attractive exterior facade.

This high cost, in general, was identified as a potential weakness of the Vermod HPMHs. Many residents received large subsidies in the form of grants or deferred loans, and expressed that they would not have been able to afford a Vermod without these subsidies. A related weakness with the Vermods is that their long-term value is difficult to parse out in the short-term; residents expressed uncertainty about the long-term durability of the homes, and potential asset appreciation. Relatively high up-front costs associated

with the Vermod are more difficult to justify if long-term benefits and durability of the Vermod are not certain.

Several residents also expressed concern about longer-term technical support for their homes. Many recognized that much of the service they currently receive from Efficiency Vermont or Vermod is individualized and tied to the commitment of key individuals within these organizations. While in the short-term this is considered a benefit, there is a concern that this service will diminish as Vermod sales increase.

By and large the greatest perceived weaknesses of ENERGY STAR homes was the poor construction and low quality materials used in building the homes. Many residents pointed to specific features of their home that were beginning to deteriorate after only a short time, and a couple residents described the noticeably poor air quality when they first moved into their homes, due to off-gassing materials used in construction.

### *Opportunities*

Most Vermod residents interviewed placed high value on the energy efficiency potential of their homes. That Net Zero is within reach for Vermods is a great opportunity and goal for the company to continue to work towards; the substantial energy savings possible with Vermod homeownership will not go unappreciated by current and future homebuyers. Vermod residents take pride in the quality of their homes for its “greenness” and its perceived long-term value, both of which are opportunities Vermod should capitalize on. Furthermore, Vermod and Efficiency Vermont have built a fair amount of credibility through their quality products and services, which should create an opportunity for excellent word of mouth marketing.

Opportunities for Vermod build on their primary strengths, including the comfort, build quality, abundant natural light, and the positive health benefits of good air quality. These are desirable qualities for homebuyers, and the positive feedback received by residents regarding these qualities is an asset for promoting Vermod. Within one of the weaknesses of Vermod there is also an opportunity. Many residents expressed either regret that they were unable to customize certain interior or exterior finishes more, or appreciation for those features they were able to customize to their needs and wants. The opportunity for Vermod is the potential to expand options for custom-built features of the homes, particularly for the exterior façade.

ENERGY STAR homeowners, overall, seemed to value energy conservation; builders of these homes could take this as an opportunity to improve the energy use standards of the homes, or to give the homes the structural capacity to use solar electricity. This could be facilitated by code changes that enabled solar systems to be mounted on standard Energy Star homes without requiring customization. The research confirmed that most residents did not anticipate relocating their homes, creating an opportunity for reducing or eliminating the practice of building these homes on a chassis with wheels.

### *Threats*

The greatest threat to Vermod is its relatively high upfront cost, which could become a more substantial issue if subsidies are removed from the picture. Many residents received some form of subsidy, either deferred loans or grants that made it possible for them to afford the Vermod. A loss of these financial incentives could hinder the adoption of Vermods by more low-income individuals. A second issue for Vermod is ensuring that technical support systems are available for these homes as Vermod scales up and systems age. What is currently a positive aspect of the company could become a threat if Vermod is unable to scale up its technical support to match increased production.



For ENERGY STAR homes, the loss of subsidies is a potential threat to future sales just as it is for Vermod. Though lower cost initially, the financial incentives to buy these homes have been just as essential to the homebuyers as their Vermod counterparts. The familiar challenge of rapid depreciation for ENERGY STAR homes is significant, and should be taken into consideration. ENERGY STAR homeowners placed high value on having durable, long-term housing, and many expressed dissatisfaction with how quickly they started to see signs of wear in their homes.

## **Recommendations**

The stakeholder analysis resulted in recommendations with an educational, financial, and market focus. The education recommendations are to (1) clarify the language around HPMHs and their competitors, (2) work with lenders first because of the higher returns compared with homebuyers, and (3) create more comprehensive information for potential buyers. Financial recommendations are to lower the prices of HPMHs through increased returns to scale as production expands. The positive health benefits of HPMHs may be useful in advocating for state subsidies on the grounds of reduced health care costs.

Overall recommendations for Vermod are gleaned from issues identified in the SWOT analysis. Moving forward, Vermod should address the minor interior blemishes residents are noticing in their homes in order to prevent longer-term frustration from residents. Extending the warranty on Vermods could help the company maintain their reputation for providing high quality homes along with service. Vermod would benefit from expanding their options for customizability, especially for the exterior façade of the homes. As HPMHs expand, technical service needs to be available. This may involve efforts, particularly by companies like Vermod, to ensure they have technical staff trained and available to serve their clients over the long term. It may also involve other organizations, such as Efficiency Vermont, who work to support the network of independent technicians and businesses serving this industry. To supplement these efforts, increasing access to updated resources, including making homeowners manuals more available and easier to navigate by providing digital copies, would further this effort. Establishing and utilizing regular newsletters to homeowners, which would alert them of any important changes or updates, could strengthen the sense of community for Vermod homeowners.

For ENERGY STAR, the primary recommendation from the resident interviews is to improve the quality of construction and building materials used to extend the life of the homes. Support for code changes that enable ENERGY STAR homes to be “solar ready” could also benefit ENERGY STAR homeowners through lower energy costs.

## Definition of Terms

This report on the market for energy-efficient modular and manufactured homes follows the work of Faesy, Grevatt, Black-Plumeau, Collins, McLellan, Eisinger (2014). For consistency, definitions included in Faesy et al. (2014), will be used when applicable.

- “Affordable housing” is defined by HUD and is defined as occupants paying no more than 30% of their income on housing costs, including utilities<sup>1</sup>. These affordable housing limits are used to determine eligibility for different HUD subsidy programs
- “High performance homes” are defined as those that use energy efficient technology to minimize monthly utility expenditures.<sup>2</sup>
- “High Performance Modular Homes” (HPMHs) describe modular homes built to Efficiency Vermont’s High Performance Homes Level and equipped with or prepared for a solar photovoltaic system to bring the home to Net Zero energy. In Vermont, Efficiency Vermont provides incentives for residential new construction that meets its Base Level or High Performance Level standards.<sup>3</sup>
- “Low-income” refers to households earning 80% or less of the median income of their county in relation to the number of people living in the household.<sup>4</sup> For the Burlington MSA, a family of four who are considered low-income would have to earn \$65,700 or less annually. Burlington’s median income is 25% higher than the rest of the state.<sup>5</sup>
- “Manufactured home,” previously known as “mobile home,” must abide by the U.S. Department of Housing and Urban Development (HUD Code), which requires homes to be built on a permanent chassis. In some states manufactured homes require DMV or other automotive registration, they are not titled as vehicles in Vermont.<sup>6</sup>
- “Mobile home” refers to manufactured homes built before HUD Codes were in effect (June 15, 1976).<sup>7</sup>
- “Modular” refers to a type of prefabrication where sections of a building are built off-site in a factory environment and are later assembled at the desired place of residence.<sup>8</sup> Modular are subject to the same legal regulations as on-site built homes. These building standards vary substantially by state and county.<sup>9</sup>
- “Net Zero” refers to energy efficient housing that aims at zero or near zero energy expenditures through the use of cold-climate heat pumps, thermal envelope design, and in-house energy generation.<sup>10</sup>
- “Site-built” or “stick-built” refers to traditional building practices, where first a foundation is completed and then the entire structure is built on the spot.<sup>11</sup>
- Thermal “energy efficiency” encompasses improvements in heating and cooling for buildings.<sup>12</sup>

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<sup>1</sup> United States Department of Housing and Urban Development, 2016

<sup>2</sup> Faesy et al., 2014

<sup>3</sup> Efficiency Vermont, 2017

<sup>4</sup> United States Department of Housing and Urban Development, 2016

<sup>5</sup> City of Burlington, Vermont, 2016

<sup>6</sup> United States Department of Housing and Urban Development, 2016

<sup>7</sup> Manufactured Housing Institute, 2016

<sup>8</sup> Quale et al., 2012

<sup>9</sup> United States Department of Housing and Urban Development, 2016

<sup>10</sup> Allan, 2015

<sup>11</sup> Quale, Eckelman, Williams, Sloditskie, Zimmerman, 2012

<sup>12</sup> Allen, 2015

# Methods

The Center for Rural Studies gathered information from a wide range of sources and viewpoints to provide a report that describes the strengths, weaknesses, opportunities, and threats to HPMHs. These sources include stakeholders involved in affordable housing in Vermont, as well as residents of Vermod and ENERGY STAR homes. The Institutional Review Board at the University of Vermont reviewed the data collection instruments and protocols to ensure the research was conducted ethically. Participation in the interview was voluntary for both stakeholders and homeowners.

The findings described in this report come from:

1. interviews with housing and energy efficiency stakeholders (including developers, funders and advocates) in Vermont
2. interviews with recent purchasers of energy efficient factory-built homes (Vermod high performance modular homes and ENERGY STAR manufactured homes)

Data collection for the stakeholder analysis considered a range of issues, including: financing, energy efficiency, home ownership costs, access to and cost of land, as well as other factory-built home features such as size, layout, materials, air quality, and the importance of a non-depreciating asset.

Between October 27<sup>th</sup> and November 14<sup>th</sup>, 20 stakeholder interviews were conducted with 21 individuals from 19 organizations. Each interview lasted approximately 30 minutes. Table 1 below summarizes the stakeholders who were interviewed. Of those interviewed, 11 were from the non-profit sector, six worked with finance issues, four worked as builders, three worked in the government, and two were low-income housing landlords. The initial list of stakeholders was developed in consultation with Vermont Housing Conservation Board, Vermont Energy Investment Corporation and faculty from the University of Vermont department of Community Development and Applied Economics.

Table 1. Summary of Stakeholders Interviewed by Type: Multiple Response Variables

| Stakeholder type            | Frequency | Percent of <i>n</i> |
|-----------------------------|-----------|---------------------|
| Affordable housing provider | 4         | 20.0%               |
| Housing finance             | 4         | 20.0%               |
| Builder/architect           | 3         | 15.0%               |
| OEO                         | 3         | 15.0%               |
| Federal/state/municipal     | 3         | 15.0%               |
| Program funder              | 2         | 10.0%               |
| Property manager            | 2         | 10.0%               |

*Note.* *n* = 20. Total response variables = 21.

Homeowner and renter interviews were conducted between December 2016 and March 2017. In total, 16 interviews were conducted with HPMH residents and six with ENERGY STAR manufactured home residents. The 16 HPMH participants had spent a minimum of one winter living in their homes, while the six ENERGY STAR participants were selected from a group that had previously lived in a non-HUD

manufactured home for at least one year. Residents were surveyed using a semi-structured interview guide that included both “closed” questions where respondents were asked to rate their satisfaction on a scale from 1-5, as well as open-ended questions. The interviews were recorded, and open-ended questions were transcribed and key themes identified and quantified using an open-coding methodology. All respondents were paid \$20 for participating in the one-hour interview. Table 2 shows a breakdown of residents by housing type, land, and ownership.

Table 2. Summary of Residents Interviewed by Type of Home Site

| Site Details                 | HPMH ( <i>n</i> = 16) | ENERGY STAR ( <i>n</i> = 6) |
|------------------------------|-----------------------|-----------------------------|
| Owned land                   | 5                     | 1                           |
| Cooperative mobile home park | 4                     | 0                           |
| Non-profit mobile home park  | 4                     | 3                           |
| Private mobile home park     | 2                     | 2                           |
| Tenant renting               | 1                     | 0                           |

The unique features of HPMH homes, including new technology and building design, along with the interest of Vermod and Efficiency Vermont in understanding how these buildings perform, have led homeowners to expect queries about their homes. This greater familiarity and comfort with information sharing made it relatively easy to interview Vermod homeowners. In contrast, ENERGY STAR residents purchased their homes from several different dealers and do not anticipate being contacted with questions about their home. This made it more difficult to arrange interviews and contributed to the low number of responses from ENERGY STAR homeowners. In this report, results from the larger HPMH study is reported quantitatively, and the results from the ENERGY STAR interviews are discussed more qualitatively. For reference, all responses from both the HPMH and ENERGY STAR interviews are reported in detail in the Appendix.

## Past Manufactured Replacement Projects

There have been relatively few manufactured home replacement projects undertaken comparable to the work in Vermont. These include Frontier Housing in Appalachia, Maine Housing in Maine, Neighbor Works in Montana, Home Sight and Housing Authority of Snohomish County in Washington, and Family Housing Resources and The Primavera Foundation in Arizona.<sup>13</sup> Additionally, some of these projects did not use new construction, such as in Montana and Washington. Montana did not require the homes to be constructed with ENERGY STAR criteria.

The negative effects associated with aging manufactured housing have been extensively researched.<sup>14</sup> Jones, Koebel, McCoy, Shanholtz, and Moeller found that many residents of older manufactured homes

<sup>13</sup> National Consumer Law Center and I’m Home, 2010; Rusco, 2013

<sup>14</sup> Jones, Koebel, McCoy, Shanholtz, and Moeller, 2016; Hailey, 2014; National Consumer Law Center and I’m Home, 2010; Rusco, 2013

suffer from poor health, and that much of the poor health can be tied to low quality building practices. The most commonly cited connection between health and older housing is that many manufactured homes deteriorate quickly, resulting in drafty interiors.

An initial goal of the federally funded projects was to minimize Low Income Home Energy Assistance Program (LIHEAP) expenditures. A study by Rusco found that this goal was not accomplished primarily because funding was based on income level, not the quality of the home (2013).

In several of the programs, where increasing energy efficiency was the objective of the programs that replaced older homes with ENERGY STAR homes, residents ended up having higher monthly payments. The cause for the higher payments was a monthly mortgage amount that was greater than the monthly energy cost savings. In some cases, the monthly energy expenditures increased, due to upsizing from smaller homes.<sup>15</sup>

The main challenges for these projects were financial and behavioral. The most common shortcoming was that many applicants were ineligible to participate in the programs. Existing debt was a primary problem for programs, such as in Maine, which was closed to those with existing liens or pending foreclosures. Poor credit history for applicants limited their access to funding. Limited prior home ownership restricted participation in several programs, including those in Maine and Montana.

Behavioral challenges to programs included general distrust, for example, the perception that they were a scam to take homes away from the residents. An unwillingness to take on new debt or a fear of increased property taxes, a behavioral and financial restraint, was identified as a limitation in the Maine and Montana programs.<sup>16</sup> Finally, unwillingness to move from their current location due to school districts and community was found to be an issue affecting the success of the programs evaluated by Rusco (2013).

These previous programs share some elements facing the Vermont housing replacement programs, particularly the financial and behavioral challenges that residents face. However, in other areas, Vermont's HPMH program is quite different. The Vermont program uses modular instead of manufactured homes and includes both homeowners and renters in mobile home park communities, expanding the reach of the programs. Finally, previous programs focused exclusively on the manufactured homes in the worst possible conditions, whereas the Vermont program includes a broader range of housing replacement types and is accessible to a wider spectrum of income groups.

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<sup>15</sup> Rusco, 2013

<sup>16</sup> Rusco, 2013

# Findings

## Strengths

### Stakeholder Perspectives and Analysis

#### Overview of HPMH Strengths

The HPMH has a number of strengths that differentiate it in the market place. The product carries a brand name reputation amongst stakeholders, frequently mentioned without a prompt as an example of quality modular housing. It is considered a durable, healthy, non-toxic home that can be streamlined to control costs, especially for rural markets.

A major strength of the HPMH is that it has gained a brand name association in the fields of energy efficient, Net Zero, and affordable housing. Of the stakeholders interviewed, 75% explicitly mentioned the Vermod HPMH in the interviews, the brand was mentioned a total of 37 times. At no point did the researcher mention Vermod before the stakeholder used it.

- “Vermod” is becoming a well-known name: mentioned in 15 interviews over 37 times
- HPMHs provide environmental benefits of lowering Vermont's GHG emissions
- Cheaper to build energy efficient than to retrofit
- Cheaper to build modular than stick of the same caliber
- Unique financing opportunities

#### Health and Environment

The environmental and health benefits of energy efficient modular homes are both on a local and international level. High performance modular homes are significantly more energy efficient than manufactured and traditional stick built homes. Efficiencies are primarily in the form of lower fuel consumption, weatherization, and controlled building environments.<sup>17</sup> Older manufactured homes, specifically those that preceded the 1976 HUD regulations are significantly less efficient and consume exponentially more heating fuel.<sup>18</sup> The older manufactured housing stock tended to have much lower insulation and substandard weather protections, while the weatherization of older models is often cost-prohibitive. The HUD code was last updated in 1994 and while there was overall improvement in quality, many of the homes built since then share the similar challenges and limitations of the pre-HUD homes including durability, relatively high energy use, and poor indoor air quality.<sup>19</sup> There are also findings that it is more cost effective to build a new house with energy efficiency than it is to retrofit existing inefficient homes.<sup>20</sup>

Older homes with substandard indoor air quality have been linked to several health issues. Vulnerable populations include children, seniors, pregnant mothers, and low-income individuals. The main factors

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<sup>17</sup> Allen, 2015; Faesy et al., 2014; Quale et al., 2012; TendersInfo News, 2014

<sup>18</sup> Allen, 2015; De Seife, 2015; Faesy et al., 2014; Furman, 2014; Hailey, 2014; McCarthy, 2016; United States Government Accountability Office, 2013

<sup>19</sup> Furman, 2014

<sup>20</sup> Pazuniak, Reina, Willis, 2015

that make air quality dangerous is a lack of ventilation, which increases the presence of toxics such as volatile organic compounds (VOCs), nitrogen dioxide (NO<sub>2</sub>), 2.5mm particulate matter (PM<sub>2.5</sub>), and lead.<sup>21</sup> The most common health hazards include birth defects, asthma, lung cancer, and allergic reactions. Substandard air quality is connected with loss of mental capacities for seniors.<sup>22</sup>

The majority of stakeholders acknowledged the importance of energy efficiency and clean energy, specifically as inefficient manufactured homes are a health risk for seniors. Currently, "Mobile homes are poor quality and deteriorate over time."

The "greatest [weatherization] challenge is to weatherize mobile homes" after the fact. "On the maintenance side, that is one that we don't have a lot of data on. You never want a low-income family to buy something that is high maintenance. That the roof doesn't need fixing and that all housing and safety codes are met...big ticket is roofs, furnace, water and septic." Stakeholders saw high performance modular homes as "comfortable and safe indoor space" and that the HPMH is exactly what is needed for Vermont, "non-toxic, durable, lasting, quality, and something lenders will provide for."

*"[The Vermont is] non-toxic, durable, lasting, quality, and something lenders will provide for."*

Based on our findings, the HPMH is a superior structure in terms of health and energy efficiency. Because it is manufactured with non-toxic, durable materials with a good ventilation system, we can expect to avoid many of the health risks associated with manufactured housing. The net savings will go to the state, as we could have lower overall health costs, currently affected by drafty and toxic structures and the higher costs of weatherizing older structures. Finally, through the replacement of older models, the efficiencies of high performance modular homes can decrease the climate change impact of Vermont's factory-built housing stock, primarily by reducing the amount of fuel consumed.

### Cost and Efficiency

Rural areas have consistently been popular for manufactured homes due to lower land costs.<sup>23</sup> Many states have undergone initiatives to replace many of the aging, particularly rural manufactured homes with energy efficient ones, but these programs have seen limited success.<sup>24</sup>

*"Mobile homes can streamline manufacturing and reproduce these units more efficiently than stick-built homes and can be procured more efficiently."*

According to stakeholders, factory-built homes in general are important for rural Vermonters. "Mobile homes fill the gap between home ownership and no homeownership." Effectively, "more energy efficient replacements would be a benefit to low-income Vermonters." As one stakeholder said, "the operational costs are so low that [Vermonters] can benefit economically because they are not spending money on the gas." The cost of high performance

modular homes is lower than the cost of high performance stick-built. Multiple stakeholders repeated that, "manufactured housing has to [be considered for Vermont's overall housing stock] because of its cost as opposed to stick." Specifically, "mobile homes can streamline manufacturing and reproduce these units more efficiently than stick-built homes and can be procured more efficiently."

<sup>21</sup> Adamkiewicz, Spengler, Harley, Stoddard, Yand, Alvarez-Reeves, Sorensen, 2014; Ghosh, Wilhelm, Ritze, 2013; Schmidt, 2008

<sup>22</sup> Samuel et al., 2015

<sup>23</sup> Consumer Financial Protection Bureau, 2014; Furman, 2014; Schmitz, 2004

<sup>24</sup> Furman, 2014; Hailey, 2014; United States Government Accountability Office, 2013

Most financing models do not recognize the value of Net Zero energy to the overall net costs of home ownership, according to a financial stakeholder, “we in our loan program only consider the fixed costs. We don’t take into consideration energy efficiency.” However, according to another, “we don’t take into consideration energy efficiency, but we would make some exception to a Vermod.” These exceptions are in the form of preferred loans and unique financial bonuses.

According to another financier, “one of the great success[es] is that people were getting interest rates of over 8% for 20 years financing, which is what you typically would get with a conventional but ENERGY STAR rated mobile home... [but the Vermod has] 25-30 year financing with interest rates around 4%.” Additional financial instruments available for high performance modular homes include a VSECU 30-year fixed-rate loan product, the VHFA zero-interest deferred loan, solar loans, and the USDA Rural Development Section 502 Direct loan.

The popularity of manufactured homes in rural areas generates a possible demand for high performance modular homes. The HPMH has a competitive advantage against other similar products because of the unique financing opportunities provided. Collectively, the demand for manufactured homes in rural areas and advantageous financing ought to make the HPMH a strong competitor in the rural market.

## Resident Perspectives of Vermod High Performance Modular and ENERGY STAR Manufactured Homes

Residents interviewed in this study had all moved into their new homes relatively recently, within four years prior to the interview. Most saw their new home as a significant step up from their previous living arrangements. Issues related to durability and long-term value, often promoted as strengths of the more expensive high performance modular homes, were difficult to capture and compare with the relatively new, but less expensive ENERGY STAR homes.

For HPMH residents, warmth, ease of maintenance, lower noise and better air quality were the most common improvements when compared to their previous home. Owners of ENERGY STAR homes also reported that warmth and increased comfort represented the greatest change from their previous home, followed by issues related to affordability and the value of homeownership.

The high performance modular home’s strengths are found in three broad areas related to the quality of its construction and design, energy savings and technical assistance. Among these three, residents were most enthusiastic about the comfort and livability of the HPMH.

### Design and Livability

Relative to their previous home, the most oft cited difference was that the HPMH was warmer and more comfortable, followed by ease of maintenance, that it was a quieter structure to live in, and had better air quality. HPMH residents reported feeling very positive about the design and layout of the building, with 100% reporting liking the layout overall, and six residents adding that they were pleased they were able to play a part in the design of their home.



Table 3. Reasons New Home Differs From Previous Home: Multiple Response Variables

| Variable                                 | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Warmer/more comfortable                  | 6         | 37.5%               |
| Easier to maintain                       | 4         | 25.0%               |
| Quieter/more privacy                     | 4         | 25.0%               |
| Better air quality/healthier             | 3         | 18.8%               |
| One-floor/more accessibility (ADA)       | 3         | 18.8%               |
| More affordable                          | 3         | 18.8%               |
| Electricity better than fuel oil/propane | 2         | 12.5%               |
| Brighter/more light                      | 2         | 12.5%               |
| Has an outdoor area now                  | 2         | 12.5%               |
| Better quality build/newer               | 2         | 12.5%               |
| More community in mobile home park       | 1         | 6.3%                |

*Note.* *n* = 16. Total variable responses = 32.

#### Health and Comfort

Natural sunlight is important to mental health. Between 0.4% and 9.7% of people have seasonal affective disorder (SAD), a seasonal depression caused by limited access to natural light.<sup>25</sup> SAD, along with depression and disturbed circadian rhythms, can greatly disturb day-to-day life. Seniors and those with disabilities are especially vulnerable to the deleterious effects of limited natural light.<sup>26</sup> When adults are exposed to higher doses of natural light, the prevalence of depression and falls substantially diminishes.<sup>27</sup> It's important to consider that, with an older population like that of Vermont, it is crucial to incorporate good natural lighting to reduce health problems.

One of the surprising findings from the study was that many residents commented on the noticeable improvement in indoor air quality after moving into an HPMH. In particular, more than 80% of residents reported that the air quality in high performance modular homes was better than their previous home, and no one reported it being worse.

Table 4. Air Quality in Current Home Compared to Previous Home

| Variable | Frequency | Percent of <i>n</i> |
|----------|-----------|---------------------|
| Better   | 13        | 81.3%               |
| Neutral  | 3         | 18.8%               |
| Worse    | 0         | 0.00%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>25</sup> Webb, 2006

<sup>26</sup> Sumaya, Rienzi, Deegan, Moss, 2001

<sup>27</sup> Brown, Jacobs, 2011

Residents also expressed great appreciation for the levels of natural lighting, with all but one resident reporting that the natural lighting in the home was positive, with more than half reporting it was very positive. More than half of respondents said they believed the HPMH has positively affected their health, with the remainder saying the impact was neutral and no one expressing a negative view.

Another feature of the HPMH important to residents was insulation from outside noise. In densely settled areas, such as mobile home parks, limiting external noise is a significant, positive amenity. All respondents reported that the HPMH was quiet and limited external noise.

The technology and systems in an HPMH are relatively advanced for affordable housing, ranging from the more familiar energy efficient appliances to the more advanced ventilation, solar and heating systems. These homes require some regular maintenance, such as changing filters, and a strength of the HPMH design is that most residents appear to have been able to manage the transition to these systems. Three-quarters of respondents reported that living with these systems was easy and not particularly noticeable. Satisfaction was not universal and there is a learning curve, with two residents said they'd learned to adjust to the systems over time. Another person was still frustrated by the systems, and a fourth found the systems to be excessively noisy. With regards to more conventional and energy efficient appliances, more than 90% of HPMH residents expressed positive or very positive experiences with these components.

Table 5. General Feelings About Living with Systems (Ventilation, Hot Water, Minisplit Heat Pump)

| Variable                                     | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Easy to maintain/not noticeable              | 12        | 75.0%               |
| Occasional issues/has gotten used to systems | 2         | 12.5%               |
| Very noisy/hard to deal with <sup>4</sup>    | 2         | 12.5%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

### Energy Savings

One of the central concepts with the HPMH is that homeowners can afford a more expensive home but lower their monthly bills through energy savings. This study found that among the 16 residents, 56% reported that their monthly costs were lower in high performance modular homes while two homeowners found that they were higher and one wasn't sure. The two high performance modular homes with the highest electric bills did not have solar, and one of those was planning on installing solar soon after the survey.

Table 6. Monthly Housing Costs in Current Home Compared to Previous Home

| Variable | Frequency | Percent of <i>n</i> |
|----------|-----------|---------------------|
| Higher   | 4         | 25.0%               |
| Lower    | 9         | 56.3%               |
| Same     | 2         | 12.5%               |
| Not sure | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

Among the 14 high performance modular homes with solar, residents appeared to be very happy with this technology, uniformly expressing positive or very positive views of the panels. One homeowner said they wished the panels could be seen more clearly from the road so that more people were aware they had them.

Another metric for considering how homeowners perceive the cost of the HPMH is their sense of the value they are getting for their payments. Among the 16 residents, 13 believed they are getting a better value for their payments than their previous home. The remaining three either said the value of their payments was about the same as before or wasn't sure.

Table 7. Value for Costs in Current Home Compared to Previous Home

| Variable         | Frequency | Percent of <i>n</i> |
|------------------|-----------|---------------------|
| Better value now | 13        | 81.3%               |
| Same as before   | 1         | 6.3%                |
| Not sure         | 2         | 12.5%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

One of the classic challenges with mobile and manufactured homes is that they lose value over time. In contrast, the HPMH was designed and marketed as a durable, longer-term investment. The findings from the survey found that residents agree with this assessment and purchased their home with the intention of living there for many years. More than half said they had no plans to move on to another home.

### Technical Assistance

Although not captured in the closed-ended questions in the interview guide, during the discussion that surrounded the interviews it was clear that one of the strengths of the HPMH is the high level of technical assistance being provided to homeowners. Most residents were clearly appreciative of the technical support provided by Efficiency Vermont, and with support with building issues provided by Vermod. Homeowners had frequently been in touch with one or both representatives from these organizations, and were very pleased with the service, with a few notable exceptions. At the present time, this is a great strength of the HPMH. It also raises some questions that will be discussed later in the following section on weaknesses.

### ENERGY STAR Strengths

Similar to HPMH owners, residents in ENERGY STAR homes found their new homes to be warmer and more comfortable than their previous living arrangement. Half of those interviewed reported that it was more affordable housing and more spacious. Among the six interviewees, the most common answer, reported by four respondents, was that simply owning their own home was the greatest change.

Table 8. Favorite Components of Current Home: Multiple Response Variables

| Variable                             | Frequency | Percent of <i>n</i> |
|--------------------------------------|-----------|---------------------|
| Home ownership                       | 4         | 66.7%               |
| Spaciousness                         | 2         | 33.3%               |
| Has outdoor space/porch              | 2         | 33.3%               |
| Customizability in building home     | 1         | 16.7%               |
| Ease of heating/cooling <sup>2</sup> | 1         | 16.7%               |
| Likes layout/rooms in home           | 1         | 16.7%               |

*Note.* *n* = 6. Total variable responses = 11.

One of the strengths of the ENERGY STAR homes is their relatively low cost for a new home. For the six homes included in this study, the average price of a new ENERGY STAR home before subsidies was \$60,128, ranging from a low of \$53,000 to a high of \$65,000. Of the five ENERGY STAR homes that provided price information, all were “single-wides” with approximate dimensions of 14’x70’, with one 14’x80’. This was about 45% of the average cost of a new HPMH of the same approximate size before subsidies. Even at this price, only three of the six residents interviewed said that their monthly housing costs were lower after purchasing their ENERGY STAR home, with two reporting their housing costs had risen. Even with that range of opinions, five out of six reported that they felt that their new ENERGY STAR home was giving them better value for their payments than their previous home.

### ENERGY STAR Original Purchase Price

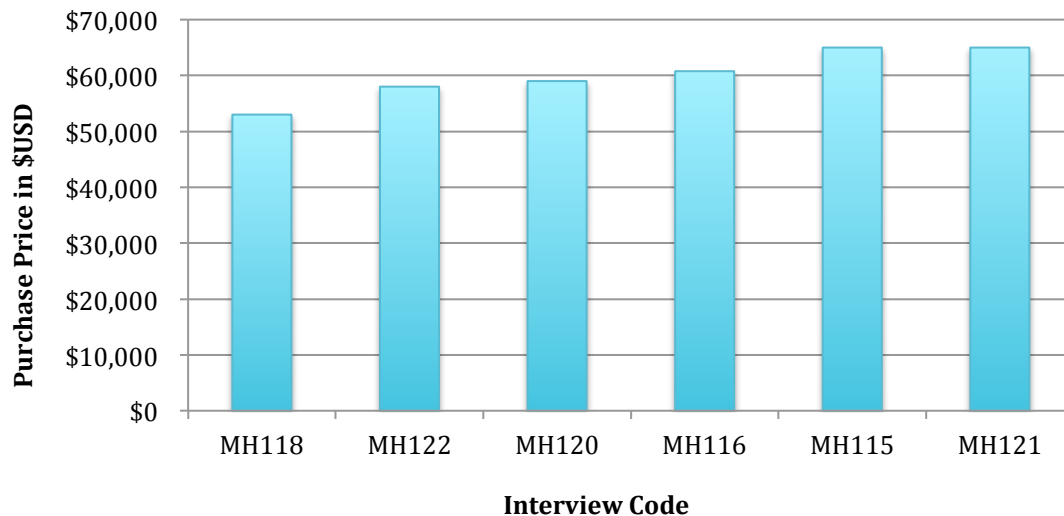


Figure 1. Original purchase price of ENERGY STAR homes.

*Note.* *n* = 6.

The cost of ENERGY STAR homes also appears to be quite manageable for these households. Five out of six respondents reported that managing their mortgage was not a strain on them. Given the objective of home ownership, the affordability of these homes is one of their clear strengths.

A final strength of the ENERGY STAR homes is that they are sold through existing, experienced dealers. These dealerships know their market and buying a home through them was relatively easy. Several homeowners also noted that working with Champlain Housing Trust and receiving the required financial training were very positive elements in the home buying process.

## Weaknesses

### Stakeholder Perspectives and Analysis

#### Overview of HPMH Weakness

The HPMH has a number of weaknesses that may have contributed to the lower than intended level of adoption for the product in the affordable housing community. Price level is perceived as the high performance modular home's greatest weakness because of the mismatch between the purchase price (even when subsidized) and the economic realities of many who own older mobile homes (most in need of replacement).

- Perceived low income of many prospective homebuyers. 16 out of 20 stakeholders mentioned price as important for individuals looking at homes.
- Higher fixed costs (mortgage) are more daunting than variable costs (utilities)
- Aesthetic preferences of target consumer groups out of alignment
- Stigma of mobile home mentioned by six stakeholders a total of nine times
- Uncertainty over registry issues of DMV and HUD regulations

#### Price

The purchase price of manufactured homes tends to be lower than stick-built.<sup>28</sup> Secondhand manufactured and mobile homes sell for about \$29,000, while the median price for a new manufactured home in Vermont is \$75,000, excluding the cost of foundation work and land.<sup>29</sup> High performance modular homes can cost as much as \$100,000 to \$150,000.<sup>30</sup>

Information summarizing income, household size, and 30% of median income is aggregated in Table 9. In Vermont, the overall median income is \$55,176 and the average persons per household are 2.34.<sup>31</sup> What this entails is that for a two-person household to be eligible for Section 515, HUD Rural Rental Housing Loans benefits they must have a median income below \$50,690. For this general household, 30% of their income would be approximately \$15,207 a year or a maximum of \$1,268 per month. For those currently living in high performance modular homes, the range of incomes varied from under \$10,000 a year to \$100,000 with the median income being approximately \$35,000 a year. The prices these

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<sup>28</sup> Consumer Financial Protection Bureau, 2014; Hailey, 2014

<sup>29</sup> McCarthy, 2016; Vermont Housing Finance Agency, 2016

<sup>30</sup> De Seife, 2015; Faesy et al., 2014; United States Government Accountability Office, 2013; VERMOD, 2016

<sup>31</sup> Vermont Housing Finance Agency, 2016

homeowners paid varied from under \$100,000 to \$275,000. The grant amounts allocated ranged from \$68,000 to \$80,000. To put this information into context, the average purchase price for a new manufactured home is \$75,000, compared to a 2<sup>nd</sup> hand manufactured home at \$29,000. A high performance modular home ranges, on average, from \$100,000 to \$150,000. The median purchase price for homes sold in 2016 was \$200,000, and the mean price was \$228,536,<sup>32</sup>

*“Mortgage principle is the big deal. I think that is what also has to be overcome.”*

Nearly every stakeholder mentioned the importance of price for prospective residents. As one stakeholder put it, “you could maybe get people to borrow at \$70,000, but in the end, it comes down to the price where people can afford to make those payments every month.” According to another, when residents earn “80% of median income but can’t spend more than 30% of

income on housing,” higher price tags for homes are unaffordable. Analogously, as per one stakeholder, the difference between variable and upfront costs was “like a car with better mileage... having to explain the total cost of ownership is a difficult thing to explain to someone.” Others mentioned that for those who are receiving low wages and who have unstable employment, the thought of making a large upfront commitment is more daunting than a colder winter.

Table 9. Levels of Low Income by Household Size and Coinciding HUD Minimums in Vermont<sup>33</sup>

| Income classification | Percent of real median income | 1 Person Household |                             | 2 Person Household |                | 3 Person Household |                |
|-----------------------|-------------------------------|--------------------|-----------------------------|--------------------|----------------|--------------------|----------------|
|                       |                               | Annual Income      | 30% <sup>a</sup> on Housing | Annual Income      | 30% on Housing | Annual Income      | 30% on Housing |
| Extremely low income  | 30% median                    | \$16,552           | \$4,965                     | \$19,002           | \$5,700        | \$21,452           | \$6,435        |
| Very low income       | 50% median                    | \$27,588           | \$8,276                     | \$31,688           | \$9,506        | \$35,788           | \$10,736       |
| Low income            | 80% median                    | \$44,140           | \$13,242                    | \$50,690           | \$15,207       | \$57,240           | \$17,172       |

*Note.* Real median income in Vermont = \$55,176 and avg. household size in Vermont = 2.34. Comparison between home price and income not explicitly specified because of different purchase methods, cash vs. mortgage, and difference in different mortgage rates and loan types available.

<sup>a</sup> HUD recommended amount to spend on housing.

One stakeholder summarized this weakness as with the “Vermod mortgage, the gap between fixed and variable cost is a big issue for low-income individuals, especially the extremely poor and lower income with a large household. When you have variable costs, you have some limits of control. Assistance for super cold winters is available.” However, “if something bad happens you have no controls [over fixed cost] ... what provisions are in place to control the price.” Likewise, “the fixed costs are more salient because those are regular bills that come up every month. They are often choosing between lot rents and mortgages, then electricity will be shut off but we won’t evict them.” “Mortgage principle is the big deal. I think that is what also has to be overcome.”

<sup>32</sup> Vermont Housing Finance Agency, 2016

<sup>33</sup> Vermont Housing Finance Agency, 2016

The problem of variable cost is multiplied when the potential buyer is planning on a cash purchase due to poor credit options. “The buyer is on a cash flow basis. They need to look at the cheapest, month by month. But they have to come up with a quantity upfront.” “If I can be housed today for \$10-15,000 and I don’t even know where I will be in a few years then I will go for the \$10,000 unit even if it has a greater variable cost.”

The higher sticker price of high performance modular homes and the limited number of subsidies and financing opportunities have likely reduced their adoption, particularly amongst lower income households. Given that many modular and manufactured homes are more appealing for low-income consumers, the high price tag of the HPMH prevents many from considering the option. With the average price of secondhand mobile and manufactured homes at about \$29,000, the price tag of \$100,000 or more seems inaccessible to low-income homebuyers. Many low-income homebuyers do consider the long-term economics of durability and energy efficiency, but cannot always follow through with the long-term purchase because of the hard realities of their month-to-month financial situation. While the HPMH does claim to have a lower lifetime cost than a lower quality manufactured or modular home, low-income homebuyers are not always coming from the position of privilege to consider longer-term economic implications.

### Appearance and Status

The appearance of the HPMH impacted stakeholders in several ways. “Part of the problem with the high efficiency homes is that they look different, geeky, and unusual. They don’t seem like they would be easy to understand and operate because all the fancy high-tech things going on with them.” According to others, “there are a lot of people out there that initially look at the Vermod and think it’s a great idea but don’t like that it looks like a traditional trailer.” One stakeholder thought the “one thing that we have found with the Vermod is that it was manufactured as a modular replacement for mobile homes but still looks like a mobile home. It is well-built, but it will have diminishment in resale because it looks like a mobile home.”

*“It is well-built, but it will have diminishment in resale because it looks like a mobile home.”*

A small number of stakeholders also were unsure about the categorizations of mobile homes. The idea that an HPMH may be a DMV registered item was problematic, particularly when considering funding. One stakeholder was worried that “part of the problem with modular homes

in Vermont is that they don’t fulfill the criteria of mobile... [and] there are issues as in whether they can go to existing mobile home parks.” “When you are talking about a mobile home park, it is not a place for modular homes to go. Vermod is twisting the rules by building what everyone would consider modular but classifying it as an overbuilt mobile home.” While this is not the classification of the Vermod, it nonetheless is important to note that this is stakeholder perception. The mixed reaction to the appearance of the Vermod is problematic for a few reasons. On one hand, by looking like a manufactured home, it could dissuade potential buyers who do not want to be associated with living in a culturally stigmatized home. On the other hand, if the Vermod does not look like a traditional manufactured home, it could dissuade previous manufactured home residents who want to have something quality but inconspicuous in a mobile home park. While the Vermod is a modular home subject to local and state building codes, not the HUD Code, the misconception of its status by experts is problematic, particularly as it could impact funding and advocacy.

## Resident Perspectives of Vermod High Performance Modular and ENERGY STAR Manufactured Homes

The weaknesses of the Vermod were largely identified during the comments and discussion that surrounded the interview questions and are more qualitative than many of the strengths noted in the previous section. Many of the weaknesses that were identified include issues that can be readily addressed, some that are inherent in the design, and others that are of concern over the medium- and longer-term.

There are several issues that were mentioned frequently that are relatively low-cost and high-impact because they are so obvious to homeowners. One are cracks in the paint and interior drywall finish. Several homeowners mentioned this (seven in total), and while it seems minor, it is also “in their face” and causes dissatisfaction. New homeowners who feel they paid a good price for a quality product want that new look to last for a while.

Several other similar, simple-to-address issues were mentioned. One is the homeowner’s manual. Some residents felt that it should be easier to obtain an additional copy or a replacement. A second was that some residents expressed dissatisfaction with the electric lighting, attributing to the lighting system what may be correctable by obtaining a different type of bulb. As these minor issues are identified, a more dynamic and readily available on-line manual may offer some solutions. While access to the Internet is increasing, updated print manuals should continue to be available. A newsletter to Vermod homeowners with updates could provide homeowners with new information and also reinforce the network and sense of belonging to a unique group of high performance homeowners.

An inherent weakness of the HPMH is that its simple exterior does not reflect either its value or its innovativeness. Some respondents expressed concern for the lack of “curb-appeal,” and others simply wanted their energy efficient, relatively expensive house to show its value in more obvious ways.

The high purchase price of high performance modular homes relative to ENERGY STAR homes will be a challenge when marketing to lower-income purchasers. The high performance modular homes surveyed were significantly more expensive than ENERGY STAR homes (see Figure 2 on following page). Comparing just “single-wide” high performance modular homes of approximately 14’x70’ ( $n=11$ ), the average cost before subsidies was \$134,832, more than double the average price of an ENERGY STAR home ( $n=6$ ) of \$60,128 before subsidies. An important limitation of this direct cost comparison is that many high performance modular homes included additional features, such as ramps, frost-protected foundations, ENERGY STAR appliance packages, and solar panels.

A related concern with greater significance for the success of the HPMH product is that the better build quality and durability paid for by HPMH purchasers may not be readily apparent for several years. To a trained eye or particularly observant layperson, the difference in materials between the HPMH and an ENERGY STAR manufactured home is apparent. Whether a typical homebuyer in the market for a factory-built home can anticipate the difference in how the two buildings will age over time is a concern in marketing the HPMH.

This issue was less of a concern for many of the current HPMH homeowners, who often had a discernable connection to either Vermod or Efficiency Vermont. This “within’ network” marketing has helped Vermod get homes into communities and increase word of mouth. Moving ahead, marketing will require more sales to people who approach the purchase with less inherent trust, and demonstration that high performance modular homes hold their value will be increasingly important.



## Original Purchase Price Before Subsidies: "Single-Wide" Vermod vs ENERGY STAR Homes

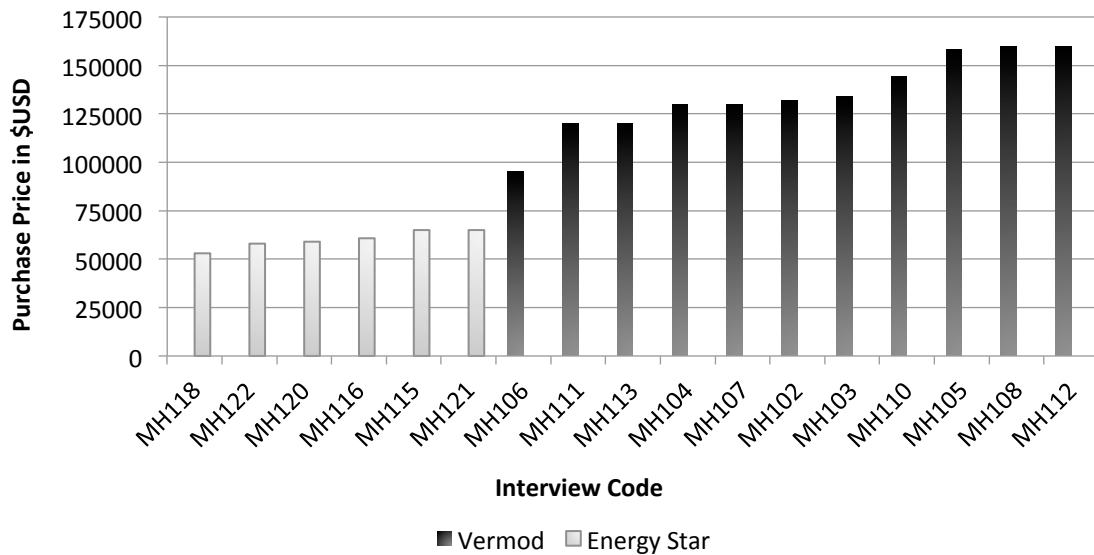


Figure 2. Original purchase price of single-wide Vermod and ENERGY STAR homes

*Note.* Vermod  $n = 11$ ; ENERGY STAR  $n = 6$ .

<sup>a</sup> “Single-wide” homes are generally 14’x70’. Homes included above varied from widths slightly less than 14’ to a maximum length of 80’.

<sup>b</sup> The purchase price includes the home itself, costs for delivery and set-up, hooking up utilities, any decks or porches, appliances (washer and dryer included for Vermods only), and solar panels (for Vermods only), but excludes any costs for land payments or park rent.

### ENERGY STAR Weaknesses

If the low price of ENERGY STAR homes is one of their strengths, the quality of materials and construction appears to be one of their weaknesses, and some of those issues were apparent to new buyers of ENERGY STAR homes. Interviews concluded with an open question inviting respondents to add comments about “anything we missed.” Three homeowners offered comments critical of the quality of the building’s quality. These included comments about deficiencies with windows and walls. When asked specifically about the quality of the interior finish, five out of six respondents reported problems with floors buckling or coming loose. Four out of six residents had generally negative opinions about the quality of interior finishes.

Table 10. General Feelings About Interior Finishes

| Variable      | Frequency | Percent of <i>n</i> |
|---------------|-----------|---------------------|
| Very positive | 0         | 0.0%                |
| Positive      | 1         | 16.7%               |
| Neutral       | 1         | 16.7%               |
| Negative      | 4         | 66.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

There was also some evidence that ENERGY STAR buyers purchased their home anticipating that it would not be a long-term investment. Only one respondent said that long-term value was important to them when they bought their house, and two said they would move out if they had a better alternative.

Table 11. Importance of Long-Term Value in Buying Home

| Variable                   | Frequency | Percent of <i>n</i> | Overall Mean |
|----------------------------|-----------|---------------------|--------------|
| 5 – Very important         | 0         | 0.0%                |              |
| 4 – Important <sup>1</sup> | 1         | 16.7%               |              |
| 3 – Neutral                | 3         | 50.0%               | 2.67         |
| 2 – Pretty unimportant     | 1         | 16.7%               |              |
| 1 – Not important at all   | 1         | 16.7%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

## Opportunities

### Stakeholder Perspectives and Analysis

#### Overview of HPMH Opportunities

Vermont’s marketplace for housing is an opportune place for high performance modular homes. An aging housing stock and lack of affordable housing, as well as a number of target groups, encourage the prospects. Key groups include younger urban home seekers, seniors, people with disabilities, and other buyers on fixed incomes. Appropriate subsidies could further reach low-income demographics.

- Aging housing stock - high demand for affordable and overall housing
- Modular and manufactured good for individual rural and rural multi-family communities
- Modular good for middle-income, younger urban first time homeowners
- Could be good for senior populations, those with disabilities, and fixed incomes in general

## Housing Shortage

*“We do not have enough housing right now, not just low-income housing.”*

More than half of the stakeholders interviewed acknowledged that one of the greatest challenges facing Vermont is not just the lack of affordable homes, but also the lack of homes in general. “We do not have enough housing right now, not just low-income housing.” In Vermont we “don’t have a big vacancy rate” and “lack of supply is the biggest problem.” The stated cost is mostly due to an aging stock of stick-built homes and a slower housing growth rate than population growth rate. “We are at a particular point in time that manufactured housing stock is old enough that there is going to be a major change over the next decade, so there is an opportunity to make a better option available.”

The opportunity resides in Vermont’s policy of replacing existing stock with new stock. If high performance modular homes could position themselves as preferred housing types when existing stock has to be replaced, then this could be a boon for the industry. This is especially true if modular homes end up on the radar of developers who would otherwise only be considering stick-built.

## Affordable, Multi-Family Housing in Rural Settings

According to stakeholders, modular and manufactured homes provide an attractive, moderately priced option for rural areas, which is most of Vermont outside of the Burlington MSA. “In more rural areas [manufactured homes] are an important part of our housing stock. In Vermont’s central areas, mobile home parks are some of the most affordable housing and they need to be upgraded and preserved.” “Mobile home parks offer higher density in a rural environment. You can’t get a condo development in a rural area, but a new park with high efficiency is great.” There is a “need for affordable housing outside of Burlington, particularly in more rural areas.”

Stakeholders saw targeted multi-family communities as a specific opportunity. “The idea that parks can generate many units on one lot is a benefit, a form of community building” and they tend “to work in groups and communities to create wide photovoltaic systems that the community can use.” “It seems like there is a certain percentage of the population that appreciates both the community and the affordability of mobile home parks. In a place like Vermont, it provides a level of density that you don’t get other than in villages.”

*“In Vermont’s central areas, mobile home parks are some of the most affordable housing and they need to be upgraded and preserved.”*

There was broad consensus amongst stakeholders over the need for more affordable housing, though it appeared that definitions of “affordable” varied from the lowest incomes to middle-income households. “Generally, we need more housing that is affordable. Our market has enough housing at the high end but we do not have enough that is under \$300,000.”

“Broadly, we need more [affordable housing], there is a huge demand and we can’t begin to meet the demand. Far too many people are paying more than half of their income in rent and that is a problem.” “Not only should it be a priority for making housing affordable to the average family, but good in terms of durability, attractive, and energy efficient.”

Given these perspectives of the stakeholders, it would seem sensible to view Vermod or HPMH only

communities as having an opportunity in rural Vermont. For this to be an effective solution, it would likely entail a bulk purchase with a discount, as creating an entire development of high performance homes is a costly endeavor. To effectively execute such multi-family communities would involve not only partnering with developers, but also finding an effective funding model that would distribute risks of potential financial loss in the case of particular tenants causing damage to the high cost properties. Similar programs were executed by McKnight Lanes in Waltham and the Evergreen Mobile Home Park in Hardwick.

### Middle-Income

Stakeholders considered it an opportunity that “a number of residents of mobile home communities are middle-income.” The opportunity lays in that “[these] homes are sort of a middle option for folks who want more feeling of permanence and a sense of home than someone who is renting within an affordable home price range... a middle approach.”

*“In a higher income range, the younger population, the more socially motivated older population that has more money, is willing to do something different.”*

One stakeholder thought that according to “the Burlington Young Professionals Housing Survey, one of the things they considered important was being near downtown but not being in apartments, they want a private house close to the city.” This is multiplied by the general “lack of affordable land and high costs to improve land.” “I know a lot of young families that have college debt and would

love to get into homeownership but don’t want to buy a 200 year old house that they have to spend thousands of dollars on with heating and maintaining every year. There is a great opportunity for a new (factory-built) model.” The North Ave Cooperative in Burlington is an example of urban placement of factory-built housing. “In a higher income range, the younger population, the more socially motivated older population that has more money, is willing to do something different.” A similar case was made by another stakeholder for middle-income residents that are “in their 50s or over and are finished with college spending and are ready to downsize and want an affordable long term living situation.”

While some stakeholders did see opportunities for younger individuals who want to live downtown, this claim might be problematic, especially if the young professionals were considering having children and would need more space than is available on a single mobile home park lot. Empty nesters may be one of the strongest demographics to target for more urban and suburban areas, assuming there is a desire to downsize and the capital to afford a high performance building. What is important to consider in these calculations is what would the target income group be that would be able to afford such housing while not being too wealthy as to consider small modular housing as an inferior good.

### Seniors, Disabilities, Supported Living

HUD provides a number of programs to support low-income, senior, and disability housing. These include Section 8, Section 202, Section 515, and Section 811. These programs aim for occupants paying a base of 30% of their income for the housing.<sup>34</sup> Section 8 housing is available for those earning less than 50% Area Median Income (AMI). Section 202 is specifically available for individuals over the age of 62. Section 515 provides public housing for those earning below 80% AMI. Section 811 focuses on

<sup>34</sup> Vermont Housing Finance Agency, 2016

households with disabilities in Vermont, where 16% of households have at least one person with disabilities.<sup>35</sup> Because these programs are oriented towards renting and not home ownership, they would be more relevant in the case of non-profit based rental communities.

Disadvantaged groups, including seniors and individuals living with disabilities, are especially vulnerable with regards to housing. Vermont is one of the USA's oldest states, with much of the population wanting to age in place. The vulnerable populations of seniors and those living with disabilities are more likely to currently be living in a factory-built home.<sup>36</sup>

*“These older houses are occupied by an aging population...now what happens is that rural communities don't have a place for aging adults.”*

According to stakeholders, “mobile homes are generally occupied by families or a couple or a single person living on a fixed income.” According to others, “we have an aging population, particularly in our rural areas living in housing that is out in the woods and bigger than they may need and energy inefficient. There are

not a lot of opportunities for people to move into their own community. These could be a solution for accessible and easy-to-maintain housing. This is a market that would be responsive as long as [the houses] don't look too weird. Vermont made a lot of progress in looking more mainstream.” “We have a lot of housing stock that is old housing stock that was built for larger families...these older houses are occupied by an aging population...now what happens is that rural communities don't have a place for aging adults. The only way you will move someone in Marshfield, he would have to move to Burlington or White River Junction.”

Stakeholders acknowledged people with “disabilities account for 40% of mobile home residents.” One stakeholder observed that it would be interesting to combine aggregate housing with disability support. “It would be interesting to do a pilot project from the perspective of a supportive housing model. Somewhere where you have a person available to check on a number of individual modular units to make sure that these people are doing well...the largest need that we see is disabilities of all sorts.”

Vermont and other high performance mobile homes may have the most success with seniors, people with disabilities, and those with other fixed incomes. Fixed income also means predictable income, so this population may place higher value on an upfront investment because they know what their income will be. Given the many health impacts associated with limited lighting and air quality that particularly target these groups and their desire to live in modular or manufactured homes, a logical conclusion would be for the federally funded programs to subsidize high quality versions. A major opportunity may be creating target senior living communities partnered with non-profits that focus on such issues. Another advantage of working with seniors is the lower probability of potential harms to the premises and the lower likelihood of opiate related damage.

## Resident Perspectives of Vermont High Performance Modular and ENERGY STAR Manufactured Homes

Interviews with residents identified several important areas of opportunity for the HPMH. Those who live in high performance modular homes can perceive the quality of the housing directly. Comfort, air quality, increased natural light and significantly reduced exterior noise are all apparent to residents. Energy

<sup>35</sup> Vermont Housing Finance Agency, 2016

<sup>36</sup> Furman, 2014; George, Bylund, 2002; Hoffman, Livermore, 2012

savings are substantial, and particularly for those who have installed solar panels, Net Zero energy usage is within reach. Importantly, high performance modular homes are perceived as both a good value and a “greener” value. The latter was important to many HPMH purchasers, with more than 60% of respondents saying that they felt consideration of the environmental impact was important in their decision to buy a home.

Table 12. Importance of Home’s Environmental Impact in Purchase Decision

| Variable                   | Frequency | Percent of <i>n</i> | Overall Mean |
|----------------------------|-----------|---------------------|--------------|
| 5 – Very important         | 8         | 53.3%               | 4.07         |
| 4 - Important              | 1         | 6.7%                |              |
| 3.5 – A little important   | 1         | 6.7%                |              |
| 3 – Neutral                | 3         | 20.0%               |              |
| 2.5 – A little unimportant | 1         | 6.7%                |              |
| 2 – Pretty unimportant     | 1         | 6.7%                |              |
| 1 – Not important at all   | 0         | 0.0%                |              |

*Note.* *n* = 15. One respondent was a renter, and thus excluded from this data. Percentages may not sum to an even 100% due to rounding.

The 16 residents interviewed confirmed there is a market for the HPMH, and that it is an affordable option for those interested in a greener home. The layout and design of the HPMH appealed to these consumers, with more than 2/3<sup>rd</sup> saying that the accessibility of the home was an important factor in their decision. All 16 purchasers reported that managing their Vermod mortgage was not a strain for them, and for more than 60% of HPMH residents the assistance from Efficiency Vermont and elsewhere was one of the most helpful factors helping them purchase their home.

Perhaps the greatest opportunity for the HPMH is that out of 16 purchasers, 15 would recommend purchasing an HPMH to another person looking to buy a new home. The one respondent who would not recommend it was pleased with the house overall, but wanted better service when dealing with issues related to the building.

Table 13. Recommendation for Others Looking to Buy Vermod

| Variable            | Frequency | Percent of <i>n</i> |
|---------------------|-----------|---------------------|
| Would recommend     | 15        | 93.8%               |
| Would not recommend | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

### ENERGY STAR Opportunities

Interviews with ENERGY STAR owners found that awareness of energy conservation was high among this group, with five out of six ranking this high among their important criteria when deciding on a home,

though none of the ENERGY STAR homes had solar panels. At the same time, the concept of “Net Zero” was unfamiliar, with four responding that they had never heard of the concept. Coupling these issues suggests that these homeowners might be open to learning more about the benefits of solar panels and how Net Zero energy initiatives could save them money on their energy bills. An important difference between ENERGY STAR homes and Vermods is that Vermods were explicitly designed with solar installation in mind, while ENERGY STAR homes are not. Furthermore, there may be some structural concerns that make solar panel placement on ENERGY STAR more problematic.

Table 14. Importance of Energy Conservation in Home

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 4         | 66.7%               | 4.33         |
| 4 - Important            | 1         | 16.7%               |              |
| 3 – Neutral              | 0         | 0.0%                |              |
| 2 – Pretty unimportant   | 1         | 16.7%               |              |
| 1 – Not important at all | 0         | 0.0%                |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

Vermod builds high performance modular homes designed to stay in place as permanent housing; they are typically anchored to frost-protected foundations. ENERGY STAR homes, while they’ve mostly dispensed with the traditional “mobile” model of a home on a chassis with wheels, are typically set down upon slabs constructed in mobile home park sites. Though ENERGY STAR residents perceived a relative ease of moving their homes compared to Vermod residents, should the need arise, the ability to relocate their home was largely unimportant to the majority of HPMH purchasers. Most of the ENERGY STAR residents interviewed mentioned their homes were tied down to the slabs as a precaution against natural disasters, important for many that saw the damage done to mobile homes during Tropical Storm Irene. The ties, as one homeowner mentioned in conversation, can easily be un-bolted by a contractor, making ENERGY STAR homes potentially more moveable than their Vermod counterparts. However, the relative fortitude of Vermod structures that are anchored to foundations and a general lack of interest in relocating the manufactured homes suggests that there might be an opportunity for ENERGY STAR homes to adopt more permanent and potentially stronger housing structures.

Table 15. Importance of Ability to Move Home to a New Location in Buying Home

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 0         | 0.0%                | 2.00         |
| 4 – Important            | 1         | 16.7%               |              |
| 3 – Neutral              | 1         | 16.7%               |              |
| 2 – Pretty unimportant   | 1         | 16.7%               |              |
| 1 – Not important at all | 3         | 50.0%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

# Threats

## Stakeholder Perspectives and Analysis

### Overview of HPMH Threats

A number of threats challenge the possibilities of high performance modular homes taking off. In general, there is a stigma with regards to factory-built homes, which can result in a preference for repairing Vermont’s stick-built stock. Many stakeholders are uncertain of the financial payoffs of Net Zero homes and energy efficiency measures. The dependence on government and private subsidies threaten the sustainability of future projects. Depreciation of stored value by lower relative prices of homes within the community and lack of value accrual of factory-built homes limit investment. There is a general lack of education on behalf of funders, planners and homebuyers of the positive features of high performance modular.

- Stakeholder perception that prospective residents consider factory-built as inferior good
- Stakeholder perception that it is cheaper to repair than to replace existing stock
- Stakeholder perception that energy savings are outweighed by upfront financial cost
- If dependent on subsidies or special financial agreements, could change making homes less affordable
- Decreased government focus on energy efficiency and affordable housing, particularly on a federal level
- Depreciation of value: best on the block and depreciation of factory-built over time
- Education problems of consumers with finance and energy savings, lenders of Net Zero, and planners of zoning preferences

### Price and Subsidies

Stakeholders viewed the high price and dependence on subsidies as the largest threat to an affordable high performance modular housing program. According to one stakeholder referencing the Vermod, we must “get the market to produce something that is competitive. It cannot exist forever as a subsidized thing.” This belief was in the context of private ownership of more high performance modular homes. “Everybody is focused on the upfront price tag of the home, then we shift the long term operating cost on Vermonters that are least able to afford it... price is a barrier for long term quality stock.” “Upfront costs are a huge impediment to that population.”

*“[We must] get the market to produce something that is competitive. It cannot exist forever as a subsidized thing.”*

The price and risk was too high even for some of the stakeholders who previously invested in high performance modular homes; it is “not a model they would likely do again because of the financial risk associated with it.” When asked about the top five criteria for purchasing manufactured or modular home, of the eight stakeholders who answered, three said “upfront costs” or “costs,” one

said affordability, and another described “what am I going to pay per month: principal, interest, taxes, insurance.”



If the current prices of approximately \$100,000 to \$150,000 take the cost savings of subsidies into consideration, then the removal of the subsidies could drastically increase the cost of the houses. Current subsidies include the solar incentive of \$7,000, the Efficiency Vermont incentive of \$8,500, and the CHT homeownership loan of \$35,000. The average price for a new manufactured home is \$30,000-\$40,000 with a 15-20 year mortgage. This puts monthly payments on chattel loans of 7% to 12.75% between \$233-\$500 for housing. Similarly, the financial institutions that provide preferred rates for high performance modular homes could find the loans problematic and change their lending practices, again increasing the price of the homes. The only way to reduce the necessity of subsidies and preferred lending practices is through decreasing the costs. This could be done through increasing output with economies of scale or through the increase of competition by the market entry of other high performance home manufacturers.

### Stigma of Manufactured Housing

While the majority of factory-built homes are on private land, the historical placement of mobile home parks limits the current placement of manufactured and modular homes. Manufactured homes experience a negative reputation, particularly because of the crime associated with mobile home parks; however,

*“In the marketplace there is a valid disbelief that you can make a modular equivalent to stick built.”*

these claims have been largely debunked.<sup>37</sup> In Vermont, their reputation is linked to the opiate epidemic, which has had a number of effects on affordable housing policy and expansion. One result of historical rural concentration was a stigmatization of mobile park residents by urban and suburban communities.<sup>38</sup>

Some stakeholders saw a fear of investment by landlords, where it was the “experience of private landlords who are holding [housing units] off the market...to spend \$200,000 to rehab a unit after evicting an opiate addict.” The stakeholders also vied that “a lot of folks don’t even make the connection that there might be a better alternative” with factory-built homes. “In the marketplace there is a valid disbelief that you can make a modular equivalent to stick built.” The stigma is particularly true for mobile home parks where “the American dream is buying land and putting a house on the property.”

This perception is threatening in a number of ways. When funders and government agencies have a stigmatized view of mobile home parks, it reduces the probability of new large scale mobile and manufactured home replacement projects. These larger projects are essential for a number of the target markets to be reached. Secondly, if individual consumers conflate manufactured and modular housing to perceive all factory-built homes as inferior to stick-built, it prevents that market from even putting an HPMH on their radar.

### Aging Stock

According to one stakeholder, “we need to rehabilitate existing housing and to create auxiliary units.” Likewise, “I don’t think with the funds available it is possible to get to Net Zero at this point in time. It would be more feasible to do good cost effective energy work and air sealing.” The

*“We need to rehabilitate existing housing and to create auxiliary units.”*

<sup>37</sup> Furman, 2014; McCarty, 2010; Schmitz, 2004

<sup>38</sup> Brown & Sellman, 1987

argument presented by the stakeholders is that you can make a bigger difference for Vermonters if you spend the same amount of money that it costs to build a new high performance modular home on many smaller weatherization and repair projects that do not reach the same goal of Net Zero energy.

This perspective holds a general threat to the viability of large scale projects, because if stakeholders who consider Vermods and other high performance homes, including stick-built, to be useful but don't see them as a "Plan A," it reduces the prospect of having strong advocates for the product. This threat may diminish in time as more of the aging stock becomes non-repairable and must be replaced.

### Net Zero Energy and Energy Savings

There is a level of hesitancy amongst some stakeholders for Net Zero energy housing. When asked about the importance of Net Zero energy, one stakeholder responded, "I don't know the cost benefit. It needs to prove itself. A lot of tech sounds great on paper but then don't work out that well... but it is still a good goal." Another described "the concern to get to zero without making it so expensive that it doesn't make sense any more, so there is a return on the dollar invested; someone just has to do the calculations effectively."

Stakeholders still view the product as too new to evaluate where the "Vermod cost could be low, but there is a lot of skepticism about the estimates and projections [because of a] low track record." This stakeholder was specifically referring to the short time frame that Vermods have been in the marketplace as the cause for skepticism about the energy-based cost savings; not enough data points have been gathered. "It's dangerous for people to spend a lot of money on something new and sexy but find out in five years it didn't produce the return."

*"It's dangerous for people to spend a lot of money on something new and sexy but find out in five years it didn't produce the return."*

Some stakeholders considered Net Zero energy to be desirable "every time," but others thought that "every rational being should want to support energy efficient construction. But the realities are that energy efficiencies cost money and not everybody can or will pay for it." Those with financial experience focused on debt: "a client with good credit. Someone who wants to be green and have low variable bills, low heating and electricity." "The Passive House standard relates directly to this, creating comfortable and safe indoor spaces that are low energy and resilient. The return on investment is great. Those are the conditions that I would be looking at."

Many stakeholders viewed variable costs for homeownership as a changing landscape that depends on the price of inputs. "[Variable costs] were more important a few years ago, higher oil prices." "We are short on data of how much you can save on monthly costs...it is dependent on the comparison of variable fossil fuels." Today, "the perception is that energy costs are fairly low." "When [energy] prices start climbing again these will be more attractive to the energy efficient homes." However, it is not typically considered against the upfront cost. "I think a lot of folks don't really think into it too much, [they're] more concerned with cost of rent, but don't ask about electric bill or fuel costs."

Collectively, these perceptions by many of the stakeholders paint a less than optimistic picture for advocating Net Zero energy usage as a selling point. The biggest problems being the novelty of the technology has not created enough data points to validate many of the claims for savings. This is a threat

that may disappear on its own over time as more units and more data becomes available. The second threat of uncertain energy prices relates to the challenges of fixed and monthly costs. If there is a perception that the government will keep fuel costs low and that temperatures will continue to rise as they have, then there are fewer savings to be associated with Net Zero energy usage.

### Stored Value

Stakeholders saw the loss of stored value as a threat due to depreciation, particularly when considering the placement in mobile home parks. "You don't want the best or worse in a neighborhood... the Vermod in a mobile home park is going to be the best building." "Can't put an expensive house in a bad neighborhood... placement and price point are the key variables." This also affects financing if "say in Swanton, (rural) Vermont, where property values are low. If the cost of the home is \$60,000, but an appraiser goes to look and comparative sales and property values are \$55,000, [the buyer] would have to pay the difference out of pocket."

*"[Manufactured homes] are not something you can easily advise someone to stick their money into unless the home itself could appreciate. This depreciation is more of a perception."*

The stakeholders shared the perception that "a hallmark of mobile housing is that they depreciate and don't produce wealth or equity that can be tapped if [the owner] needs to sell or move on." "In general, [mobile home owners] pass their trailers on to a family member when they move on or die."

Manufactured homes "are not something you can easily advise someone to stick their money into unless the home itself could appreciate. This depreciation is more of a perception." "The newer [manufactured homes] are better than the older ones, but now they just don't keep their value like a stick-built home does."

Based on the perceptions of stakeholders, there is a sense of doubt about the appreciation of value of any factory-built structure. If a park's reputation changes, so will the values of the homes, which is daunting for a prospective buyer. While paying \$20,000-\$50,000 may be justifiable for a depreciable asset (like a car or a manufactured home), the upfront price of a high performance modular home in a park may be more difficult to justify if its value depreciates (unlike a stick-built home on land that is expected to appreciate in value over time).

### Education

Nearly half of all stakeholders mentioned education of one or another population groups. Some stakeholders focused on consumer education, in that the need to understand "what [they] can do in the

*"[The] education piece is really big. Potential buyers have an understanding of what they are getting into and what the benefits are."*

short-term versus long-term is why [they] need financial coaching and education." "People are not educated to the level of estimating long term costs of variable costs. They do not account for the variable cost." The "education piece is really big. Potential buyers have an understanding of what they are getting into and what the benefits are. They get sticker shock at first, but once they get

the bigger picture of living in a higher efficiency mobile home, they explain the economics...the lenders, the appraisers, realtors all have to be educated...it is happening but really slowly." Other stakeholders saw energy efficiency as the target for education, where the "challenge is showing people the comfort and value in a well-built insulated building." "There is an education piece for all energy efficiency. Customers need to understand that something might look like a similar home without the upgrade, but is not the same."

Other stakeholders considered financial and government agencies to be the needed recipients of additional education. "Those that are providing the financing need to understand the benefits and the economics of a Net Zero modular home." There is a historical tendency to see low mobile parks as a blight with higher rates of crime than elsewhere; however, this fear is unfounded, as was shown by McCarty (2010). According to a stakeholder, "municipalities are the ones who need more education about the opportunities for modular homes... To recognize there is a demand for small home ownership... [educating] commissions could help for allowing smaller lot sizes and more units."

*"[We need better education for] those that are providing the financing to understand the benefits and the economics of a Net Zero modular home."*

Education seemed to be one of the most important themes mentioned by many of the stakeholders. It would seem some of the stakeholders were even referring to one another, as some stakeholders themselves were unsure about legal status of modular homes. Even though a lack of education maybe one of the largest threats to the expansion of high performance modular homes, it also is one of the easiest aspects to focus on in expanding the reach of the products. By educating financial and government entities about the values of high performance modular homes, manufacturers and developers would be able to expand their reach with greater ease.

## Resident Perspectives of Vermod High Performance Modular and ENERGY STAR Manufactured Homes

A perennial challenge for a home designed to fit within spaces formerly occupied by conventional mobile homes will be its high price tag. Currently, that price has been substantially reduced through a number of grants and subsidies. If and when those subsidies are reduced, the out-of-pocket cost to purchasers will increase and threatens to limit the market for a home with this combination of aesthetic and price.

Various subsidies were helpful in affording the HPMH for 75% of HPMH residents, and 12% indicated that the grants were the most helpful part of buying the house. Most the grants were from housing and land trusts and Efficiency Vermont. This highlights the risk associated with changing policies, which may reduce grant amounts. In many cases the subsidy amount accounted for about half of the total costs of purchasing the HPMH.

Table 16. Subsidies Provided to Offset Purchase Price of Vermod Homes

| Pre-subsidy purchase price | <i>Subsidy amount</i> | Post-subsidy purchase price |
|----------------------------|-----------------------|-----------------------------|
| \$153,000                  | <i>\$68,000</i>       | \$85,000                    |
| \$95,000                   | <i>\$69,000</i>       | \$26,000                    |
| \$144,500                  | <i>\$75,000</i>       | \$69,500                    |
| \$160,000                  | <i>\$78,000</i>       | \$82,000                    |
| \$130,000                  | <i>\$80,000</i>       | \$50,000                    |

*Note.*  $n = 5$ . One respondent was a renter, and thus excluded from this data. Other respondents either did not mention receiving any subsidies or did not specify the amount of subsidies received, and were thus excluded from this table.

A second important area that threatens the HPMH as it goes to scale is the provision of technical assistance as the novelty of the product wears off and the geographic range of the HPMH increases. The current model of a small number of highly motivated and well-connected individuals forming the hub for technical assistance will not be sustainable if the market for the HPMH expands. At the same time, as the technology in the HPMH ages, it will require increased maintenance, repair, and replacement. While some components are well understood and increasingly available, others are less so. If a support system of technicians and affordable parts or replacements is not available, it threatens the continued success of the Vermod product.

#### ENERGY STAR Threats

For some ENERGY STAR homeowners, subsidies were essential for them to move into their home. Similar to high performance modular homes, the loss of subsidy would limit the ability of some purchasers to afford these homes. Different than the HPMH, the lower cost and more established markets suggest that even were subsidies removed, it is unlikely that the market for ENERGY STAR manufactured homes would disappear.

The larger threat facing these homeowners is that the long-standing concern about how these homes will age and whether they will appreciate does not appear to have been addressed. Even for the new homes in this study, evidence of excessive wear and tear are showing up. This limits the ability of these homeowners to increase their wealth through appreciated value, and may result in a decline in the quality of housing over time. Given the range of manufacturers producing ENERGY STAR homes, it is likely that some will hold their value better than others. The challenge for homebuyers is identifying which among this stock will be the best long-term investment.

# Barriers

## Stakeholder Perspectives and Analysis

### Overview of HPMH Barriers

The primary barriers to the HPMH are financial. Stakeholders believed that there are not enough innovative financing options, particularly for individuals with low income and/or bad credit. If more housing cooperatives existed, it would create a second market, but currently their presence in Vermont is limited. Some stakeholders mentioned that in flood prone areas, mobile park residents did not wish to move because of the community and nearness to current employment and their children’s education. This served as a barrier preventing financing that was contingent on relocating to a less flood prone area.

- Affordability
- Limited financing opportunities
- Limited cooperative mobile home parks
- Prospective homeowner debt
- Low desire to relocate

*“More patient capital.”*

According to stakeholders, the primary barrier to the success of high performance modular homes, particularly as a form of affordable housing, is a lack of financing options.

“If it were a dollar for a dollar, one way or another folks would buy the energy efficient ones, but the higher costs do create a barrier.” “Typical HUD homes are about \$58,000; that is too much. Efficiency will gain you some affordability but lenders do not recognize that. \$70,000 is probably the ceiling but you will not get the folks at the lowest end of the spectrum.” “New HUD rules have added a lot of costs to bring in new homes.” “The Vermod, all in with solar and frost wall, is \$140,000. Even though the interest rate is lower, it is still not affordable. Additional subsidies are critical to reduce the financing.” “Vermods are a great product but they are expensive.” “Even with brand-new subsidies, the Vermod is \$80,000. Affordability is a bigger sticking point this year than it has been for getting financing.”

Part of the financial challenge is a lack of innovative financing models. Some stakeholders suggested “more patient capital.” In the context, used patient capital referred to loans with zero interest that can be paid off over a 20 or 30 year span or until the borrower has access to a specified financial stream. Patient capital would help “when people are sitting down making the long-term investment, they are not asking the question of what will I do in the next 20 [years] when I might be retiring or the interest rate will jump.” While “the barriers are the upfront cost, financing affordable housing is complicated. There is a well known battery of professionals who are able to put those packages together.” “Our biggest subsidy is to middle and upper-middle class housing.” Another barrier mentioned by stakeholders for low-income subsidies is that they tend to go to renters, not

*“Ideally it would be great if there was a co-housing set up. Where you have a mobile home park transforming into a cooperative. Where anyone who moves into the park is committed to living in [that] way; maybe they don’t have a Vermod in the first five years, but they will in the future.”*

prospective homeowners. "The largest chunk of subsidies is for rental housing." "Most people who are looking for a mobile home have low incomes and don't qualify for the subsidies, and can't bring the cost down to a financing package that they can afford. A lot of people who are looking for a home are thinking of spending \$20,000 or less."

A lack of cooperatively owned mobile home parks was mentioned by stakeholders as a limitation for better funding. "Co-ops are better for getting subsidies but it would be more the responsibility of the individual." "Ideally it would be great if there was a co-housing set up. Where you have a mobile home park transforming into a cooperative. Where anyone who moves into the park is committed to living in [that] way; maybe they don't have a Vermod in the first five years, but they will in the future."

Cooperatively owned mobile home parks account for a very small segment of Vermont mobile homes. According to a stakeholder "30% of Vermont renters rent mobile homes... just 10% of mobile home residents live in co-op parks." Co-op parks often have deferred maintenance, as without a landowner there are challenges to getting community agreement for additional operating expenses. Also, co-op members may not have additional funds available to address long-term maintenance issues in the same way a single landlord would be expected to maintain a rental property. As one stakeholder noted, "we expect that older mobile home communities will move to more rental units unless we can find financing for units within parks...but many of these units are substandard [so we cannot finance them]."

*"Most of the people in these income brackets are looking to put a home in a park and are not going to be able to get into a mortgage situation or long-term purchase agreement because of lack of income and credit."*

Another funding issue is the debt level of prospective homeowners. Stakeholders saw that for many individuals "it is a real challenge. Especially those burdened with debt." Some folks live in unsafe homes, but there are "very poor resources to incentivize people to leave, because they have debt and don't want to refinance. Or they still owe debt on old homes that are in rough shape because they cannot afford to replace the homes and make the repairs

needed without paying the original debt." "Most of the people in these income brackets are looking to put a home in a park and are not going to be able to get into a mortgage situation or long-term purchase agreement because of lack of income and credit."

Funding problems extend to new mobile home parks in general. "You can sustain a park for a limited period of time, then you need to recapitalize. But there is often no sources to do that." "If someone wanted to come in and build a mobile park for renters, I don't think that the scoring system would reward a park system like this. The qualified application plan and how they want to develop affordable housing in Vermont, I don't think the park would score." With regards to zoning, "there is a suburban bias," whereas "not really much in promoting mobile home neighborhoods. They are historically something to be avoided." Not all stakeholders agreed: "mobile homes seem like an anachronism for the past, but now municipalities are prioritizing new parks."

Other park related issues are that people live in parks that are hazardous, but they have no intention of or financial ability to move, and are therefore unable to receive better quality housing. This was reflected by homeowners who were very uninterested in moving to a new location. After Tropical Storm Irene, "people were adamant about staying in their park even though it was flooding and in a 100-year

floodplain ... people wanted to stay in their communities and a lot was available there. If they moved, their children would have to go to a new school." At the same time, "the challenges are access to large loans from Rural Development... there are very few parks that build equity or a sense of community."

Park owners face a challenge in lack of incentives to push an energy efficient product over a standard one because they are primarily concerned with cash flow and profits. "One of the difficulties is that the park owners, be it private or nonprofit, who own the land and infrastructure, need to ensure cash flow by renting lots. They don't have the motivation to push one product over another." To justify paying more for a rental property, the landlords would need additional incentives to justify investing in Net Zero energy, given they don't experience the benefits of the higher costs.

Another barrier shared by stakeholders was the perceived economic impracticality of a Net Zero energy, single-family home. "Folks just don't know how to get there in a practical manner," and that "whether it is multi-family or single-family housing, multi is more efficient."

## Limitations

For the resident survey, the results of this study are qualified by several limitations. High performance modular homes are a recent introduction, and relatively few of them have been bought and sold. While there are many times more ENERGY STAR homes, finding comparable housing situations in age and financing limited this sampling frame, and of this number only a fraction of homeowners volunteered to be interviewed. This small sample size is more a concern for the ENERGY STAR manufactured home than the HPMH, where in the case of the latter, nearly all homeowners who had lived in their house for at least a year were contacted.

A second limitation is that the difference in residents' perspectives on the quality of the housing and associated energy costs may well change over time. The higher cost of the HPMH is expected by the manufacturer to result in a structure that maintains its quality over time. Assessing this was outside the timeframe of this study.

Finally, respondents likely varied in their ability to recall and report on their monthly housing costs. Some expenses are in fact monthly, while others are annual. Monthly costs for energy vary by season and year. Homeowners were sometimes unable to recall precise amounts of subsidies received, whether in the forms of grants or deferred loans. The figures reported in this study were what residents were able to recall, and this may differ from their actual payments.



# Recommendations

An opportunity for the success of the HPMH is to focus on specific groups who would find the package most appealing. Earlier findings suggested that there was no single group that was drawn to high performance modular homes other than the hyper-specific group of risk taking, environmentally conscious, and affluent home buyers. Our findings reveal a few groups that may be more attuned with the Vermod product. This condition gives ground to Rogers (2003) notion of diffusion in a target market. According to Rogers, diffusion is the process by which a new idea (innovation) is communicated over time among a social system. Further, for new ideas to take hold requires 10-20% adoption within a social system. Thus, a specified focus on a single group may have its own positive feedback.

*“It is not the existing mobile home market... near job centers near school districts. These are parks where the parks are doing financially better and look more like a suburban neighborhood”*

From the American Community Survey, of 254,865 occupied housing units in Vermont, 7.4% are mobile home or other – thus the universe of mobile homes is less than 18,860. According to one stakeholder, “it is not the existing mobile home market. Can you create a park environment where this would work?... Parks that are well maintained near job

centers near school districts. These are parks where the parks are doing financially better and look more like a suburban neighborhood.... We have a park in Monkton and ¾ of the homes are Vermods.” According to another stakeholder, “something that...fit in with a typical park setting. If it could have the durability and energy efficiency to be at zero, then you could maybe get people to borrow \$70,000.”

Based on the responses that we gathered from stakeholders, marketing high performance modular homes, at the current price level and current level of subsidies, is not recommended. Nearly every single affordable housing stakeholder with whom we spoke mentioned that the price, usually upfront price, for this market is too high. Some non-profit stakeholders who had purchased high performance modular homes in the past as a form of affordable rental housing mentioned that even they would not do this again due to the relatively high price combined with the risk of non-payment from tenants.

An alternative market that seemed to emerge from stakeholder responses was that of seniors and other individuals on fixed income, specifically those with higher monthly pension amounts. The logic behind this market is that, unlike low-income buyers with unstable unemployment, those with fixed income know precisely how much they will have from month to month. These individuals would be better adept at making a larger upfront purchase with a steady mortgage and predictable monthly payments. These groups are the ideal candidates for such a program, as the long-term nearly fixed monthly cost of HPMH ownership, approximately \$500 a month for mortgage and energy costs, would overlap with the fixed-income model of those receiving government payments. One caveat, as mentioned by a stakeholder, was that some seniors would be weary of pursuing a long mortgage if they were worried that their children would then inherit their debt.

Education is a critical component of this recommendation. Two major groups could be targeted for education initiatives: prospective homebuyers and government/financial stakeholders. By educating lenders on the values of energy efficiency, they would be able to provide loans and mortgages that better reflect the true value of the asset, and not simply view a high performance modular home as another

manufactured home. While none of the current residents viewed their cost of a mortgage as a strain, there may be a relatively lower income subset that would still find the costs prohibitive. If financial institutions would be willing to work with them, particularly using “patient capital,” then it could expand the reach of the product.

Educating government planners would be advantageous for the product, particularly as it relates to the value of mobile park communities, like those geared towards seniors. This approach would be useful because it could help encourage high performance modular communities. The benefits of these exclusive communities is that they would

*“We need more stock. More education. More help and guidance. Understanding cost and benefits between the two. More subsidy.”*

allow for the homes to all share the same median value and avoid the negative effect of neighboring, poor-quality homes. Secondly, with greater general demand, the price of the high performance technology would decrease as per the premise of traditional market incentives for new entrants and economies of scale. As one stakeholder mentioned, in general, “we need more stock. More education. More help and guidance. Understanding cost and benefits between the two. More subsidy.”

Considering high performance modular homes as an innovation in the marketplace gives the opportunity to consider Rogers’ (2003) description of how to gain adoption of an innovative technology or product. It is necessary to consider the innovation in terms of:

1. Trialability
2. Observability
3. Complexity
4. Compatibility
5. Relative advantage

Understanding how high performance modular homes fit each of these dimensions provides direction for gaining more widespread market adoption. One area that is worth considering is relative advantage. HPMH adoption continues to be challenged by comparisons to much cheaper (low-tech) alternatives. Vermod should define its competition in a way that compares it to something truly comparable, and the price comparison should be small (10-20% premium for better technology).

When considering the first two items, one way to address trialability and observability is to define the target market tightly. By having a small target market, the innovative product becomes more trialable and observable within the market or community, according to Rogers (2003). One way in which this spread affected the HPMH is evident in that 13% of current HPMH residents are there because friends or family told them about the product.

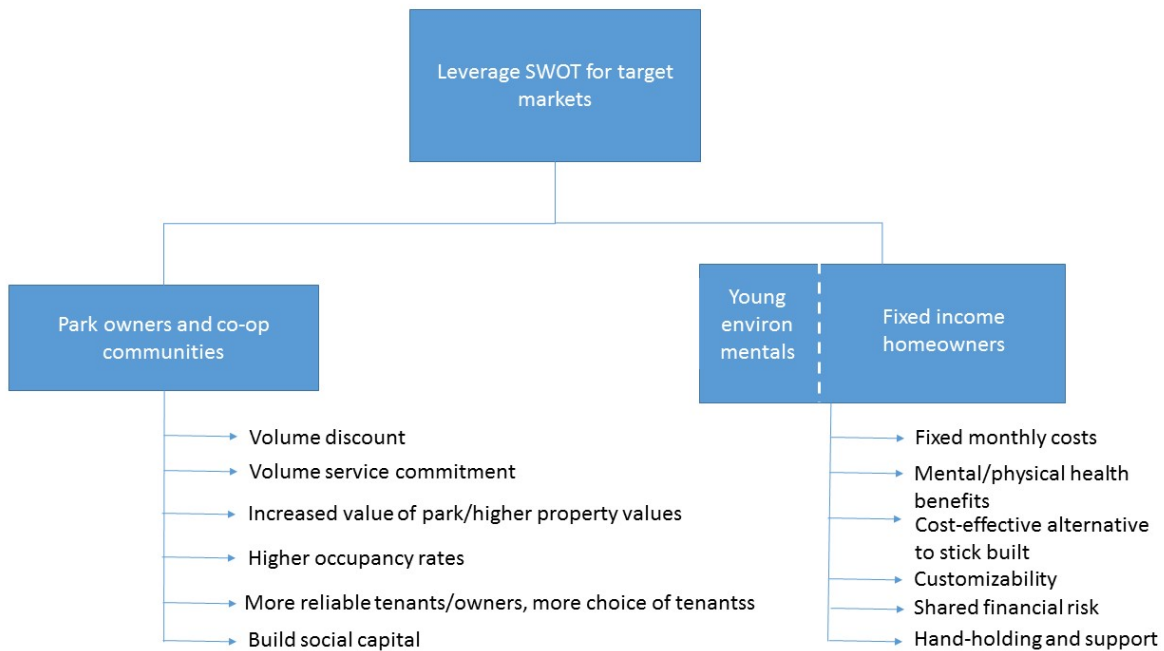


Figure 3. Strategies for increasing adoption within suggested markets.

The figure above presents strategies for increasing adoption within the suggested target markets. For example, if the payback is real, then sharing some of the risk of payback might be a strategy to help customers believe in the promised benefits. Customers on fixed incomes may be willing to pay a higher up front price if they can be more confident in their long-term costs. This also may provide an opportunity to begin to transition from the subsidy-driven pricing model currently offered.

Encouraging people to accept higher costs now, with deferred benefits, can be a useful strategy to change behavior.<sup>39</sup> Decisions that benefit most from behavioral “nudges” are typically difficult or complex decisions that people make infrequently and have little opportunity for feedback to improve future decision-making.<sup>40</sup> One way to offer a nudge is to provide a more structure for the complex choice being made.<sup>41</sup> This positive feedback is also applicable with regards to current homeowners, 93% of which indicated they would recommend a high performance modular home to others.

Innovators and early adopters typically expect a not “out of the box” product and some personal connection with the manufacturer and some additional support. As an innovative product moves into the “majority,” customers will expect a product that works as expected without any additional support.

Further, as with other innovative solutions, the competitive frame must be on values, not on price. Potential buyers who seek to choose primarily based on price are not good prospects for an innovative solution. The first step to focusing efforts on true prospects is to understand the financial requirements for

<sup>39</sup> Thaler and Sunstein, 2008

<sup>40</sup> Thaler and Sunstein, 2008

<sup>41</sup> Thaler and Sunstein, 2008

your product - find out upfront if they have the financial resources that will be necessary to complete the purchase. Once you know that it is possible for a potential buyer to make a purchase, focus on the values. The figure above makes a preliminary effort at highlighting the values of the two primary target markets. If your prospective customer does not identify with these values, then it is likely that they are not a true prospect either. Behavioral nudges will only be effective with a truly qualified prospective buyer.

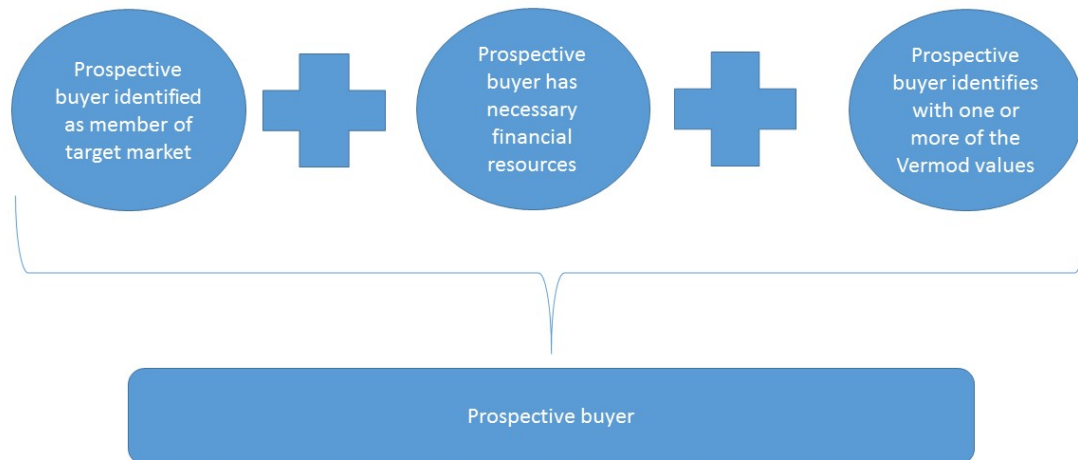


Figure 4. Identifying prospects.

A few key takeaways gleaned from interviews with residents of the Vermod homes, in particular, can be transformed into helpful recommendations for continued improvement and expansion of Vermod. Though a relatively minor issue at its core, a number of residents expressed frustration about interior blemishes, such as cracks in sheet rock or floorboards separating as the homes settle and adjust to temperature changes. In addition to these aesthetic issues inside the homes, not dissimilar to potential issues found in new stick-built homes, some residents disliked the exterior aesthetic of the homes, or their “curb appeal.” It is recommended that Vermod pay closer attention to the prevention of, or immediate fixing, of the interior blemishes mentioned by residents, and that they expand the options for exterior facades of the homes. Expending more effort on remedying these little details could prevent much greater dissatisfaction residents may have with their Vermod homes.

In addition to focusing attention on minor fixes and improvements in the homes, Vermod could consider extending and expanding the warranty for these homes. As the long-term durability of the homes is one of Vermod’s main selling points, it would be valuable to have a stronger warranty to help uphold this promise, and to allow Vermod to continue to improve the experience of homebuyers living in Vermods as HPMH technologies continue to improve.

For ENERGY STAR modular home builders, the issues related to the quality of interior and exterior finishes of the homes were much more substantial. It is recommended that builders of these homes improve the standards for construction and the quality of materials used. Many residents expressed

interest in energy conservation, and it would benefit builders of ENERGY STAR homes to tap into this interest with building and code improvements that enable solar energy opportunities for the homes.

High performance modular homes are innovative and highly energy efficient buildings. As they become less novel and more abundant, the need to clarify and sustain long-term technical assistance will be essential. While some elements will be familiar to existing HVAC businesses, other elements, such as the CERV ventilation system, will be less familiar. As the market for high performance modular homes expands, the ability for homeowners to locate skilled technicians will become increasingly important. Assisting homeowners in finding these technicians should be part of the planning for growth of this housing type. Many Vermont residents expressed concern over long-term access to the high quality service they've come to enjoy in the short-term. Additionally, as Vermod expands their markets and scales up, it will be essential to scale up the ability to service homeowners' needs, as well.

One strategy that could address this issue, as well as meet the needs of current homeowners, is to expand and commit to updating the manual available to HPMH buyers. As high performance modular homeowners gain experience, and Efficiency Vermont and Vermod learn about the issues homeowners are encountering, the manual should be amended to address these concerns. This dynamic manual, likely to be digital, could also include links to technical assistance for all the diverse elements that are being incorporated into these buildings. Additionally, having a newsletter that informs customers about updates and provides current information could prove useful.

## Appendix

### Appendix 1. Stakeholder Questions and Codes

| <b>Variable</b> | <b>Group</b> | <b>Description</b>   | <b>Total Indivs.</b> | <b>Total Times</b> |
|-----------------|--------------|--|----------------------|--------------------|
| #A.1            | (Question)   | First, please describe your role in affordable, energy efficient housing.  | NA                   | NA                 |
| #B.1            | (Question)   | What do you see as the priorities for affordable housing? How do you see mobile home parks and mobile/manufactured homes on private land fitting into the priorities of affordable housing in Vermont?   | NA                   | NA                 |
| #B.2            | (Question)   | How would you describe owners of mobile and manufactured homes in parks and on private land? Are they the same? How are they different? How might they approach a decision to purchase a new home?   | NA                   | NA                 |
| #B.3            | (Question)   | When thinking about someone who is considering purchasing a mobile, manufactured or modular home, what do you think are the top five criteria? [if needed, prompt with criteria examples: energy usage, energy costs, indoor air quality, durability, long term value, purchase price, square footage, floor plan, maintenance costs, quality, etc.] | NA                   | NA                 |
| #B.4            | (Question)   | If costs/price mentioned, how do you think that these buyers consider the purchase price vs. the lifetime price of a home? How does the long-term value compare to purchase price in importance? How important are monthly costs compared to initial purchase price?   | NA                   | NA                 |
| #B.5            | (Question)   | What would motivate a mobile park owner to buy or market new homes for their park, assuming there are already homes of various qualities in the park?  | NA                   | NA                 |

|      |            |  |    |    |
|------|------------|--|----|----|
| #B.6 | (Question) | If you were going to invest in a mobile home park as a new affordable housing development, what criteria would you use for choosing the building type? [can prompt with examples above]                          | NA | NA |
| #B.7 | (Question) | [Park owners only] What is your criteria for a new home in your park? What costs/benefits do you and the homeowner consider?   | NA | NA |
| #B.8 | (Question) | How important is having a goal of “Net Zero” housing for the state of Vermont? How practical is it to achieve this goal?   | NA | NA |
| #C.1 | (Question) | What challenges do you believe park owners face in acquiring (energy, low-income housing, etc.) subsidies for mobile homes? [probe for integrating zero energy modular homes]                                    | NA | NA |
| #C.2 | (Question) | How important do you think energy efficiency is to park owners? How important are zero energy homes to park owners? If these are important, what are the barriers to achieving?                                  | NA | NA |
| #C.3 | (Question) | What features are most important for a mobile park to provide? What has prevented some park owners from providing them?  | NA | NA |
| #C.4 | (Question) | What attributes tend to motivate people to move into a particular mobile park? What might dissuade a prospective homeowner/tenant?   | NA | NA |
| #C.5 | (Question) | Who are the trusted experts that you would turn to if you needed more information about energy efficient housing? Who do you think a homeowner would turn to? What about trusted sources for affordable housing? | NA | NA |
| #D.1 | (Question) | How do you approach the variable costs of housing? i.e., insurance, utilities, maintenance   | NA | NA |
| #D.2 | (Question) | How important are these variable costs to the overall affordability of housing? How do you imagine these costs might change over time (say 5 years, 10 years, 20 years)?   | NA | NA |

|                               |                                |   |    |    |
|-------------------------------|--------------------------------|---|----|----|
| #D.3                          | (Question)                     | How do you think homebuyers account for these variable costs relative to the fixed costs (mortgage)?  | NA | NA |
| #D.4                          | (Question)                     | How do you think homebuyers account for these variable costs relative to the fixed costs (mortgage)?  | NA | NA |
| #E.1                          | (Question)                     | If you could describe the conditions under which you believe a zero energy modular home might be the right choice, what would they be?  | NA | NA |
| #E.2                          | (Question)                     | Thank you for participating in this interview. Your responses will remain confidential, and will help to refine the modular home offerings and how they address the needs of the community. Do you have any questions for me? | NA | NA |
| Aesthetic                     | (Criteria for Housing Value)   | Includes comfort and look   | 8  | 14 |
| Aging Stock                   | (Challenges to Mobile General) | Physically aging and decrepit   | 5  | 7  |
| Builder                       | (Background)                   | Builders, architects, developers  | 4  | 4  |
| Capstone                      | (Trusted Organizations)        |   | 1  | 1  |
| Community Action              | (Trusted Organizations)        |   | 1  | 3  |
| Depreciation of Value         | (Challenges to Mobile General) | Financial depreciation, over time or because of neighborhood  | 4  | 7  |
| Durability Present and Future | (Criteria for Housing value)   | Includes weatherization and infrastructure of park  | 11 | 24 |
| Economic and Financial Need   | (Needs)                        | Subsidies, financing, folks too poor to afford anything but cheapest  | 16 | 54 |
| Efficiency Vermont            | (Trusted Organizations)        |   | 8  | 10 |
| Energy                        | (Trusted                       |   | 1  | 1  |



|                                 |  |  |    |    |
|---------------------------------|--|--|----|----|
| Action Partnership              | Organizations)                               |  |    |    |
| Energy Efficiency               | (Criteria for Housing Value)                 | Energy efficiency is valuable  | 11 | 17 |
| Energy Efficient Too Expensive  | (Challenges to Energy Efficient or Net Zero) | Energy efficient homes are too expensive to purchase   | 5  | 6  |
| Finance                         | (Background)                                 | Works for a lending institution  | 6  | 6  |
| Financial Issues                | (Challenges to Vermod-esc)                   | Vermods cost too much to be realistic in today's market  | 13 | 31 |
| Geography Zoning & Incentives   | (Challenges to Vermod-esc)                   | Including multi-unit and multi-family challenges, placement of homes, lack of space in parks, lack of funds for mobile parks | 11 | 18 |
| Government                      | (Background)                                 | Work for a government agency   | 3  | 3  |
| Grassroots and Local            | (Trusted Organizations)                      |  | 5  | 6  |
| Green Building Advisor          | (Trusted Organizations)                      |  | 1  | 1  |
| Housing Type Need               | (Needs)                                      | Affordable, single-family, energy efficient, durable   | 17 | 26 |
| How they look                   | (Challenges to Vermod-esc)                   | Either because they look like trailers or because they don't look like traditional trailers                                  | 5  | 5  |
| Irene Cause for Change          | (Background)                                 | Energized to make a difference after damage of Tropical Storm Irene  | 6  | 6  |
| Landlord                        | (Background)                                 | Landlord or property manager   | 2  | 2  |
| Location                        | (Criteria for Housing Value)                 | Where the park is, the neighborhood, near family, near work  | 12 | 17 |
| Manufactured Cheaper Than Stick | (Opportunities)                              | Cost savings of mobile as opposed to stick   | 6  | 6  |
| Mobile as                       | (Challenges to                               | Problem that homes regulated under DMV   | 1  | 1  |

|                                   |  |  |    |    |
|-----------------------------------|--|--|----|----|
| DMV Registered                    | Mobile General)                              |  |    |    |
| Mobile Good for Land Type         | (Opportunities)                              | Including geography like rural, foot print, shape, coop, private   | 8  | 10 |
| Mobile Good for target Group      | (Opportunities)                              | Low income, fixed income, middle income, young professionals, seniors, homeless, co-op, transitional, non-profit | 8  | 14 |
| More Housing Over All Stock       | (Needs)                                      | Including limited land and lots available  | 11 | 12 |
| Need More Public Education        | (Needs)                                      | Homeowners, funders, financial institutions, communities   | 8  | 9  |
| non-profit                        | (Background)                                 | Work in a non profit institution   | 11 | 11 |
| Not Practical                     | (Challenges to energy Efficient or Net Zero) | As per question of is Net Zero practical   | 4  | 4  |
| Park Infrastructure and Placement | (Park Infrastructure and Placement)          | Including structure of houses, flooding prone areas, and other infrastructure and placement issues               | 6  | 6  |
| Price                             | (Criteria for Housing Value)                 | Folks look at price of homes   | 16 | 30 |
| Repair Existing Stock             | (Needs)                                      | Have to repair existing homes and parks  | 5  | 6  |
| Safety and Crime                  | (Criteria for Housing Value)                 | Includes reputation  | 5  | 6  |
| Size                              | (Criteria for Housing Value)                 | House and lot size   | 4  | 4  |
| Stigma Of Mobile Home             | (Challenges to Mobile General)               | Folks view living in a mobile home as low class  | 6  | 9  |
| Technology                        | (Challenges to                               | Folks are intimidated by the scary technology  | 1  | 1  |

|                                    |                         |  |    |    |
|------------------------------------|-------------------------|--|----|----|
| Intimidating                       | Vermod-esc)             | in a Vermod  |    |    |
| Underserved Communities Needs      | (Needs)                 | Seniors, disabilities, homeless                              | 8  | 12 |
| VEIC                               | (Trusted Organizations) |  | 2  | 2  |
| Vermod Mentioned                   | (Uncategorized)         | Was Vermod mentioned   | 15 | 37 |
| Vermod Specific Opportunities      | (Opportunities)         | Includes financial, energy efficient, weatherized, aesthetic | 10 | 21 |
| Vermont Housing Conservation Board | (Trusted Organizations) |  | 2  | 3  |
| Vermont State Housing Authority    | (Trusted Organizations) |  | 2  | 2  |
| Worked With Old Models             | (Background)            | Worked with a precursor to Vermods                           | 1  | 1  |

## Appendix 2. Resident Research Question Summaries: Vermod Homes

### ***Basic Home Details***

Table 1

#### *Home Size – Bedrooms and Bathrooms*

| Variable         | Frequency | Percent of <i>n</i> |
|------------------|-----------|---------------------|
| 2 bedroom 2 bath | 8         | 50.0%               |
| 3 bedroom 2 bath | 3         | 18.8%               |
| 2 bedroom 1 bath | 3         | 18.8%               |
| 3 bedroom 1 bath | 1         | 6.3%                |
| 1 bedroom 1 bath | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

Table 2

#### *Home Size - Dimensions*

| Variable        | Frequency | Percent of <i>n</i> |
|-----------------|-----------|---------------------|
| 14'x70'         | 8         | 50.0%               |
| 14'x66'         | 2         | 12.5%               |
| 14x68'          | 1         | 6.3%                |
| 13'8"x70'       | 1         | 6.3%                |
| 27'6"x62'/55'   | 1         | 6.3%                |
| 2 box "L"       | 1         | 6.3%                |
| 13'/44'x14'/56' | 1         | 6.3%                |
| 48'x46'         | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

Table 3

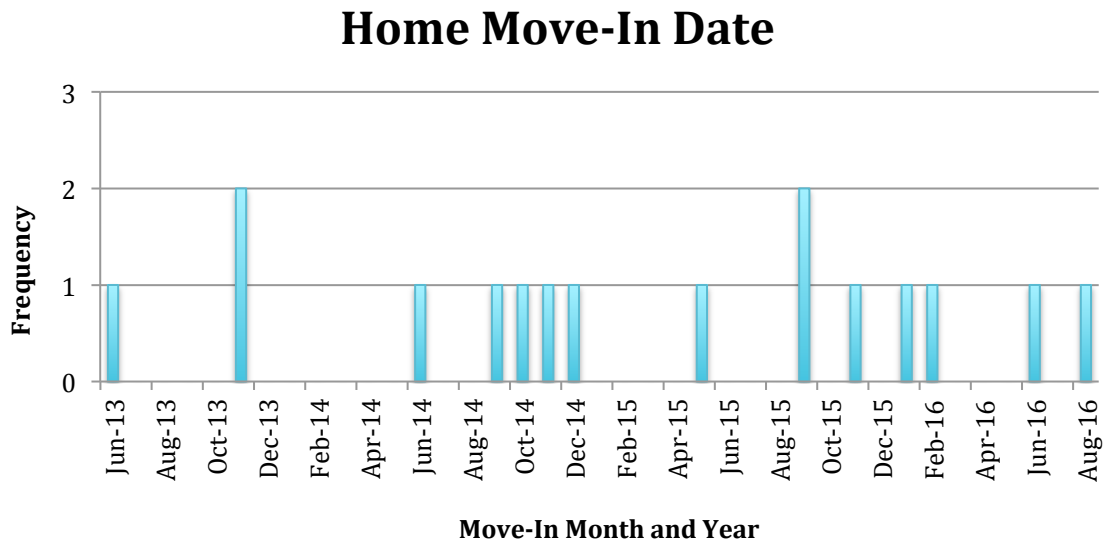
*Site Details*

| Variable                     | Frequency | Percent of <i>n</i> |
|------------------------------|-----------|---------------------|
| Owned land                   | 5         | 31.3%               |
| Cooperative mobile home park | 4         | 25.0%               |
| Non-profit mobile home park  | 4         | 25.0%               |
| Private mobile home park     | 2         | 12.5%               |
| Tenant renting               | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

**Interview Guide Questions**

**Q1: When did you purchase this home (month and year)?**



*Figure 1.* Move-in month and date by frequency.

*Note.* *n* = 16.

<sup>a</sup>Interview question asks specifically for purchase date, however the date a purchase agreement was made and the date moving into home were often very different – to assess time living in home, the move-in date was used here, and thus includes the one person renting.

**Q2: Was it new when you moved in (i.e. are you the first owner)?**

Table 4

*Home Was New Upon Move-In*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| New home <sup>1</sup> | 15        | 93.8%               |
| Previously lived in   | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>For one of the “New home” responses, the owner was the first to live in it, but the home had been a show model for a year prior to the owner moving in.

**Q3: Is this the first home that you have owned?**

Table 5

*First-Time Home Owner*

| Variable      | Frequency | Percent of <i>n</i> |
|---------------|-----------|---------------------|
| No            | 11        | 68.8%               |
| Yes           | 4         | 25.0%               |
| N/A - renting | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

**Q4: How did you come to the decision to buy a new home?**

Table 6

*Factors in Decision to Buy a Vermod: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Looking for an affordable but nice home          | 8         | 53.3%               |
| Direct connection to Vermod or VEIC <sup>2</sup> | 7         | 46.7%               |
| Needed a one-floor/easy to maintain home         | 3         | 20.0%               |
| Friend/Family told them about Vermods            | 2         | 13.3%               |
| Moving to be closer to family                    | 2         | 13.3%               |

|   |   |       |
|---|---|-------|
| Wanting to be a first-time homeowner/Invest in a home | 2 | 13.3% |
| Looking to upgrade an older mobile home               | 2 | 13.3% |
| Approached about funding available for Vermods        | 2 | 13.3% |
| Seeking out a Net Zero home                           | 2 | 13.3% |
| Went to open-house                                    | 1 | 6.7%  |

*Note.*  $n = 15$ . One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Total variable responses = 31.

<sup>2</sup>Of the seven who mentioned a direct connection to Vermod or VEIC as a reason for buying a Vermod, six knew Steve Davis personally, and one knew Peter Schneider.

### **Q5: What type of house did you live in before you moved into this home?**

Table 7

#### *Previous Home Type*

| Variable                  | Frequency | Percent of $n$ |
|---------------------------|-----------|----------------|
| Single-family stick-built | 6         | 37.5%          |
| Apartment                 | 5         | 31.3%          |
| Mobile home               | 4         | 25.0%          |
| Condo                     | 1         | 6.3%           |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

### **Q6: What were your other housing options before you bought your new home?**

Table 8

#### *Alternative Housing Options Considered: Multiple Response Variables<sup>1</sup>*

| Variable                            | Frequency | Percent of $n$ |
|-------------------------------------|-----------|----------------|
| Only considered Vermod <sup>2</sup> | 6         | 37.5%          |
| Stick-built                         | 4         | 25.0%          |
| Apartments                          | 3         | 18.8%          |
| Condos                              | 3         | 18.8%          |
| Other manufactured/mobile homes     | 2         | 12.5%          |
| Tiny home/other Net Zero homes      | 2         | 12.5%          |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding. One respondent was a renter, so the question was altered to “What were your other housing options before you decided to rent this home?” in order to fit dataset.

<sup>1</sup>Total variable responses = 20.

<sup>2</sup>Of those who only considered Vermods, four had been directly approached and/or incentivized to buy/move into a Vermod, and otherwise had not been looking for new housing.

**Q7: Have you lived here the entire time since the purchase?**

Table 9

*Living in Home Since Move-In*

| Variable                  | Frequency | Percent of $n$ |
|---------------------------|-----------|----------------|
| In home since move-in     | 16        | 100.0%         |
| Not in home since move-in | 0         | 0.0%           |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding. One respondent was a renter, so the question was altered to “Have you lived here the entire time since you moved in?” in order to fit dataset.

**Q8: How many people live in the home?**

Table 10

*Number of People Living In Home*

| Variable                        | Frequency | Percent of $n$ |
|---------------------------------|-----------|----------------|
| 1 adult                         | 8         | 50.0%          |
| 2 adults                        | 5         | 31.3%          |
| 2 adults, 2 kids                | 2         | 12.5%          |
| 2 adults, 3-5 kids <sup>1</sup> | 1         | 6.3%           |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One family has three children living at home full-time, and two children away at college that only live at the home part-time.



**Q8a: Has this changed since you moved in?**

Table 11

*Number of People In Home Has Changed Over Time*

| Variable                 | Frequency | Percent of <i>n</i> |
|--------------------------|-----------|---------------------|
| Has not changed          | 15        | 93.8%               |
| Has changed <sup>1</sup> | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner had a roommate living in their home for one year.

**Q9: How long do you anticipate living in this home?**

Table 12

*Anticipated Time Living in Home*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| No plans to leave                                     | 8         | 50.0%               |
| May move after family member passes away <sup>1</sup> | 2         | 12.5%               |
| Until they can buy land                               | 2         | 12.5%               |
| Not sure  | 2         | 12.5%               |
| At least until mortgage paid                          | 1         | 6.3%                |
| As long as farm business is good <sup>2</sup>         | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Two homeowners are informal caretakers for a family member, and if that person passes, homeowner may decide to sell home and move elsewhere.

<sup>2</sup>The tenant renting plans to stay in Vermod located on the farm where he works so long as his job there remains stable.

**Q10: What was the purchase price with everything included: home, delivery, set, utility hook-up, decks and porches, solar, appliances?**

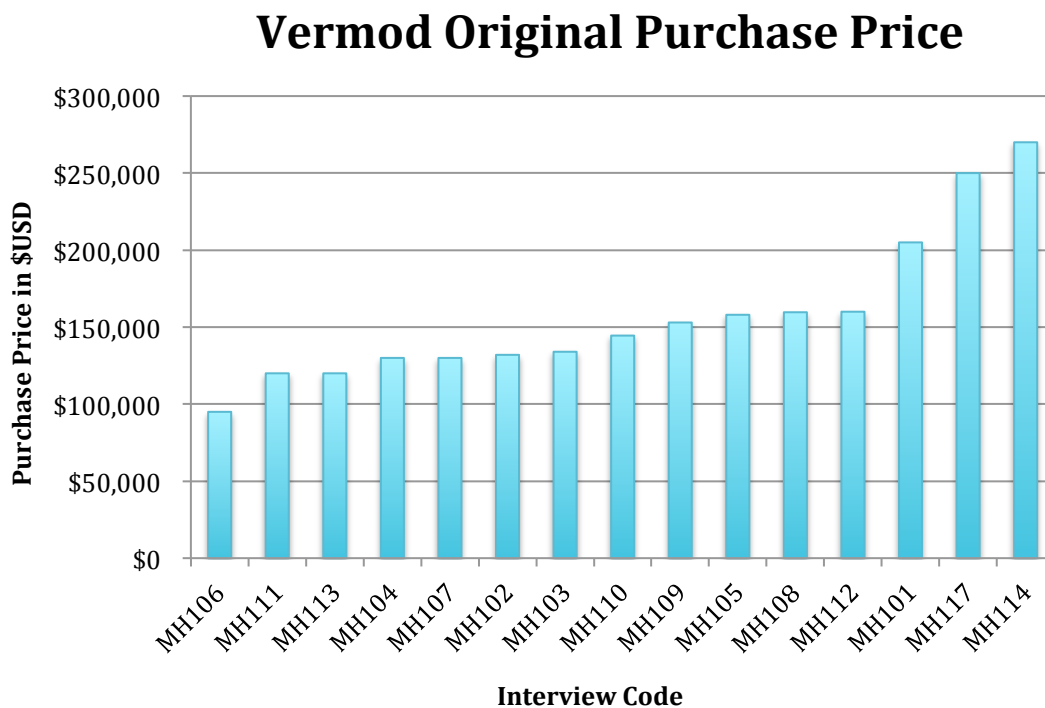
Table 13

*Purchase Price of Home*

| Variable | Frequency | Percent of <i>n</i> |
|----------|-----------|---------------------|
|----------|-----------|---------------------|

|                     |   |       |
|---------------------|---|-------|
| \$100,000 or less   | 1 | 6.7%  |
| \$100,001-\$125,000 | 2 | 13.3% |
| \$125,001-\$150,000 | 5 | 33.3% |
| \$150,001-\$175,000 | 4 | 26.7% |
| \$175,001-\$200,000 | 0 | 0.0%  |
| \$200,001-\$225,000 | 1 | 6.7%  |
| \$225,001-\$250,000 | 1 | 6.7%  |
| \$250,001-\$275,000 | 1 | 6.7%  |

*Note.*  $n = 15$ . Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.



*Figure 2.* Original purchase price of Vermod homes.

*Note.*  $n = 15$ .

<sup>a</sup>The purchase price includes the home itself, costs for delivery and set-up, hooking up utilities, any decks or porches, appliances, and solar panels, but excludes any costs for land payments or park rent.

<sup>b</sup>One tenant is a renter, and thus is excluded from data regarding home purchase price.

Table 14

*Subsidies Provided to Offset Purchase Price of Vermont Homes*

| Pre-subsidy purchase price | Subsidy amount | Post-subsidy purchase price |
|----------------------------|----------------|-----------------------------|
| \$153,000                  | \$68,000       | \$85,000                    |
| \$95,000                   | \$69,000       | \$26,000                    |
| \$144,500                  | \$75,000       | \$69,500                    |
| \$160,000                  | \$78,000       | \$82,000                    |
| \$130,000                  | \$80,000       | \$50,000                    |

Note. n = 5.

<sup>a</sup> One respondent was a renter, and thus excluded from this data.

<sup>b</sup> Six respondents said they did not receive any grants or subsidies to offset the purchase price of their homes, and are thus excluded from this table.

<sup>c</sup> Four respondents said they received grants or subsidies, but did not specify the amount, and are thus excluded from this table.

### Vermont Purchase Price After Applicable Subsidies

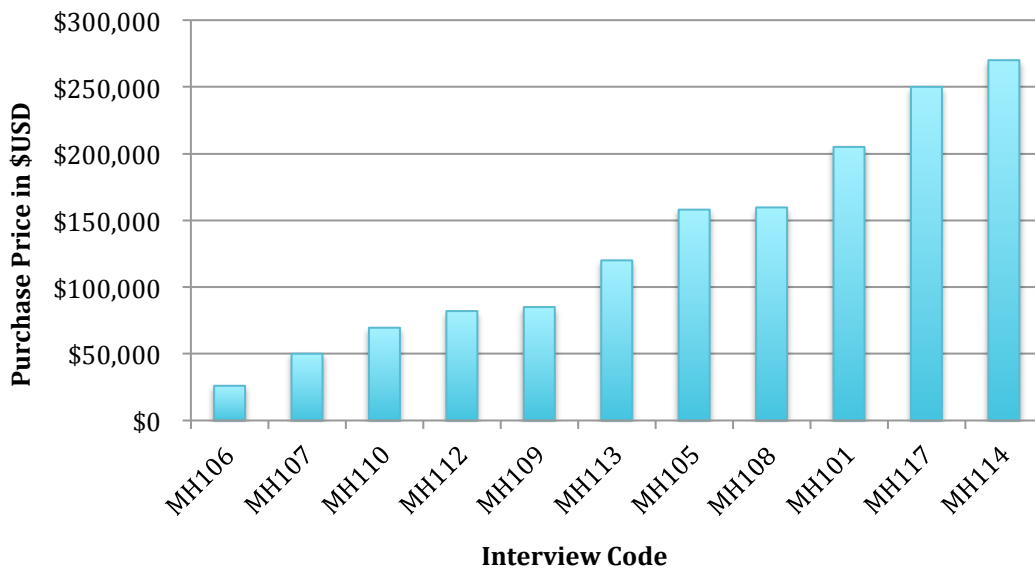


Figure 3. Purchase price of Vermont homes after applicable subsidies are included.

Note. n = 11.

<sup>a</sup> Four respondents did not know the amount of the subsidies they received and were thus excluded from this chart.

<sup>b</sup> One tenant is a renter, and thus is excluded from data regarding home purchase price.

Five homeowners received subsidies to offset the purchase price: MH106, MH107, MH110, MH112, and MH109. These five homeowners have the lowest final purchase price reported in the chart; the other six homeowners did not receive subsidies.

**Q11: How important was comfort in choosing a home on a scale of 1 to 5?**

Table 15

*Importance of Comfort in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 9         | 60.0%               | 4.27         |
| 4 - Important            | 3         | 20.0%               |              |
| 3 - Neutral              | 2         | 13.3%               |              |
| 2 – Pretty unimportant   | 0         | 0.0%                |              |
| 1 – Not important at all | 1         | 6.7%                |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

**Q12: How important were acoustics in choosing a home on a scale of 1 to 5?**

Table 16

*Importance of Acoustics in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 4         | 26.7%               | 3.13         |
| 4 - Important            | 3         | 20.0%               |              |
| 3 - Neutral              | 2         | 13.3%               |              |
| 2 – Pretty unimportant   | 3         | 20.0%               |              |
| 1 – Not important at all | 3         | 20.0%               |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

**Q13: How important was indoor air quality in choosing a home on a scale of 1 to 5?**

Table 17

*Importance of Indoor Air Quality in Buying Home*

| Variable                              | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------------|-----------|---------------------|--------------|
| 5 – Very important                    | 7         | 46.7%               | 4.07         |
| 4 - Important                         | 6         | 40.0%               |              |
| 3 - Neutral                           | 0         | 0.0%                |              |
| 2 – Pretty unimportant                | 0         | 0.0%                |              |
| 1 – Not important at all <sup>1</sup> | 2         | 13.3%               |              |

*Note.* *n* = 15. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>One person commented that when they were looking for homes, air quality was not at all a concern, but it’s turned out to be one of their favorite parts of their home.

**Q14: How important were energy costs in choosing a home on a scale of 1 to 5?**

Table 18

*Importance of Energy Costs in Buying Home*

| Variable                        | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------|-----------|---------------------|--------------|
| 5 – Very important <sup>1</sup> | 12        | 80.0%               | 4.67         |
| 4 - Important                   | 1         | 6.7%                |              |
| 3 - Neutral                     | 2         | 13.3%               |              |
| 2 – Pretty unimportant          | 0         | 0.0%                |              |
| 1 – Not important at all        | 0         | 0.0%                |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Two people made comments about how energy conservation and their carbon footprint were just as much, if not more, important than the energy costs of the home.

**Q15: How important was the overall cost of the home on a scale of 1 to 5?**

Table 19

*Importance of Overall Cost in Buying Home*

| Variable                        | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------|-----------|---------------------|--------------|
| 5 – Very important <sup>1</sup> | 12        | 80.0%               | 4.80         |
| 4 - Important                   | 3         | 20.0%               |              |
| 3 - Neutral                     | 0         | 0.0%                |              |
| 2 – Pretty unimportant          | 0         | 0.0%                |              |
| 1 – Not important at all        | 0         | 0.0%                |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Five people said they found the homes to be very affordable, some because of grants.

**Q16: How important was the long-term value of the house when buying a home, on a scale of 1 to 5?**

Table 20

*Importance of Long-Term Value in Buying Home*

| Variable                              | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------------|-----------|---------------------|--------------|
| 5 – Very important                    | 9         | 60.0%               | 4.37         |
| 4.5 – More than just important        | 1         | 6.7%                |              |
| 4 - Important                         | 3         | 20.0%               |              |
| 3 – Neutral <sup>1</sup>              | 1         | 6.7%                |              |
| 2 – Pretty unimportant                | 0         | 0.0%                |              |
| 1 – Not important at all <sup>1</sup> | 1         | 6.7%                |              |

*Note.* *n* = 15. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>These two homeowners commented that since it’s a new program, it’s hard to know the long-term value yet. Homeowner who’s response was “1” also said they’ve found it’s difficult to mortgage a manufactured home, so unsure of long-term value.

**Q17: How important was the durability of the house when buying a home, on a scale of 1 to 5?**

Table 21

*Importance of Durability in Buying Home*

| Variable                       | Frequency | Percent of <i>n</i> | Overall Mean <sup>1</sup> |
|--------------------------------|-----------|---------------------|---------------------------|
| 5 – Very important             | 9         | 60.0%               | 4.64                      |
| 4.5 – More than just important | 2         | 13.3%               |                           |
| 4 – Important                  | 2         | 13.3%               |                           |
| 3 – Neutral                    | 1         | 6.7%                |                           |
| 2 – Pretty unimportant         | 0         | 0.0%                |                           |
| 1 – Not important at all       | 0         | 0.0%                |                           |
| No response <sup>2</sup>       | 1         | 6.7%                |                           |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Mean is calculated with *n* =14, excluding the non-response variable.

<sup>2</sup>Homeowner did not give a numerical value, stating they assumed durability of any home they would purchase, and so considered it a non-issue and could not rank it's importance.

**Q18: How important was accessibility in choosing a home on a scale of 1 to 5?**

Table 22

*Importance of Accessibility in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 8         | 53.3%               | 3.93         |
| 4 - Important            | 2         | 13.3%               |              |
| 3 - Neutral              | 2         | 13.3%               |              |
| 2 – Pretty unimportant   | 2         | 13.3%               |              |
| 1 – Not important at all | 1         | 6.7%                |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

**Q19: How important was the ability to move the home to another location on a scale of 1 to 5?**

Table 23

*Importance of Ability to Move Home to a New Location in Buying Home*

| Variable                              | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------------|-----------|---------------------|--------------|
| 5 – Very important                    | 0         | 0.0%                |              |
| 4 - Important                         | 1         | 6.7%                |              |
| 3 – Neutral <sup>1</sup>              | 1         | 6.7%                | 1.40         |
| 2 – Pretty unimportant                | 1         | 6.7%                |              |
| 1 – Not important at all <sup>2</sup> | 12        | 80.0%               |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Homeowner responded that he considered the ability to move the home a “3” when looking to buy, but after it was such a challenge to get the home to his site, he would now consider the ability to move “1” in importance – it’s not going anywhere.

<sup>2</sup>One of the homeowners who, at the time of purchase, didn’t find it at all important to be able to move his home, is now considering moving it, as he doesn’t like his neighbors.

**Q20: How important was the environmental impact of your home on your decision to purchase this house, on a scale of 1 to 5?**

Table 24

*Importance of Home’s Environmental Impact in Purchase Decision*

| Variable                              | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------------|-----------|---------------------|--------------|
| 5 – Very important                    | 8         | 53.3%               |              |
| 4 - Important                         | 1         | 6.7%                |              |
| 3.5 – A little important <sup>1</sup> | 1         | 6.7%                |              |
| 3 – Neutral                           | 3         | 20.0%               | 4.07         |
| 2.5 – A little unimportant            | 1         | 6.7%                |              |
| 2 – Pretty unimportant                | 1         | 6.6%                |              |
| 1 – Not important at all              | 0         | 0.0%                |              |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent was a renter, and thus excluded from this data.

<sup>1</sup>Now that they’re part of the “green movement” after buying their home, they’re proud of it, even though it was only a little important at the time of purchase.



**Q21. In general, what is it like living in your new home compared to what it was like in your previous home?**

Table 25

*Reasons New Home Differs From Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable                                 | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Warmer/more comfortable                  | 6         | 37.5%               |
| Easier to maintain                       | 4         | 25.0%               |
| Quieter/more privacy                     | 4         | 25.0%               |
| Better air quality/healthier             | 3         | 18.8%               |
| One-floor/more accessibility (ADA)       | 3         | 18.8%               |
| More affordable                          | 3         | 18.8%               |
| Electricity better than fuel oil/propane | 2         | 12.5%               |
| Brighter/more light                      | 2         | 12.5%               |
| Has an outdoor area now                  | 2         | 12.5%               |
| Better quality build/newer               | 2         | 12.5%               |
| More community in MHP <sup>2</sup>       | 1         | 6.3%                |

*Note.* *n* = 16.

<sup>1</sup>Total variable responses = 32.

<sup>2</sup>Not a structural aspect of the home itself, but homeowner is happy to be living in the mobile home park (MHP) for the community around her – previously she was in an apartment in the city but didn’t feel connected to people around her. Sees being able to live in the MHP as a positive.

**Q22: In terms of overall comfort, how does this home compare to your previous home?**

Table 26

*Comfort in Vermod Compared to Previous Home*

| Variable                      | Frequency | Percent of <i>n</i> |
|-------------------------------|-----------|---------------------|
| More comfortable              | 11        | 68.8%               |
| Neutral                       | 4         | 25.0%               |
| Less comfortable <sup>1</sup> | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Homeowner shared her last home with her daughter, and it was more spacious than current home, so overall she considers her previous home to be more comfortable.

**Q23: What needed to change about your previous housing situation?**

Table 27

*Factors Needing to Change in Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Needed a more affordable home                              | 5         | 31.3%               |
| Wanted ownership/more privacy/to make own rules            | 4         | 25.0%               |
| Previous home was damaged/too old/generally not good       | 3         | 18.8%               |
| Family outgrew last place                                  | 2         | 12.5%               |
| Wanted a one-floor/something more accessible (ADA)         | 2         | 12.5%               |
| Personal issues (divorce/bad neighbors + too far from job) | 2         | 12.5%               |
| Needed something easier to maintain                        | 1         | 6.3%                |
| Not close enough to family                                 | 1         | 6.3%                |

*Note.* *n* = 16.

<sup>1</sup>Total Variable Responses = 20.

**Q24: What is different about your new home? Has your new home improved your housing and what are your favorite parts?**

Table 28

*Favorite Components of Current Home: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Energy efficient/has solar panels                      | 4         | 25.0%               |
| Easy to maintain and keep clean                        | 4         | 25.0%               |
| Everything is new                                      | 3         | 18.8%               |
| Well insulated/not drafty/very warm                    | 3         | 18.8%               |
| Great air quality                                      | 3         | 18.8%               |
| Quiet/privacy  | 3         | 18.8%               |
| Brightness/big windows                                 | 3         | 18.8%               |
| Likes the systems (minisplit, ventilation, monitoring) | 3         | 18.8%               |
| Likes appliances                                       | 2         | 12.5%               |
| Likes interior finishes <sup>2</sup>                   | 2         | 12.5%               |
| Fewer utility bills/lower cost                         | 2         | 12.5%               |
| Spaciousness   | 2         | 12.5%               |

|                                    |   |       |
|------------------------------------|---|-------|
| Home ownership                     | 2 | 12.5% |
| Easier access to work <sup>3</sup> | 2 | 12.5% |
| Community in mobile home park      | 1 | 6.3%  |
| Customizability in building home   | 1 | 6.3%  |
| Has outdoor space                  | 1 | 6.3%  |
| More affordable                    | 1 | 6.3%  |

*Note.*  $n = 16$ .

<sup>1</sup>Total Variable Responses = 42.

<sup>2</sup>The floors were mentioned twice as interior finishes that were among favorites.

<sup>3</sup>One homeowner was able to put a salon in her home, which she considers a retirement business, and the tenant interviewed is now able to live on the farm where he works.

### **Q25: Does this house have solar panels mounted on the roof?**

Table 29

#### *Solar Panels Attached to Home*

| Variable                                | Frequency | Percent of $n$ |
|---|-----------|----------------|
| Has solar panels <sup>1</sup>           | 14        | 87.5%          |
| Does not have solar panels <sup>2</sup> | 2         | 12.5%          |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner has solar powered electricity, but panels are on the solar farm on his property, and meters of home and field are netted together. All other homes have solar panels on the roofs of the houses.

<sup>2</sup>One home does not have solar panels but they are supposedly being installed very soon.

### **Q25a: What about a power wall/battery back-up that is used in the case of a power outage?**

Table 30

#### *Battery Back-Up/Power Wall/Generator at Home*

| Variable                         | Frequency | Percent of $n$ |
|----------------------------------|-----------|----------------|
| Has a power back-up <sup>1</sup> | 1         | 6.3%           |
| Does not have any power back-up  | 15        | 93.8%          |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner has an automatic generator that runs on propane gas.

### Q25b: How do you feel about them (the solar panels)?

Table 31

#### *General Feelings About Solar Panels*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| Very positive <sup>1</sup> | 4         | 28.6%               |
| Positive <sup>2,3</sup>    | 10        | 71.4%               |
| Negative or neutral        | 0         | 0.0%                |

*Note.* *n* = 14. Percentages may not sum to an even 100% due to rounding. Two respondents did not have solar panels, and were thus excluded. One of these respondents is looking forward to getting solar panels soon, and the other doesn't think she has enough sun and doesn't trust they work that well, in general.

<sup>1</sup>A "very positive" response was coded if respondent said they loved them or used other emphatic language.

<sup>2</sup>Two respondents who felt positively about solar panels mentioned they wished they worked better in snowy conditions, or that it was easier to clean snow off them.

<sup>3</sup>One respondent mentioned they wish they knew more about how they worked/how to maintain them, e.g. if squirrels could mess them up if it was too easy for squirrels to reach the roof.

### Q26: What do you think about the quality of appliances?

Table 32

#### *General Feelings About Appliances*

| Variable                     | Frequency | Percent of <i>n</i> |
|------------------------------|-----------|---------------------|
| Very positive <sup>1,2</sup> | 6         | 37.5%               |
| Positive <sup>2,3</sup>      | 9         | 56.3%               |
| Neutral                      | 0         | 0.0%                |
| Negative                     | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A "very positive" response was coded if respondent said the appliances were "great" or if they consider them top-of-the-line and were excited about picking them out.

<sup>2</sup>Three people – two with "positive" feelings about appliances and one "very positive" – mentioned liking that they got to pick out the appliances they wanted (e.g. an induction stove or top-brand appliances), some even paying more than the allowed appliance budget to get better quality appliances.

<sup>3</sup>Four people with generally "positive" feelings about the appliances mentioned experiencing minor issues, e.g. an improperly installed dishwasher, a dishwasher that doesn't seem to turn off on its own, circuitry behind the dishwasher that needed to be fixed, and a fridge that had to be replaced. These reports

either didn't seem to bother the homeowner much, or were fixed quickly and were no longer issues, and overall homeowners were still happy with appliances.

<sup>4</sup>One person with “negative” feelings expressed frustrations with most of the appliances, and with the servicing of them. One person with overall “positive” feelings has a stove with a burner that’s out and it’s still not fixed after a few weeks, though it might get fixed soon.

**Q27: What about the quality of the interior finishes?**

Table 33

*General Feelings About Interior Finishes*

| Variable                     | Frequency | Percent of <i>n</i> |
|------------------------------|-----------|---------------------|
| Very positive <sup>1,5</sup> | 3         | 18.8%               |
| Positive <sup>2,5</sup>      | 8         | 50.0%               |
| Neutral <sup>3</sup>         | 3         | 18.8%               |
| Negative <sup>4,5</sup>      | 2         | 12.5%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent said the interior finishes were “great” or “loves” them and has no issues with anything.

<sup>2</sup>A “positive” response was coded if respondent said interior finishes were “fine” or “good” or seemed to like them overall, despite possibly having some issues with certain finishes.

<sup>3</sup>A “neutral” response was coded if respondent didn’t specify liking or loving the finishes, and mentioned some issues, but said that overall the issues didn’t bother them or that the issues were being fixed and were not a persistent problem.

<sup>4</sup>A “negative” response was coded if respondent listed several issues with interior finishes and the servicing of those issues. Even if they mentioned one or two finishes they liked, if the overall impression of the finishes was very negative, a negative response was coded.

<sup>5</sup>One person with a “very positive” response, two with “positive” responses, and one with a “negative” response all mentioned liking the customizability involved in the building process and getting to pick out several of the interior finishes themselves.

Table 34

*Issues Reported For Interior Finishes: Multiple Response Variables<sup>1</sup>*

| Variable                                 | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Cracks in ceiling/walls <sup>2</sup>     | 7         | 43.8%               |
| Other structural issues <sup>3</sup>     | 7         | 43.8%               |
| Buckling/gaps in floorboards             | 5         | 31.3%               |
| Poor workmanship/problems not fixed well | 5         | 31.3%               |

|                                      |   |       |
|--------------------------------------|---|-------|
| Didn't get some finishes they wanted | 4 | 25.0% |
| Small blemishes                      | 3 | 18.8% |

Note. n = 16.

<sup>1</sup>Total Variable Responses = 31.

<sup>2</sup> Four of the people reporting cracks in ceiling/walls don't seem too bothered or mentioned they're planning to patch the cracks up themselves.

<sup>3</sup> "Other structural issues" include: 1) not enough support across whole foundation and a slanted floor; 2) door not shutting (had to be shaved); 3) bathroom drawer came apart; 4) windows won't shut (hinges need tightening); 5) a crack in a window for several months; 6) windows and door not sealed well - too drafty; and 7) some paint starting to chip.

### Q28: What about the quality of the exterior finishes?

Table 35

#### *General Feelings About Exterior Finishes*

| Variable                   | Frequency | Percent of n |
|----------------------------|-----------|--------------|
| Very positive <sup>1</sup> | 2         | 12.5%        |
| Positive <sup>2</sup>      | 11        | 68.8%        |
| Neutral <sup>3</sup>       | 2         | 12.5%        |
| Negative <sup>4</sup>      | 1         | 6.3%         |

Note. n = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A "very positive" response was coded if respondent said they "love" the exterior finishes.

<sup>2</sup>A "positive" response was coded if respondent said exterior finishes were "fine" or "good" or seemed to like them overall, despite possibly having some issues with certain finishes.

<sup>3</sup>A "neutral" response was coded if respondent mentioned some minor issues, but overall doesn't seem to be bothered by them.

<sup>4</sup>A "negative" response was coded if respondent listed several issues with interior finishes and nothing positive.

Table 36

#### *Positive and Negative Comments About Exterior Finishes: Multiple Response Variables<sup>1</sup>*

| Variable                                 | Frequency | Percent of n |
|--|-----------|--------------|
| Positive Comments                        |           |              |
| Loves the deck add-on                    | 3         | 18.8%        |
| Happy to have frost-wall/real foundation | 3         | 18.8%        |

Negative Comments

|   |   |       |
|---|---|-------|
| Poor workmanship  | 5 | 31.3% |
| Some issues with siding (bulging/separating/developing mold)    | 4 | 25.0% |
| Door issues (not well sealed/added or still wants a storm door) | 3 | 18.8% |
| Drainage issues on property (pooling under deck, porch sinking) | 2 | 12.5% |
| A beam on deck is buckling                                      | 1 | 6.3%  |

Note.  $n = 16$ .

<sup>1</sup>Total Variable Responses = 21.

**Q29a: What is your opinion about the electric lighting in the house?**

Table 37

*General Feelings About Electric Lighting*

| Variable                   | Frequency | Percent of $n$ |
|----------------------------|-----------|----------------|
| Very positive <sup>1</sup> | 2         | 12.5%          |
| Positive <sup>2</sup>      | 5         | 31.3%          |
| Neutral <sup>3</sup>       | 3         | 18.8%          |
| Negative <sup>4</sup>      | 6         | 37.5%          |

Note.  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent said the electric lighting was “fabulous” or “excellent”.

<sup>2</sup>A “positive” response was coded if respondent said they liked at least some of the lights or thought they were “good.”

<sup>3</sup>A “neutral” response was coded if respondent said they were “fine” but didn’t have a preference either way, or if they replaced the LEDs that came in the house with different LEDs they liked better, but didn’t say anything positive or negative either way as a result.

<sup>4</sup>A “negative” response was coded if respondent explicitly said they didn’t like the LED lights, or that they don’t use them because they’re too bright, cold, or have too much glare.

Table 38

*Criticisms<sup>1</sup> of Electric Lighting: Multiple Response Variables<sup>2</sup>*

| Variable  | Frequency | Percent of $n$ |
|---|-----------|----------------|
| Thinks they're too bright/too much glare <sup>3</sup> | 6         | 37.5%          |
| Doesn't use/has replaced them <sup>4</sup>            | 5         | 31.3%          |

*Note.*  $n = 16$ .

<sup>1</sup>There were seven overall positive responses given to question 29a, but almost all of the specific comments provided by homeowners were criticisms.

<sup>2</sup>Total Variable Responses = 13.

<sup>3</sup>One person with an overall “very positive” response commented that initially the lights were overlit, i.e. too bright, so they installed dimmer switches and now they love them. One of the “neutral” respondents said they thought the blue light from the original LEDs was too bright so they replaced them with warmer LED lights. The rest of people commenting the lights were too bright were still unhappy.

<sup>4</sup>One “positive” response mentioned they don’t use the overhead lights in their main living space much but they like the bright lights in the bedrooms. One “neutral” response had the too bright LEDs replaced with warmer ones. The other three homeowners that specifically mentioned that they don’t use the LED lights, often or at all, were very unhappy with them.

### **Q29b: What is your opinion about the natural lighting in the house (the windows)?**

Table 39

#### *General Feelings About Natural Lighting*

| Variable                     | Frequency | Percent of $n$ |
|------------------------------|-----------|----------------|
| Very positive <sup>1,4</sup> | 8         | 50.0%          |
| Positive <sup>2</sup>        | 7         | 43.8%          |
| Neutral                      | 0         | 0.0%           |
| Negative <sup>3</sup>        | 1         | 6.3%           |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent said the homeowner said they “love” the natural lighting or called it “fantastic,” “awesome,” “excellent,” or said the big windows were “stunning” and the natural light from them was great.

<sup>2</sup>A “positive” response was coded if respondent seemed happy overall and said they liked the natural light or thought it was “good.”

<sup>3</sup>The one renter interviewed did not like the natural lighting in the home – he thought there were too many windows and that they made the house feel drafty, and has most of them covered up with thick curtains.

<sup>4</sup>Some positive comments people made about the windows and lighting in the home include liking that it’s bright inside but the windows are tinted so people can’t see in very easily, that the awning windows open out, that the triple pane with the crossbars in the middle pane make the windows easy to clean, and that the big window sills are nice.



**Q30a: Would you say the house is quiet internally, between rooms in the house?**

Table 40

*Noise Level Between Rooms in Home*

| Variable               | Frequency | Percent of <i>n</i> |
|------------------------|-----------|---------------------|
| Quiet <sup>1</sup>     | 12        | 75.0%               |
| Not quiet <sup>2</sup> | 4         | 25.0%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Three “quiet” responses say they live alone, so it’s hard to tell, but overall it seems like the home is quiet from room to room.

<sup>2</sup>Two homeowners who gave “not quiet” responses don’t seem to mind, overall, that the house is not that quiet room to room – one said he thinks it’s due to the energy efficiency design and it’s work the trade-off. A third person said they think the sound travels through the ductwork. The fourth “not quiet” response said the sound inside the home was “reasonably good” but you can hear the furnace fans and that they’re “annoyingly loud.”

**Q30b: Would you say the house is quiet externally from inside to the outside of the house?**

Table 41

*Noise Level Between Outside and Inside of Home*

| Variable           | Frequency | Percent of <i>n</i> |
|--------------------|-----------|---------------------|
| Quiet <sup>1</sup> | 16        | 100.0%              |
| Not quiet          | 0         | 0.0%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Seven people mentioned home was “very quiet.” Three people specifically mentioned that the home is well insulated, attributing this to how quiet it is inside the home.

**Q31: How is the air quality in this home?**

Table 42

*General Feelings About Air Quality*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| Very positive <sup>1</sup> | 11        | 68.8%               |
| Positive <sup>2</sup>      | 5         | 31.3%               |

Negative or neutral 0 0.0%

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if homeowners described the air quality in their homes as anything beyond just “good” or “fine,” for example “excellent,” “better than outside,” or “great.” One person said it was “one of the home’s best qualities” and is why he’d probably buy another Vermod if he ended up moving out of his present one.

<sup>2</sup>A “positive” response was coded if the air quality was described as “good,” “fine,” or “pretty good.” One of these respondents mentioned the vents don’t seem to clear the air as they should, probably because of the unique “L” shape of her home, but she thinks this is atypical for most Vermods.

**Q31a: How does the air quality in this home compare to your previous home?**

Table 43

*Air Quality in Current Home Compared to Previous Home*

| Variable             | Frequency | Percent of $n$ |
|----------------------|-----------|----------------|
| Better <sup>1</sup>  | 13        | 81.3%          |
| Neutral <sup>2</sup> | 3         | 18.8%          |
| Worse                | 0         | 0.0%           |

*Note.*  $n = 16$ .

<sup>1</sup>Almost all respondents who think current home has better air quality think it’s “much better” and mention that their previous homes were dustier, leakier/draftier, or the air never circulated.

<sup>2</sup>Two people stated they see no noticeable difference in the air quality between their current and previous homes, and a third person mentioned their last home was in the woods, so the air quality was probably very good.

**Q32: Do you think this new home has positively or negatively affected your health or the health of the other people living in the home? If so, how?**

Table 44

*Impact of Current Home on Health of People Living in Home*

| Variable              | Frequency | Percent of $n$ |
|-----------------------|-----------|----------------|
| Positive <sup>1</sup> | 9         | 56.3%          |
| Neutral               | 7         | 43.8%          |
| Negative              | 0         | 0.0%           |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Five respondents said that the improved air quality in the home has positively affected their health or the health of someone living in the home, that the good air quality has helped with any breathing issues, like allergies, sleep apnea, or COPD. One person mentioned that they are less stressed and have improved mental health since moving their family into this new home.

**Q33a: How has it been living with the ventilation system?**

Table 45

*General Feelings About Ventilation System*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| Very positive <sup>1</sup> | 3         | 18.8%               |
| Positive <sup>2</sup>      | 8         | 50.0%               |
| Neutral <sup>3</sup>       | 4         | 25.0%               |
| Negative <sup>4</sup>      | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent said the ventilation system was “great” or “outstanding” and reported no issues at all.

<sup>2</sup>A “positive” response was coded if the homeowner’s comments about the ventilation system ranged from it “works well” or is “fine” to “good” or “very good.” One person said it’s “working great” but reported that the air filters are dripping water and they’re waiting to get that fixed.

<sup>3</sup>Any responses were coded as “neutral” if the homeowner simply said they have no issues with the ventilation system, or they just don’t use it much. One person said that when the system works, it works well, but it doesn’t seem to work as well in very cold weather; this homeowner has a Nilan ventilation system, which is different than all other Vermod homeowners.

<sup>4</sup>The homeowner with only a negative response said the ventilation does not work as well as it should, and attributes this to the “L” shape of her house, which is unique to her home.

**Q33b: How has it been living with the hot water system?**

Table 46

*General Feelings About Hot Water System*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| Very positive <sup>1</sup> | 5         | 31.3%               |
| Positive <sup>2</sup>      | 9         | 56.3%               |
| Neutral <sup>3</sup>       | 2         | 12.5%               |
| Negative                   | 0         | 0.0%                |

Note.  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent said the hot water system worked “great,” “excellent,” or “fabulous.”

<sup>2</sup>A “positive” response was coded if the homeowner seemed happy overall with the hot water system, and said it worked well. One person mentioned their hot water heater was replaced after Peter Schneider noticed something wrong in monitoring the system, but the homeowner didn’t notice a difference. They like that Vermod/VEIC is helping monitor the systems. One “positive” response came with the caveat that the water doesn’t get as hot as the respondent’s previous home, but he thinks that keeps people from getting burned.

<sup>3</sup>One of the “neutral” responses was given where the homeowner found the hot water system “sufficient” but that their last home had hotter water, though they understand the tradeoff for energy efficiency. A second “neutral” response said the hot water works, but their water seems bad (potentially not potable) and needs to get checked out.

**Q33c: How has it been living with the wall mounted minisplit air source heat pump used for heating and cooling?**

Table 47

*General Feelings About Minisplit Heat Pump*

| Variable                   | Frequency | Percent of $n$ |
|----------------------------|-----------|----------------|
| Very positive <sup>1</sup> | 4         | 25.0%          |
| Positive <sup>2</sup>      | 9         | 56.3%          |
| Neutral <sup>3</sup>       | 1         | 6.3%           |
| Negative <sup>4</sup>      | 2         | 12.5%          |

Note.  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “very positive” response was coded if respondent was generally emphatic about the minisplit. Two people mention really loving the air conditioning function.

<sup>2</sup>A “positive” response was coded if the homeowner said the minisplit was “fine” or “good” or overall worked well. Three of these responses had caveats, however: one person found it hard to learn how to operate the system and thinks a class or more information initially would be helpful; one homeowner has two minisplits for a larger house, and the smaller in the bedroom stays turned off because it gets too hot in winter months if it’s left on; a third person thinks it’s good in general but still feels the need to use a space heater because of drafts coming through poorly sealed windows and doors.

<sup>3</sup>The “neutral” response is for a homeowner who’s minisplit had condensation building up that Vermod was able to help fix. The minisplit took some getting used to but now it’s fine.

<sup>4</sup>One homeowner with a “negative” response was told their minisplit is working harder than it needs to because there’s too much black piping outside the home connecting to the compressor; their first compressor failed and was replaced, but the hosing stayed the same. The homeowner’s back bedrooms do not get enough heat or cool air when the minisplit is running, potentially because it’s needing to work too

hard to keep up. A second homeowner is unable to get his home up to the temperature he sets his heat to, and so far Vermod has been unable to figure out why it is not working as it should.

**Q33d: To what extent do you notice the systems on a daily basis?**

Table 48

*General Feelings About Living with Systems (Ventilation, Hot Water, Minisplit Heat Pump)*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Easy to maintain/not noticeable <sup>1,2</sup>            | 12        | 75.0%               |
| Occasional issues/has gotten used to systems <sup>3</sup> | 2         | 12.5%               |
| Very noisy/hard to deal with <sup>4</sup>                 | 2         | 12.5%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Almost every homeowner discussed the ease of changing or cleaning filters when necessary. Two homeowners mentioned that it’s easy to adjust the minisplit between seasons.

<sup>2</sup>One homeowner thinks the systems work great now, but brought up a concern that if there were issues, they would not know whom to call for maintenance – Vermod, the energy company, etc.

<sup>3</sup>One homeowner said they noticed the systems running at first but has since gotten used to them. A second homeowner with the Nilan ventilation system said they don’t notice the systems usually, unless the Nilan isn’t working well.

<sup>4</sup>One homeowner complained the hot water heater is very loud and seems to be constantly running, and the mechanical room is too noisy. A second homeowner seems irritated that the heating system doesn’t work as it should and he’s had to have many calls to Vermod, but the system hasn’t quite been fixed yet. He also thinks it is not very easy to get the filters out in order to clean/change them.

**Q34: Are there any things you would change about the layout of the home or how it was built that would improve the home?**

Table 49

*Opinions About Layout of Home: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Likes the layout overall <sup>2</sup>                     | 16        | 100.0%              |
| Happy to have helped in designing the layout              | 6         | 37.5%               |
| Would move dishwasher - hard to put away dishes when open | 1         | 6.3%                |
| Floors are cold - would like radiant heat                 | 1         | 6.3%                |

|   |   |      |
|---|---|------|
| Would make kitchen bigger, bathroom and front closet smaller <sup>3</sup> | 1 | 6.3% |
| Would move the laundry room <sup>4</sup>                                  | 1 | 6.3% |
| Would add a basement for storage  | 1 | 6.3% |

Note. n = 16.

<sup>1</sup>Total Variable Responses = 27.

<sup>2</sup>Every respondent said that they either like the layout as it is and wouldn't change anything, or even if they offered suggestions for things to change, they were overall happy with the layout of their home.

<sup>3</sup>Homeowner has unique, "L" shaped home and feels that certain layout design elements were not communicated well when the home was being built, like the relative sizes of the kitchen and the front bathroom and hall closet, and that the heating and ventilation systems do not work as well with the home's layout.

<sup>4</sup>Homeowner would move the laundry set-up to where the smaller bathroom currently is; thinks it was placed where it is because it was cheaper to put the laundry machines where pipes were already in place, but it is not as functional in that spot.

### Q35: What are your monthly housing costs (not including park rent or land payments)?

Table 50

#### *Vermont Monthly Housing Costs with Qualifications<sup>1</sup>*

| Interview Code | Monthly Housing Cost | Qualifications  |
|----------------|----------------------|---|
| MH101          | \$941.67             | None  |
| MH102          | \$163.09             | No mortgage – home already paid for   |
| MH103          | \$537.13             | None  |
| MH104          | \$465.26             | None  |
| MH105          | \$1,152.83           | No HD <sup>2</sup> applicable   |
| MH106          | \$289.33             | No HD applicable; car insurance included with homeowners insurance                    |
| MH107          | \$438.00             | None  |
| MH108          | \$1,282.17           | No HD applicable; not sure yet what electric bills will cost on average               |
| MH109          | \$357.75             | None  |
| MH110          | \$757.92             | Uncertain if HD applies <sup>3</sup>  |
| MH111          | \$84.17              | No mortgage – home already paid for; car insurance included with homeowners insurance |

|       |            |  |
|-------|------------|--|
| MH112 | \$525.00   | No HD applicable; not sure yet what electric bills will cost on average                    |
| MH113 | \$908.33   | No HD applicable; couldn't provide insurance costs <sup>4</sup>                            |
| MH114 | \$807.00   | Home too new to have property taxes assessed/paid  |
| MH117 | \$83.33    | No mortgage – home already paid for; home too new to have property taxes assessed/paid     |
| MH119 | \$1,000.00 | Home is rented by tenant – no insurance or taxes included as part of monthly housing costs |

Note. n = 16.

<sup>1</sup>All monthly housing costs are estimated based on figures provided by homeowners including mortgage costs, homeowners insurance, property taxes (adjusted for post-Homestead Declaration numbers, if applicable), and electricity bills, unless otherwise specified in the “Qualifications” column. In many cases, annual figures and approximations were provided, and monthly costs were calculated accordingly.

<sup>2</sup>HD = Homestead Declaration.

<sup>3</sup>The homeowner was only able to provide one figure for the total costs of mortgage, taxes, and insurance, saying they were all escrowed together, and did not say whether or not they received any tax adjustment from the Homestead Declaration.

<sup>4</sup>Homeowner has his homeowner’s insurance included with his company’s insurance payments, as they are on the same property, and he could not separate out just the home’s insurance.

## Vermont Monthly Housing Costs

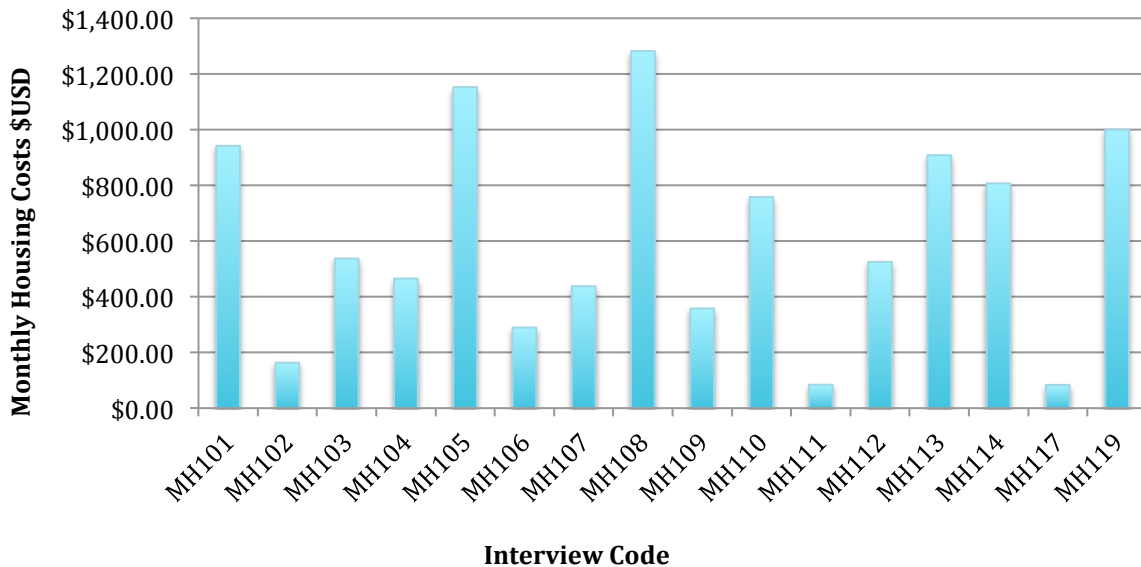


Figure 4. Average monthly housing costs for Vermont homeowners.

Note. n = 16.

<sup>a</sup>Monthly housing costs include average monthly mortgage, homeowner’s insurance, property taxes (after the Homestead Declaration tax adjustment, if applicable), and electric bills.

## Vermont Monthly Housing Costs: Segmented Expenses

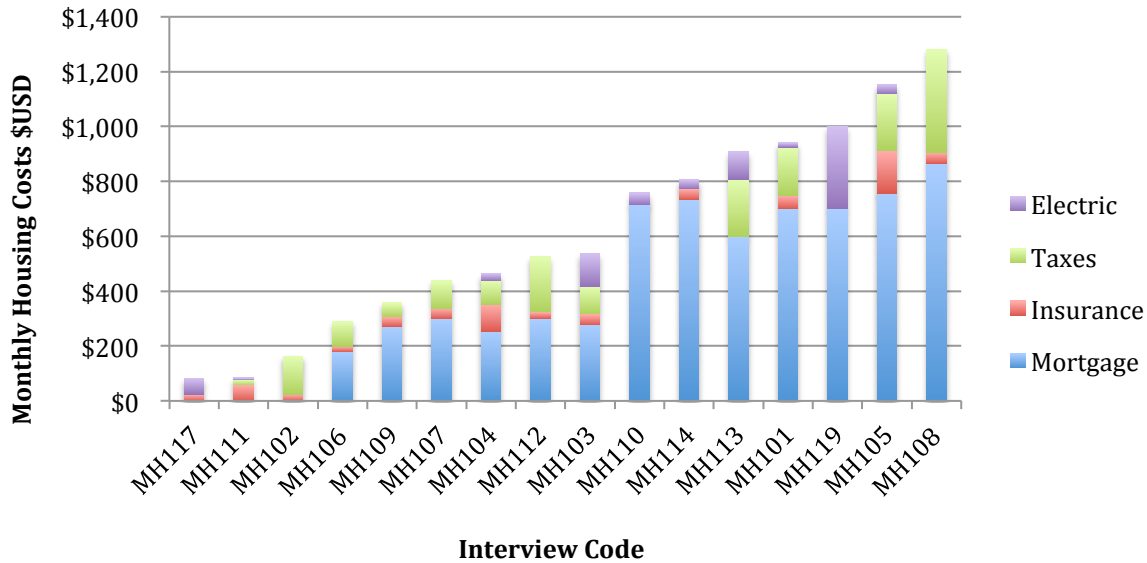


Figure 5. Average monthly housing costs for Vermont homeowners, segmented by expense.

Note.  $n = 16$ .

<sup>a</sup>Monthly housing costs include average monthly mortgage, homeowner’s insurance, property taxes (after the Homestead Declaration tax adjustment, if applicable), and electric bills.

<sup>b</sup>MH102, MH11, MH117: Mortgage is recorded as \$0, as homes are already paid for.

<sup>c</sup>MH108, MH112: Electric bills are recorded as \$0, as homeowners were not yet sure what the average electric bill would be.

<sup>d</sup>MH102, MH106, MH107, MH109: Electric bills are recorded as \$0, as homeowners had enough energy credits to cover all electric costs for the year.

<sup>e</sup>MH110: Costs for taxes and insurance are both recorded as \$0, as they are included in the monthly mortgage price – homeowner was unable to separate out the different expenses.

<sup>f</sup>MH113: Insurance recorded as \$0, because homeowner was unable to provide an estimate – said insurance was rolled into his company’s other insurance costs.

<sup>g</sup>MH114, MH117: Taxes are recorded as \$0, as the homes were too new and had not yet had property taxes assessed, or homeowners had not yet paid the property taxes.

<sup>h</sup>MH119: Insurance and taxes are recorded as \$0, because the tenant of the home is renting and does not pay these; the “mortgage” should be considered the tenant’s rent here.



**Q35a: What is your monthly mortgage?**

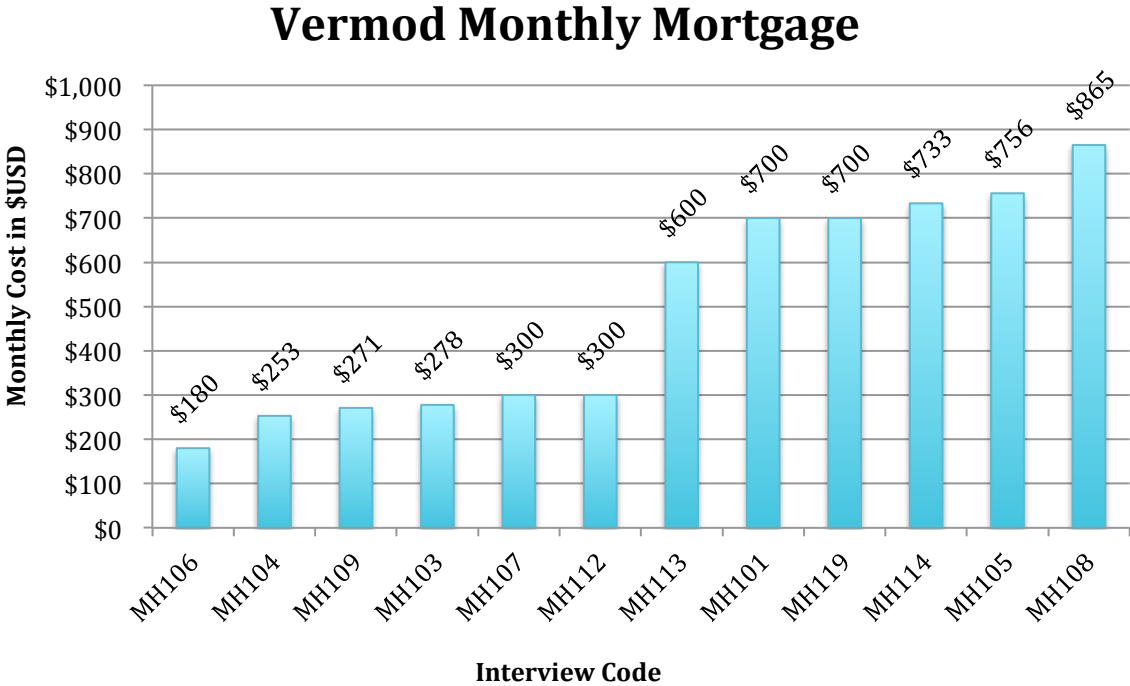


Figure 6. Average monthly mortgage costs for Vermod homeowners.

Note. n = 12.

<sup>a</sup>Monthly mortgage costs are rounded to nearest dollar.

<sup>b</sup>One homeowner was excluded from chart because they were unable to separate mortgage, insurance, and tax costs into different items.

<sup>c</sup>Three homeowners were excluded from chart as they did not have a mortgage because they paid for their home outright.

<sup>d</sup>One tenant is a renter, and their “mortgage” cost is actually their rental cost for the home.

<sup>e</sup>The six homeowners with the lowest mortgages, \$300 or below per month, are six of the seven homeowners that received substantial grants for purchasing their homes. The second is the homeowner not included in this chart because they could not separate their mortgage costs from insurance and taxes.

**Q35b: What is your monthly homeowners insurance?**

### Vermont Monthly Homeowners Insurance

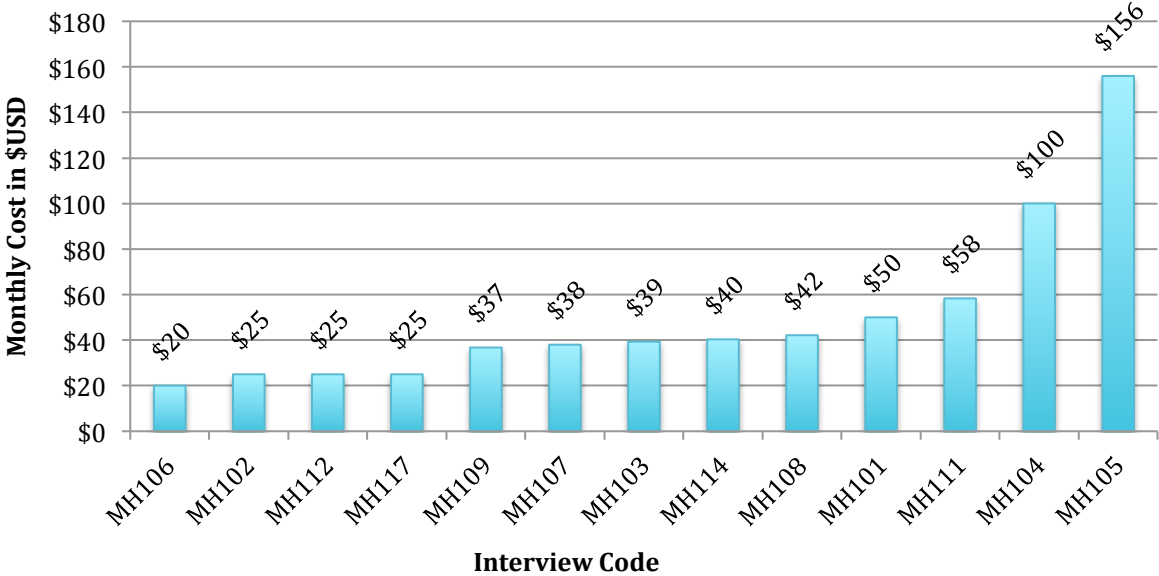


Figure 7. Average monthly homeowners insurance costs for Vermont homeowners.

Note. n = 13.

- <sup>a</sup>Monthly insurance costs are rounded to nearest dollar.
- <sup>b</sup>One homeowner was excluded from chart because they were unable to separate mortgage, insurance, and tax costs into different items.
- <sup>c</sup>One homeowner was excluded from the chart, as they could not separate the insurance costs for their home from all other insurance costs they pay for their company on the same land property.
- <sup>d</sup>One tenant was a renter, and thus excluded because they do not pay any insurance costs.
- <sup>e</sup>Two homeowners, MH106 and MH111, stated that what they pay for monthly insurance includes both homeowners and car insurance, and they were unable to separate them.
- <sup>f</sup>The monthly amount for insurance stated by homeowner MH111 was between \$600-800 for the year, which includes car insurance. The average of \$700 was taken from this amount, and the monthly rate of \$58 was calculated and reported here.

**Q35c: What is your monthly electricity bill?**

**Vermont Monthly Electricity Bill**

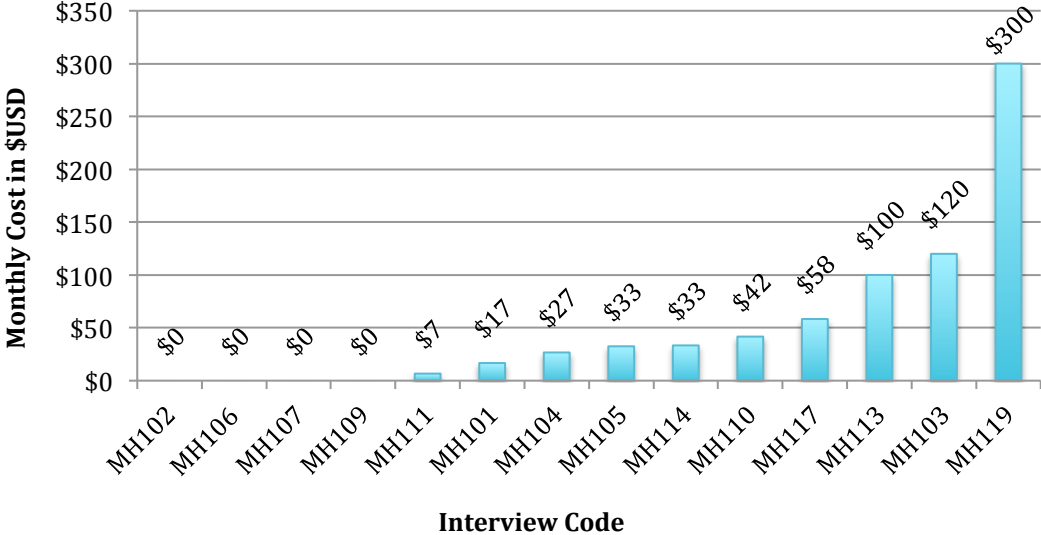


Figure 8. Average monthly electricity costs for Vermont homeowners.

Note. n = 14.

<sup>a</sup>Monthly electricity costs are rounded to nearest dollar.

<sup>b</sup>Two homeowners were excluded from chart because they were not yet able to estimate their monthly or annual energy costs – they had not lived in the home long enough to know what their solar energy credits would cover and what remaining expenses they would have.

<sup>c</sup>Four homeowners reported having zero energy costs, as the solar power energy credits they accrued were enough to cover all over energy costs, on average, for the year.

<sup>d</sup>One homeowner, MH113, charges his electric car at his home, which raises the monthly electric bill substantially, though he thinks this cost is worth the reduction in fossil fuels.

<sup>e</sup>The two highest monthly costs estimated, MH103 and MH119, were for respondents that do not have solar panels providing energy to their homes.

**Q35d: What are your monthly energy costs from fuel oil, propane gas, or other fuel sources?**

Table 51

*Use of Fuel Oil or Propane Gas in Home*

| Variable                            | Frequency | Percent of <i>n</i> |
|-------------------------------------|-----------|---------------------|
| No fuel oil or propane              | 15        | 93.8%               |
| Propane used sparingly <sup>1</sup> | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One respondent stated she has a propane tank for use as a backup generator, but has not needed to fill it in quite a while since she does not need to use it much – no dollar amount was given for cost of propane.

**Q35e: What are your monthly costs for any maintenance or repairs?**

Table 52

*Monthly Costs for Maintenance or Repairs<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| \$0  | 12        | 75.0%               |
| \$20 <sup>2</sup>                                      | 1         | 6.3%                |
| Maintenance covered by Vermod or warranty <sup>3</sup> | 3         | 18.8%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Cost of air filters not considered part of “maintenance or repair.”

<sup>2</sup>One respondent had to replace the fuse in an electrical outlet.

<sup>3</sup>One respondent said Peter replaced the hot water heater, and had cracks in ceiling and window repaired, and no charge for anything. Another respondent said the control board of the minisplit had to be fixed, but it was done quickly and was still under warranty. Another person did not give specifics but said that Peter or Steve had taken care of anything that needed repairing.

**Q35f: What are your monthly property taxes? And do you take advantage of the Homestead Declaration?**

**Vermont Monthly Property Taxes**

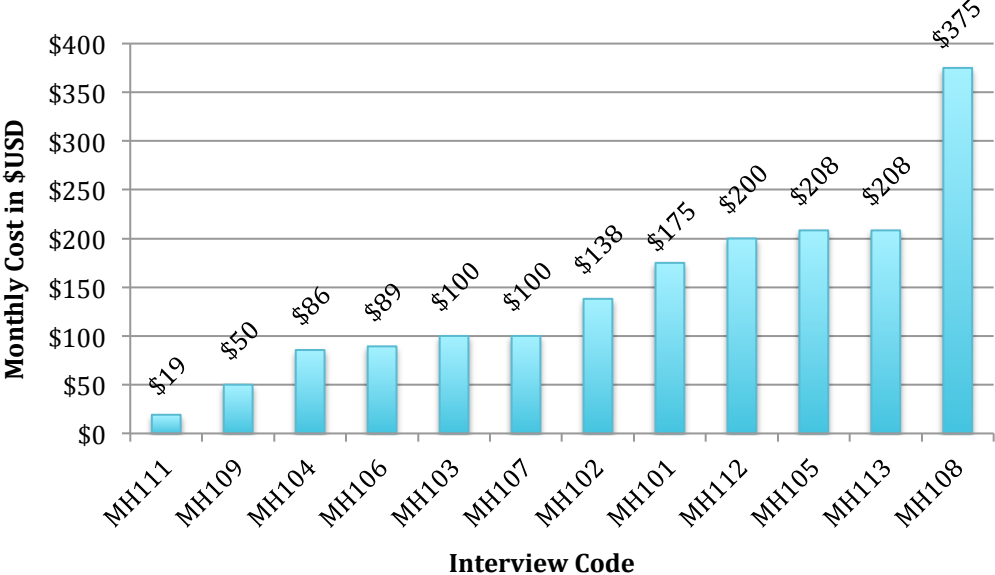


Figure 9. Average monthly property taxes paid by Vermont homeowners.

Note. n = 12.

- <sup>a</sup>Monthly property taxes are rounded to nearest dollar.
- <sup>b</sup>One homeowner was excluded from chart because they were unable to separate mortgage, insurance, and tax costs into different items.
- <sup>c</sup>Two homeowners were excluded from the chart because they have not lived in their home long enough to have property taxes assessed or to have paid property taxes on the home.
- <sup>d</sup>One tenant was a renter, and thus excluded because they do not pay any property taxes.
- <sup>e</sup>Most respondents reported property taxes for the year, or quarterly in one case, so monthly property taxes were calculated from that amount.
- <sup>f</sup>The amounts provided in this chart are the amounts paid by Vermont homeowners, i.e. they've been adjusted for any homeowners who take advantage of the Homestead Declaration.
- <sup>g</sup>Seven homeowners received tax adjustments through the Homestead Declaration: MH111, MH109, MH104, MH103, MH107, MH102, and MH101. These homeowners represent seven of the eight homeowners who ended up paying the lowest amount in property taxes, all under \$200 per month.

Table 53

*Utilization of Homestead Declaration*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Yes – used Homestead Declaration <sup>1</sup>                    | 7         | 46.7%               |
| No – did not use Homestead Declaration <sup>2</sup>              | 5         | 33.3%               |
| Plans to use Homestead Declaration, but has not yet <sup>3</sup> | 2         | 13.3%               |
| Use of Homestead Declaration not specified <sup>4</sup>          | 1         | 6.7%                |

*Note.* *n* = 15. Percentages may not sum to an even 100% due to rounding. One respondent is a tenant, and was thus excluded because the Homestead Declaration is not applicable.

<sup>1</sup>One homeowner stated that the Homestead Declaration reduced their property taxes to only \$230 per year, but did not say how much their taxes were before the adjustment. Other respondents said the Homestead Declaration reduced their property taxes ranging from \$450 to \$2300 for the year, or from approximately \$38 to \$192 monthly.

<sup>2</sup>Homeowners who said they do not use the Homestead Declaration stated with certainty that they did not qualify for it, or they thought they probably did not qualify for it.

<sup>3</sup>Two people did not yet have their property taxes assessed or paid yet, and thus did not use the Homestead Declaration yet, as their homes were too new. They intend to use the Homestead Declaration for property tax adjustments when possible.

<sup>4</sup>One homeowner stated only one monthly cost they paid using an escrow account, which includes their mortgage, insurance, and property taxes, so it was unclear whether the Homestead Declaration was applied.

**Q36a: How do your monthly housing costs in this new house compare to your previous living arrangements? Are they higher or lower?**

Table 54

*Monthly Housing Costs in Current Home Compared to Previous Home*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Higher <sup>1</sup>   | 4         | 25.0%               |
| Lower                 | 9         | 56.3%               |
| Same                  | 2         | 12.5%               |
| Not sure <sup>2</sup> | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person who said their current monthly housing costs are higher than before clarified that they don't think their current home could really be compared to their old mobile home (i.e. that current home is much better, and higher cost is reasonable). Two homeowners mentioned they now have higher monthly

housing costs because they are paying a greater share of the costs than before, as their parents paid for much or all of the monthly housing costs in their previous home.

<sup>2</sup>One person had a unique situation where she had bought her previous home outright, so she did not have a mortgage, but her costs for heating were very high. In her current home, she has a mortgage but her heating costs are significantly lower due to the solar panels. However, she makes note that the solar panels pay for themselves in roughly ten years time, though she thinks they're more cost-effective overall. It is hard to compare energy costs and mortgage between the two homes because of this.

**Q36b: In what way have they changed?**

Table 55

*Monthly Costs in Current Home Compared to Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Energy bills (utilities) are lower               | 8         | 50.0%               |
| Energy bills (utilities) are higher <sup>2</sup> | 5         | 31.3%               |
| Mortgage/rent is lower <sup>3</sup>              | 4         | 25.0%               |
| Mortgage is higher <sup>4</sup>                  | 3         | 18.8%               |
| Lot rent/land payments are higher <sup>5</sup>   | 2         | 12.5%               |
| Didn't specify <sup>6</sup>                      | 1         | 6.3%                |

Note. *n* = 16.

<sup>1</sup>Total Variable Responses = 23.

<sup>2</sup>Heat and/or electricity were included in the rent paid at three respondents' previous apartments, so it's more expensive now. One homeowner lived with his parents before who paid all the bills, so now he's paying. One person had solar power in last home, too, including solar hot water, and now he charges his Tesla from his home so overall his bills are higher – if fuel costs for his previous non-electric car were factored in this might change, however.

<sup>3</sup>One respondent is a renter, and said rent now was lower than rent in previous home.

<sup>4</sup>Two respondents had their mortgage paid off on their previous homes, so mortgage now is higher.

<sup>5</sup>Two people have higher overall costs now because they have either lot rent or land payments on top of their other costs.

<sup>6</sup>One person said their costs overall are less now, but at their previous home she had a unique arrangement with her daughter who was helping pay for things, so she wasn't able to explain how costs had changed.

~~~~Following question was merged with Q36a~~~~

**Q37: Overall, do you think this new house is costing you more or less than your previous home?**

~~~~~

**Q38: Do you think that this new home is giving you a better value for your payments than your previous home?**

Table 56

*Value for Costs in Current Home Compared to Previous Home*

| Variable                      | Frequency | Percent of <i>n</i> |
|-------------------------------|-----------|---------------------|
| Better value now <sup>1</sup> | 13        | 81.3%               |
| Same as before <sup>2</sup>   | 1         | 6.3%                |
| Not sure <sup>3</sup>         | 2         | 12.5%               |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Three homeowners mentioned that they're happy to be paying money towards ownership and not just paying rent to someone else. One person said he thinks he's getting a better value for his payments now, but primarily discussed the benefits of being able to drive an electric car and not using fossil fuels (his car costs are tied into home costs).

<sup>2</sup>One respondent, the person renting, thinks the value is the same as before, but it might change when the solar panels get put on his roof.

<sup>3</sup>One of the "not sure" responses is for a homeowner who has a lot of problems in the house that still need to be resolved.

**Q39a: What were most helpful parts in the process of buying your house?**

Table 57

*Helpful Parts of Buying Process: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Working with Vermod/VEIC <sup>2</sup>                         | 10        | 62.5%               |
| Assistance from a friend/family                               | 3         | 18.8%               |
| Working with housing trust and property managers <sup>3</sup> | 3         | 18.8%               |
| Grants received   | 2         | 12.5%               |
| Working with banks  | 1         | 6.3%                |
| Nothing mentioned   | 3         | 18.8%               |

*Note.* *n* = 16.

<sup>1</sup>Total Variable Responses = 22.

<sup>2</sup>Five people said Steve Davis was very helpful, two people said the same about Peter Schneider, and one about Nate, the designer at Vermod. Two people said Vermod was helpful, in general.

<sup>3</sup>Two people said working with the Windham & Windsor Housing Trust was very helpful, and one person, the renter, said Pine Island Farm was very helpful in moving him into the Vermod.



**Q39b: What were most difficult parts in the process of buying your house?**

Table 58

*Difficult Parts of Buying Process: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Dealing with Vermod (from design to delivery) <sup>2</sup> | 7         | 43.8%               |
| Logistics of moving  | 3         | 18.8%               |
| Dealing with property managers <sup>3</sup>                | 3         | 18.8%               |
| Dealing with banks/improving credit for loans              | 2         | 12.5%               |
| Long process in securing lease                             | 1         | 6.3%                |
| Having to get legal assistance <sup>4</sup>                | 1         | 6.3%                |
| Classes required to get mortgage                           | 1         | 6.3%                |
| Nothing mentioned  | 2         | 12.5%               |

*Note.* *n* = 16.

<sup>1</sup>Total Variable Responses = 20.

<sup>2</sup>Five people said the delivery of the Vermods took longer than expected, and some people incurred unnecessary living expenses because of the extra wait time. Two people said they had difficulties working with Vermod to make sure they were getting the customizations or finishes they wanted.

<sup>3</sup>Two people mentioned difficulties working with the Addison County Community Land Trust, and one person mentioned issues dealing with the Vermont State Housing Authority to get a Vermod put into one of their parks.

<sup>4</sup>One person expressed shock in realizing that legal assistance was needed in the process to make sure home buyers are protected against realtors and banks that might take advantage of them – said the Champlain Housing Trust requires home buyers to hire a lawyer if they are to receive a CHT grant.

**Q40: Were there programs or incentives that helped you afford this new home?**

Table 59

*Programs or Incentives for a More Affordable Home: Multiple Response Variables<sup>1</sup>*

| Variable                                       | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Grants from housing or land trust <sup>2</sup> | 7         | 43.8%               |
| Grants from VEIC (Efficiency Vermont)          | 6         | 37.5%               |
| Unknown grants <sup>3</sup>                    | 3         | 18.8%               |
| Grants or deals from Vermod <sup>4</sup>       | 2         | 12.5%               |
| Grant from Terry McKnight                      | 1         | 6.3%                |

|   |   |       |
|---|---|-------|
| Ledyard Closing credit  | 1 | 6.3%  |
| Vermont Housing and Conservation Board <sup>5</sup>             | 1 | 6.3%  |
| First three months rent-free from Pine Island Farm <sup>6</sup> | 1 | 6.3%  |
| VSECU - good rates  | 1 | 6.3%  |
| None  | 4 | 25.0% |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Total Variable Responses = 27.

<sup>2</sup>Five people mentioned receiving grants from Champlain Housing Trust, one from the Twin Pines Housing Trust, and one from the Addison County Community Land Trust.

<sup>3</sup>Two people received grants but could not remember who they were from, and one person said they received an anonymous grant.

<sup>4</sup>One Vermod grant was unspecified, and another person mentioned getting deals for being the first person to buy a Vermod.

<sup>5</sup>One person said they got a grant from VCHB but did not specify more details.

<sup>6</sup>This is the person renting the Vermod.

#### **Q41: Is this your first time managing a home mortgage?**

Table 60

##### *First Home Mortgage*

| Variable                   | Frequency | Percent of $n$ |
|----------------------------|-----------|----------------|
| No – had a mortgage before | 11        | 73.3%          |
| Yes – first mortgage       | 4         | 26.7%          |

*Note.*  $n = 15$ . Percentages may not sum to an even 100% due to rounding. One respondent was renting and thus excluded from question about home mortgaging.

#### **Q41a: How do you feel about managing this mortgage? Is it a strain? If so, how?**

Table 61

##### *Difficulty Managing Home Mortgage*

| Variable     | Frequency | Percent of $n$ |
|--------------|-----------|----------------|
| Not a strain | 12        | 100.0%         |
| A strain     | 0         | 0.0%           |

*Note.*  $n = 12$ . Percentages may not sum to an even 100% due to rounding. Three respondents do not have a mortgage because their home is already paid for, and a fourth respondent was renting and does not have a mortgage, so these four people were excluded from the question.

**Q42Va: On a scale of 1-5, with 5 meaning the most, how well do you understand the concept of "Net Zero"?**

Table 62

*Level of Understanding of "Net Zero" Concept*

| Variable                                 | Frequency | Percent of $n$ | Overall Mean |
|--|-----------|----------------|--------------|
| 5 – Complete understanding of “Net Zero” | 7         | 43.8%          | 3.84         |
| 4.5 – Very good understanding of concept | 1         | 6.3%           |              |
| 4 – Good understanding of concept        | 3         | 18.8%          |              |
| 3 – Very basic understanding of concept  | 2         | 12.5%          |              |
| 2 – Barely understand concept            | 1         | 6.3%           |              |
| 1 – Never heard of “Net Zero”            | 2         | 12.5%          |              |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

**Q42Vb: On a scale of 1-5, with 5 meaning the most important, how important is it to you that your home is a "Net Zero" home?**

Table 63

*Importance of "Net Zero" Efficiency in Home*

| Variable                 | Frequency | Percent of $n$ | Overall Mean |
|--------------------------|-----------|----------------|--------------|
| 5 – Very important       | 11        | 68.8%          | 4.28         |
| 4 - Important            | 1         | 6.3%           |              |
| 3.5 – Slightly important | 1         | 6.3%           |              |
| 3 – Neutral              | 1         | 6.3%           |              |
| 2 – Pretty unimportant   | 1         | 6.3%           |              |
| 1 – Not important at all | 1         | 6.3%           |              |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

**Q43: What is your best estimate of your annual household income?**

## Vermont Estimated Annual Household Income

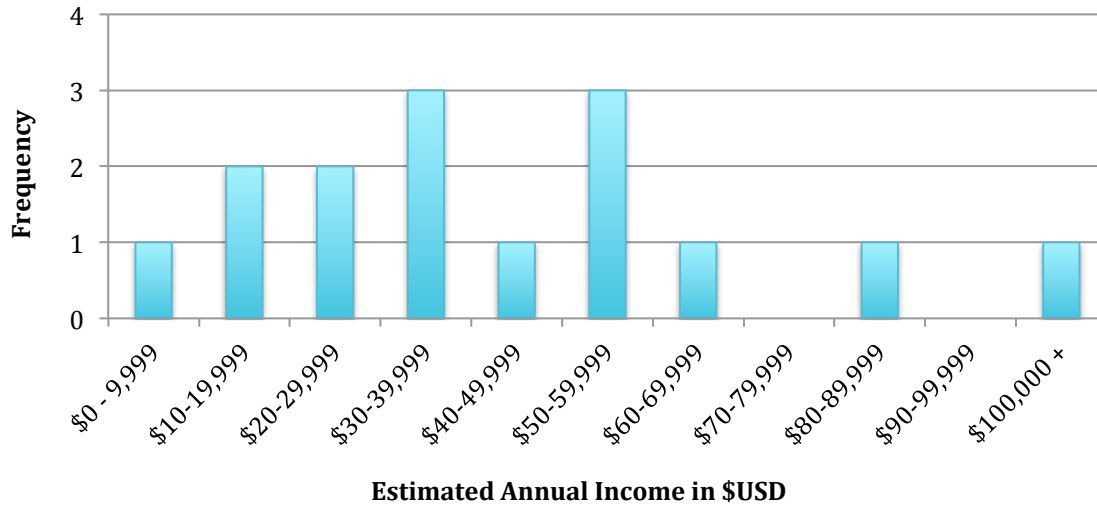


Figure 10. Estimated annual household income.

Note.  $n = 15$ . One of the respondents refused to disclose their annual income, and they were thus excluded from the data presented in the chart.

Table 64

### Estimated Annual Household Income

| Variable                    | Frequency | Percent of $n$ |
|-----------------------------|-----------|----------------|
| Under \$10,000 <sup>1</sup> | 1         | 6.3%           |
| \$10-19,999 <sup>2,3</sup>  | 2         | 12.5%          |
| \$20-29,999                 | 2         | 12.5%          |
| \$30-39,999                 | 3         | 18.8%          |
| \$40-49,999                 | 1         | 6.3%           |
| \$50-59,999                 | 3         | 18.8%          |
| \$60-69,999                 | 1         | 6.3%           |
| \$70-79,999                 | 0         | 0.0%           |
| \$80-89,999                 | 1         | 6.3%           |

|                   |   |      |
|-------------------|---|------|
| \$90-99,999       | 0 | 0.0% |
| \$100,000 or more | 1 | 6.3% |
| Refused           | 1 | 6.3% |

*Note.*  $n = 16$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person stated they receive \$763 a month from SSDI payments, totaling \$9,156 over 12 months.

<sup>2</sup>One person said they earned \$27,000 a year when they first moved into the home, but is now only earning \$16,000 a year.

<sup>3</sup>One person stated they were receiving about \$1,800 a month through August of the recent year, but then switched to receiving only \$1,045 a month through government assistance. The total income earned the previous year is thus estimated at \$18,580, and going forward is estimated at \$12,540.

**Q44: Finally, are there any other things we missed that are important to you about this home?**

Table 65

*Additional Positive and Negative Comments About Home: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of $n$ |
|---|-----------|----------------|
| <b>Positive Comments</b>  |           |                |
| Overall happy - nothing more to say <sup>2</sup>                        | 6         | 37.5%          |
| Vermod/VEIC are helpful and supportive <sup>3</sup>                     | 5         | 31.3%          |
| Reiterated favorite parts of home <sup>4</sup>                          | 2         | 12.5%          |
| Likes being able to monitor systems online                              | 1         | 6.3%           |
| Everything easy to hook up (well, septic, electrical, phone)            | 1         | 6.3%           |
| <b>Negative Comments</b>  |           |                |
| Issues with finishes or features of home <sup>5</sup>                   | 5         | 31.3%          |
| Wants better ongoing communication and service from Vermod <sup>6</sup> | 3         | 18.8%          |
| Doesn't like curb appeal  | 1         | 6.3%           |
| Workmanship could be better <sup>7</sup>                                | 1         | 6.3%           |
| Poor heat/cold air distribution at ends of house <sup>8</sup>           | 1         | 6.3%           |

*Note.*  $n = 16$ .

<sup>1</sup>Total Variable Responses = 26.

<sup>2</sup>One person mentioned she felt it was meant to be, because everything in the buying process was so smooth and easy.

<sup>3</sup>Three people specifically mention how great Peter Schneider is, and two people specifically mention how great Steve Davis is.

<sup>4</sup>These include the big windows, the openness of the house, the ventilation system, and good air quality.

<sup>5</sup>Issues specified: bamboo floors are too hard; homeowner wants a bigger crawlspace; solar panels should be designed to better prevent snow build-up; homeowner wants a skirting on their foundation; and the compressor outside was initially poorly designed and froze and had to be fixed.

<sup>6</sup>Two people said they think Steve is great but he needs more help to fix everything, i.e. Vermod should stay on top of things more. One person recommended more dialogue with the builder and thinks the homeowner should be able to customize more, and also that Vermod should better explain how things in the home function.

<sup>7</sup>Homeowner mentioned a gap in the door that Vermod hasn't been able to fix yet.

<sup>8</sup>Homeowner mentioned they're creating a variable speed fan that might help with this kind of air distribution problems.

**Q45: If someone approached you who was interested in buying a new home like yours, what would you tell them about your home?**

Table 66

*Recommendation for Others Looking to Buy Vermod*

| Variable                         | Frequency | Percent of <i>n</i> |
|----------------------------------|-----------|---------------------|
| Would recommend <sup>1</sup>     | 15        | 93.8%               |
| Would not recommend <sup>2</sup> | 1         | 6.3%                |

*Note.* *n* = 16. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup> "Would recommend" includes four responses that either mention having issues or caveats, but overall they would still recommend Vermods to others; two of these emphasize the need to have more communication with builders in the buying process.

<sup>2</sup> The person who "would not recommend" the Vermod clarified that she liked the house overall but currently it has a lot of issues, she is unhappy with service from Vermod in fixing these problems, and her two children have decided against Vermods because of this.

## Appendix 3. Resident Research Question Summaries: ENERGY STAR Homes

### ***Basic Home Details***

Table 1

#### *Home Size – Bedrooms and Bathrooms*

| Variable          | Frequency | Percent of <i>n</i> |
|-------------------|-----------|---------------------|
| 2 bedroom 2 baths | 3         | 50.0%               |
| 2 bedroom 1 bath  | 1         | 16.7%               |
| 3 bedroom 2 baths | 1         | 16.7%               |
| No Answer         | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

Table 2

#### *Home Size - Dimensions*

| Variable  | Frequency | Percent of <i>n</i> |
|-----------|-----------|---------------------|
| 14'x68'   | 2         | 33.3%               |
| 14'x70'   | 1         | 16.7%               |
| 14'x72'   | 1         | 16.7%               |
| 14'x80'   | 1         | 16.7%               |
| No Answer | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

Table 3

#### *Site Details*

| Variable                    | Frequency | Percent of <i>n</i> |
|-----------------------------|-----------|---------------------|
| Non-profit mobile home park | 3         | 50.0%               |
| Private mobile home park    | 2         | 33.3%               |
| Owned land                  | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

*Interview Guide Questions*

**Q1: When did you purchase this home (month and year)?**

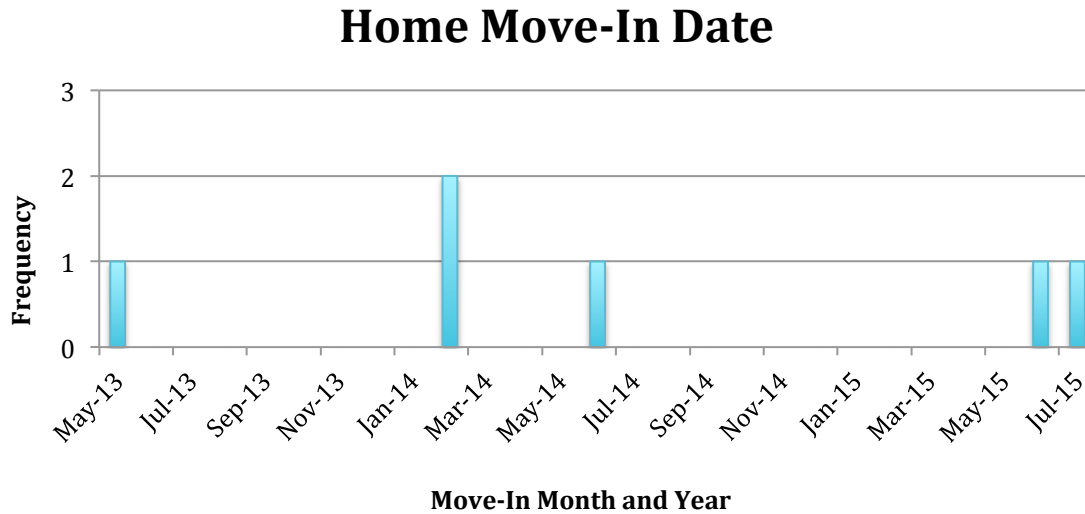


Figure 1. Move-in month and date by frequency.

Note.  $n = 6$ .

<sup>a</sup>Interview question asks specifically for purchase date, however the date a purchase agreement was made and the date moving into home were often very different – to assess time living in home, the move-in date was used here, and thus includes the one person renting.

**Q2: Was it new when you moved in (i.e. are you the first owner)?**

Table 4

*Home Was New Upon Move-In*

| Variable              | Frequency | Percent of $n$ |
|-----------------------|-----------|----------------|
| New home <sup>1</sup> | 6         | 100.0%         |
| Previously lived in   | 0         | 0.0%           |

Note.  $n = 6$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>For one of the “New home” responses, the owner was the first to live in it, but the home had been a show model for a period of time prior to the owner moving in.



**Q3: Is this the first home that you have owned?**

Table 5

*First-Time Home Owner*

| Variable | Frequency | Percent of <i>n</i> |
|----------|-----------|---------------------|
| No       | 4         | 66.7%               |
| Yes      | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q4: How did you come to the decision to buy a new home?**

Table 6

*Factors in Decision to Buy an ENERGY STAR Home: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Looking for an affordable but nice home                             | 4         | 66.7%               |
| Looking to upgrade an older mobile home                             | 2         | 33.3%               |
| Needed a one-floor/easy to maintain home                            | 2         | 33.3%               |
| Wanting to be a first-time homeowner/Invest in a home               | 1         | 16.7%               |
| Approached by dealer about homes and available funding <sup>2</sup> | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total variable responses = 10.

<sup>2</sup>Homeowner was friendly acquaintances with the Fectau family of Fectau Homes, who informed her about the ENERGY STAR homes and grants available through Champlain Housing Trust.

**Q5: What type of house did you live in before you moved into this home?**

Table 7

*Previous Home Type*

| Variable                  | Frequency | Percent of <i>n</i> |
|---------------------------|-----------|---------------------|
| Apartment                 | 3         | 50.0%               |
| Mobile home               | 2         | 33.3%               |
| Single-family stick-built | 1         | 16.7%               |
| Condo                     | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q6: What were your other housing options before you bought your new home?**

Table 8

*Alternative Housing Options Considered: Multiple Response Variables<sup>1</sup>*

| Variable                         | Frequency | Percent of <i>n</i> |
|----------------------------------|-----------|---------------------|
| Other manufactured/mobile homes  | 4         | 66.7%               |
| Stick-built                      | 2         | 33.3%               |
| Apartments                       | 1         | 16.7%               |
| Not specified – back to New York | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total variable responses = 8.

**Q7: Have you lived here the entire time since the purchase?**

Table 9

*Living in Home Since Move-In*

| Variable                  | Frequency | Percent of <i>n</i> |
|---------------------------|-----------|---------------------|
| In home since move-in     | 6         | 100.0%              |
| Not in home since move-in | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q8: How many people live in the home?**

Table 10

*Number of People Living In Home*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| 1 adult               | 3         | 50.0%               |
| 2 adults <sup>1</sup> | 2         | 33.3%               |
| 1 adults, 1 kid       | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One of the “2 adult” families has a child on the way.

**Q8a: Has this changed since you moved in?**

Table 11

*Number of People In Home Has Changed Over Time*

| Variable                     | Frequency | Percent of <i>n</i> |
|------------------------------|-----------|---------------------|
| Has not changed <sup>1</sup> | 6         | 100.0%              |
| Has changed                  | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One of the “has not changed” responses will change once the family has their child, very soon.

**Q9: How long do you anticipate living in this home?**

Table 12

*Anticipated Time Living in Home*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| No plans to leave                               | 3         | 50.0%               |
| Would leave for better alternative <sup>1</sup> | 2         | 33.3%               |
| Not sure <sup>2</sup>                           | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner has a number of issues with the home that have not been fixed yet, and feels that if she had enough money to do so, she would leave the home immediately for something better, but until then

has no concrete plans to leave. A second homeowner plans to keep his family in the home for a couple years until they can save for a new home, unless something better came along in the meantime.

<sup>2</sup>One homeowner plans to stay until June to decide if she’s able to maintain the home and land, as she recovers from an illness; if not, she will have to sell and move out of the home.

**Q10: What was the purchase price with everything included: home, delivery, set, utility hook-up, decks and porches, solar, appliances?**

Table 13

*Purchase Price of Home*

| Variable          | Frequency | Percent of <i>n</i> |
|-------------------|-----------|---------------------|
| \$50,001-\$52,500 | 0         | 0.0%                |
| \$52,501-\$55,000 | 1         | 16.7%               |
| \$55,001-\$57,500 | 0         | 0.0%                |
| \$57,501-\$60,000 | 2         | 33.3%               |
| \$60,001-\$62,500 | 1         | 16.7%               |
| \$62,501-\$65,000 | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**ENERGY STAR Original Purchase Price**

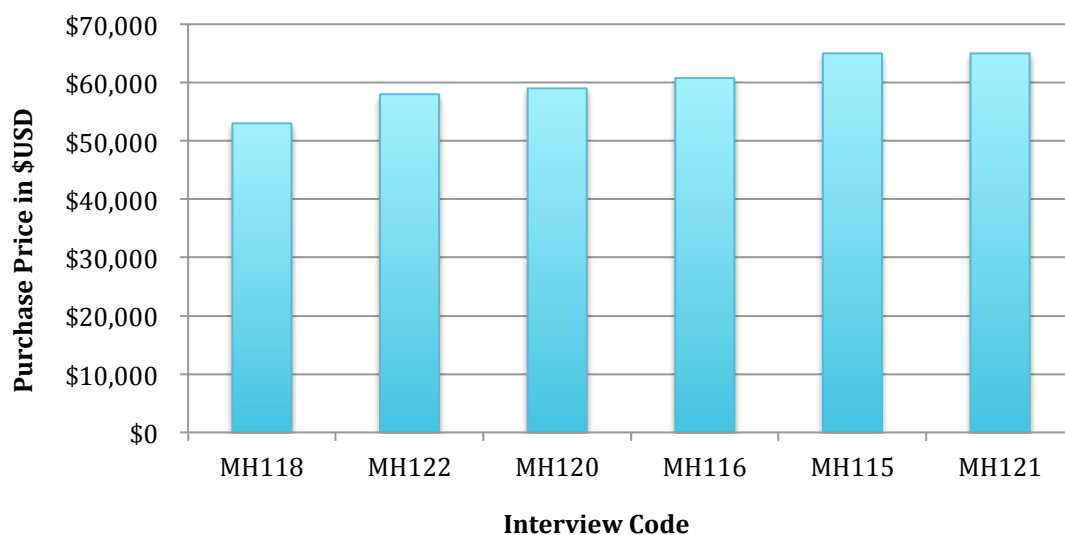


Figure 2. Original purchase price of ENERGY STAR homes.

*Note.* *n* = 6.

<sup>a</sup>The purchase price includes the home itself, costs for delivery and set-up, hooking up utilities, any decks or porches, and appliances (not including a washer and dryer), but excludes any costs for land payments or park rent.

<sup>b</sup>For homeowner MH118, the slab was already in place on the site, so the overall purchase price is much lower than it would otherwise be.

Table 14

*Subsidies Provided to Offset Purchase Price of ENERGY STAR Homes*

| Pre-subsidy purchase price | Subsidy amount | Post-subsidy purchase price |
|----------------------------|----------------|-----------------------------|
| \$59,000                   | \$22,000       | \$37,000                    |
| \$58,000                   | \$26,500       | \$31,500                    |
| \$53,000                   | \$27,000       | \$26,000                    |
| \$60,767                   | \$30,383       | \$30,384                    |
| \$65,000                   | \$31,000       | \$34,000                    |

Note.  $n = 5$ .

<sup>a</sup> One respondent said they received subsidies, but did not specify the amount of the subsidies, and are thus excluded from this table.

### ENERGY STAR Purchase Price After Applicable Subsidies

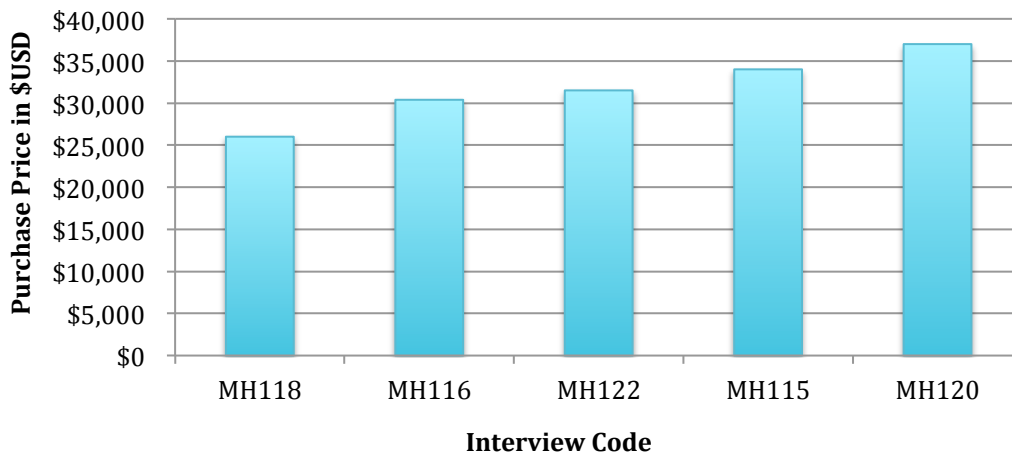


Figure 3. Purchase price of ENERGY STAR homes after applicable subsidies are included.

Note.  $n = 5$ .

<sup>a</sup>One respondent did not know the amount of the subsidies they received and were thus excluded from this chart.

**Q11: How important was comfort in choosing a home on a scale of 1 to 5?**

Table 15

*Importance of Comfort in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 5         | 83.3%               | 4.83         |
| 4 - Important            | 1         | 16.7%               |              |
| 3 - Neutral              | 0         | 0.0%                |              |
| 2 – Pretty unimportant   | 0         | 0.0%                |              |
| 1 – Not important at all | 0         | 0.0%                |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q12: How important were acoustics in choosing a home on a scale of 1 to 5?**

Table 16

*Importance of Acoustics in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 1         | 16.7%               | 2.33         |
| 4 - Important            | 0         | 0.0%                |              |
| 3 - Neutral              | 2         | 33.3%               |              |
| 2 – Pretty unimportant   | 0         | 0.0%                |              |
| 1 – Not important at all | 3         | 50.0%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q13: How important was indoor air quality in choosing a home on a scale of 1 to 5?**

Table 17

*Importance of Indoor Air Quality in Buying Home*

| Variable           | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------|-----------|---------------------|--------------|
| 5 – Very important | 3         | 50.0%               | 3.67         |
| 4 - Important      | 0         | 0.0%                |              |
| 3 - Neutral        | 2         | 33.3%               |              |

|                          |   |       |
|--------------------------|---|-------|
| 2 – Pretty unimportant   | 0 | 0.0%  |
| 1 – Not important at all | 1 | 16.7% |

*Note. n = 6. Percentages may not sum to an even 100% due to rounding.*

**Q14: How important were energy costs in choosing a home on a scale of 1 to 5?**

Table 18

*Importance of Energy Costs in Buying Home*

| Variable                        | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------|-----------|---------------------|--------------|
| 5 – Very important <sup>1</sup> | 4         | 66.7%               | 4.67         |
| 4 - Important                   | 2         | 33.3%               |              |
| 3 - Neutral                     | 0         | 0.0%                |              |
| 2 – Pretty unimportant          | 0         | 0.0%                |              |
| 1 – Not important at all        | 0         | 0.0%                |              |

*Note. n = 6. Percentages may not sum to an even 100% due to rounding.*

<sup>1</sup>One person commented that the home does not seem to be as energy efficient as expected.

**Q15: How important was the overall cost of the home on a scale of 1 to 5?**

Table 19

*Importance of Overall Cost in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 4         | 66.7%               | 4.33         |
| 4 - Important            | 0         | 0.0%                |              |
| 3 - Neutral              | 2         | 33.3%               |              |
| 2 – Pretty unimportant   | 0         | 0.0%                |              |
| 1 – Not important at all | 0         | 0.0%                |              |

*Note. n = 6. Percentages may not sum to an even 100% due to rounding.*

**Q16: How important was the long-term value of the house when buying a home, on a scale of 1 to 5?**

Table 20

*Importance of Long-Term Value in Buying Home*

| Variable                   | Frequency | Percent of <i>n</i> | Overall Mean |
|----------------------------|-----------|---------------------|--------------|
| 5 – Very important         | 0         | 0.0%                | 2.67         |
| 4 – Important <sup>1</sup> | 1         | 16.7%               |              |
| 3 – Neutral                | 3         | 50.0%               |              |
| 2 – Pretty unimportant     | 1         | 16.7%               |              |
| 1 – Not important at all   | 1         | 16.7%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner who thought the long-term value of their home was an important factor in deciding to buy it thinks that because the home is newer, on a pad, and is tied down with straps, it shouldn't lose value as quickly as other mobile homes.

**Q17: How important was the durability of the house when buying a home, on a scale of 1 to 5?**

Table 21

*Importance of Durability in Buying Home*

| Variable                        | Frequency | Percent of <i>n</i> | Overall Mean |
|---------------------------------|-----------|---------------------|--------------|
| 5 – Very important <sup>1</sup> | 4         | 66.7%               | 3.83         |
| 4 – Important                   | 0         | 0.0%                |              |
| 3 – Neutral                     | 0         | 0.0%                |              |
| 2 – Pretty unimportant          | 1         | 16.7%               |              |
| 1 – Not important at all        | 1         | 16.7%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner thought durability in the home was very important in deciding to buy it, and thinks that it did not turn out as durable as expected.



**Q18: How important was accessibility in choosing a home on a scale of 1 to 5?**

Table 22

*Importance of Accessibility in Buying Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 2         | 33.3%               | 2.83         |
| 4 - Important            | 0         | 0.0%                |              |
| 3 - Neutral              | 1         | 16.7%               |              |
| 2 – Pretty unimportant   | 1         | 16.7%               |              |
| 1 – Not important at all | 2         | 33.3%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q19: How important was the ability to move the home to another location on a scale of 1 to 5?**

Table 23

*Importance of Ability to Move Home to a New Location in Buying Home*

| Variable                            | Frequency | Percent of <i>n</i> | Overall Mean |
|-------------------------------------|-----------|---------------------|--------------|
| 5 – Very important                  | 0         | 0.0%                | 2.00         |
| 4 – Important <sup>1</sup>          | 1         | 16.7%               |              |
| 3 – Neutral                         | 1         | 16.7%               |              |
| 2 – Pretty unimportant <sup>2</sup> | 1         | 16.7%               |              |
| 1 – Not important at all            | 3         | 50.0%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Homeowner who said it was an important factor in buying the home that it be able to move said that the man who bolted the tie-downs for the home said he could easily un-bolt them, and she keeps this as a possibility.

<sup>2</sup>Homeowner who responded that it was “pretty unimportant” to be able to move the home when they first decided to buy it said that if they bought land, they would consider moving it to purchased land.

**Q20: How important was the environmental impact of your home on your decision to purchase this house, on a scale of 1 to 5?**

Table 24

*Importance of Home's Environmental Impact in Purchase Decision*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 2         | 33.3%               | 2.83         |
| 4 – Important            | 1         | 16.7%               |              |
| 3 – Neutral              | 0         | 0.0%                |              |
| 2 – Pretty unimportant   | 0         | 0.0%                |              |
| 1 – Not important at all | 3         | 50.0%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q21. In general, what is it like living in your new home compared to what it was like in your previous home?**

Table 25

*Reasons New Home Differs From Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable                      | Frequency | Percent of <i>n</i> |
|-------------------------------|-----------|---------------------|
| Warmer/more comfortable       | 4         | 66.7%               |
| More affordable               | 3         | 50.0%               |
| Ownership better than renting | 3         | 50.0%               |
| More spacious                 | 2         | 33.3%               |
| Quieter/More privacy          | 1         | 16.7%               |
| Easier to maintain            | 1         | 16.7%               |
| More energy efficient         | 2         | 33.3%               |
| Brighter/more light           | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total variable responses = 17.

**Q22: In terms of overall comfort, how does this home compare to your previous home?**

Table 26

*Comfort in Current Home Compared to Previous Home*

| Variable                      | Frequency | Percent of <i>n</i> |
|-------------------------------|-----------|---------------------|
| More comfortable              | 3         | 50.0%               |
| Neutral <sup>1</sup>          | 2         | 33.3%               |
| Less comfortable <sup>2</sup> | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Two homeowners say their current home is comfortable and they like it, but they do not say that it is necessarily more comfortable than their last place.

<sup>2</sup>One homeowner says that this current home is bigger than their last home, and more expensive to heat, so it is perhaps a little less comfortable than before.

**Q23: What needed to change about your previous housing situation?**

Table 27

*Factors Needing to Change in Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Needed a more affordable home                                     | 3         | 50.0%               |
| Wanted ownership/more privacy/to make own rules                   | 2         | 33.3%               |
| Previous home was damaged/too old/generally not good <sup>2</sup> | 2         | 33.3%               |
| Needed something easier to maintain                               | 1         | 16.7%               |
| Problem with landlord   | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 9.

<sup>2</sup>Among many other issues, the homeowner's last home was a mobile home that developed black mold following damage from Tropical Storm Irene. The whole trailer needed to be replaced for a number of reasons, not least of which was the black mold.

**Q24: What is different about your new home? Has your new home improved your housing and what are your favorite parts?**

Table 28

*Favorite Components of Current Home: Multiple Response Variables<sup>1</sup>*

| Variable                             | Frequency | Percent of <i>n</i> |
|--------------------------------------|-----------|---------------------|
| Home ownership                       | 4         | 66.7%               |
| Spaciousness                         | 2         | 33.3%               |
| Has outdoor space/porch              | 2         | 33.3%               |
| Customizability in building home     | 1         | 16.7%               |
| Ease of heating/cooling <sup>2</sup> | 1         | 16.7%               |
| Likes layout/rooms in home           | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 11.

<sup>2</sup>One homeowner likes the electric hot water heater. Even though her electric bills have gone up, she is happy to not have to worry about pilot lights or about her airtrol tank freezing because it's outside.

**Q25: Does this house have solar panels mounted on the roof?**

Table 29

*Solar Panels Attached to Home*

| Variable                                | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Has solar panels                        | 0         | 0.0%                |
| Does not have solar panels <sup>1</sup> | 6         | 100.0%              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner said they wanted to get solar panels but their roof does not get enough sunlight.

~~~~Following two questions, 25a and 25b, are excluded, since none of the homeowners have solar panels~~~~

**Q25a: What about a power wall/battery back-up that is used in the case of a power outage?**

**Q25b: How do you feel about them (the solar panels)?**

~~~~~

## Q26: What do you think about the quality of appliances?

Table 30

### *General Feelings About Appliances*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Very positive         | 1         | 16.7%               |
| Positive <sup>1</sup> | 3         | 50.0%               |
| Neutral               | 0         | 0.0%                |
| Negative <sup>2</sup> | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person who said they thought the appliances were “really good” was happy they were included with the purchase of the home (except for a washer and dryer – not included in ENERGY STAR homes) did have an issue with their furnace – they had to have the motor replaced for \$600, though Fectau Homes gave them \$200 to help out. Another homeowner likes the appliances but thinks they’re not as energy efficient as they could be.

<sup>2</sup>Two homeowners had complaints about the appliances. One had a lemon of a fridge and says she has had to have it fixed four or five times, and the motor in the hood on the stove has issues. The second person thinks the appliances are cheap, and the microwave, fridge, and stove burners all make worrisome noises.

## Q27: What about the quality of the interior finishes?

Table 31

### *General Feelings About Interior Finishes*

| Variable                | Frequency | Percent of <i>n</i> |
|-------------------------|-----------|---------------------|
| Very positive           | 0         | 0.0%                |
| Positive <sup>1</sup>   | 1         | 16.7%               |
| Neutral <sup>1,2</sup>  | 1         | 16.7%               |
| Negative <sup>1,3</sup> | 4         | 66.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>The person with a “positive” response recorded, the person with the “neutral” response, and one person with a “negative response all mentioned liking the trim/finishes on the cupboards and/or windows.

<sup>2</sup>A “neutral” response was recorded for a homeowner who mentioned a few issues they’ve had in the home, but overall seemed to be not too concerned with the issues, and for at least one problem, Fectau Homes came and fixed the issue free of charge.

<sup>3</sup>The homeowners with negative feelings about the finishes list a number of problems they’ve had, which are outlined in the table below.

Table 32

*Issues Reported For Interior Finishes: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Problems with the flooring <sup>2</sup>         | 5         | 83.3%               |
| Poor quality materials/poorly designed finishes | 4         | 66.7%               |
| Poor workmanship/problems not fixed well        | 3         | 50.0%               |
| Windows not sealed well <sup>3</sup>            | 2         | 33.3%               |
| Cracks in ceiling/wainscotting                  | 2         | 33.3%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 16.

<sup>2</sup>Two people mentioned that they had issues with their linoleum floors either buckling or bubbling, including the one homeowner with the overall “positive” feelings about the interior finishes. The person with the “neutral” response had tiles that kept popping up and needed to be re-grouted, but Fectau Homes took care of it for them. One homeowner mentioned noticing a lot of flaws in the carpeting, and a final homeowner said that one area of their linoleum floor was cut and put into place really poorly, and that in their bedroom they got carpet when they didn’t want it.

<sup>3</sup>Two people said their windows seem drafty; one homeowner said the walls by the window are cold because of this, and another homeowner said her window frosted up on the inside once when it got below 0 degrees.

**Q28: What about the quality of the exterior finishes?**

Table 33

*General Feelings About Exterior Finishes*

| Variable             | Frequency | Percent of <i>n</i> |
|----------------------|-----------|---------------------|
| Very positive        | 0         | 0.0%                |
| Positive             | 3         | 50.0%               |
| Neutral <sup>1</sup> | 1         | 16.7%               |
| Negative             | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “neutral” response was coded for the homeowner who made some suggestions for exterior features they’d like, but overall just said they haven’t had any problems.

Table 34

*Positive and Negative Comments About Exterior Finishes: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Positive Comments                                 |           |                     |
| Likes that home is strapped down                  | 2         | 33.3%               |
| Liked helping to design some finishes             | 1         | 16.7%               |
| Negative Comments                                 |           |                     |
| Poor workmanship <sup>2</sup>                     | 2         | 33.3%               |
| Wants exterior finishes not provided <sup>3</sup> | 2         | 33.3%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 7.

<sup>2</sup>One homeowner complained they've been having trouble getting the builders/home dealers to fix the issues she's been having. Another homeowner said that some nails fell out of somewhere and onto the porch and thinks they did a poor job overall on the exterior finishes.

<sup>3</sup> Finishes that homeowners said they want but were not provided include: storm/screen door combos, outlets and spigots on front of house, porch, carport, and a tin roof.

**Q29a: What is your opinion about the electric lighting in the house?**

Table 35

*General Feelings About Electric Lighting*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Very positive         | 0         | 0.0%                |
| Positive <sup>1</sup> | 5         | 83.3%               |
| Neutral               | 0         | 0.0%                |
| Negative <sup>2</sup> | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Three people with overall "positive" responses mentioned some changes they would make or have made. One person would move some light switches if they could, and has swapped out the LED lights for ones she likes better. Another homeowner likes the LED lights and actually put in other bright LEDs, and replaced two of the ceiling fixtures with combination ceiling fan/light fixture. A third homeowner wishes there were more lights in some closets and the living room.

<sup>2</sup>The person with the "negative" response thinks there are not enough overhead lights in the living room, and there are too many in the kitchen/dining room area.

**Q29b: What is your opinion about the natural lighting in the house (the windows)?**

Table 36

*General Feelings About Natural Lighting*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| Very positive <sup>1</sup> | 1         | 16.7%               |
| Positive <sup>2</sup>      | 5         | 83.3%               |
| Neutral                    | 0         | 0.0%                |
| Negative                   | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>The “very positive” response was coded because the homeowner described the natural lighting as “great” and that they have windows on both sides so there’s plenty of sun.

<sup>2</sup>One of the “positive” respondents had a few more windows added to her home than normally come with the homes. A second homeowner said they have one more window than is typical.

**Q30a: Would you say the house is quiet internally, between rooms in the house?**

Table 37

*Noise Level Between Rooms in Home*

| Variable           | Frequency | Percent of <i>n</i> |
|--------------------|-----------|---------------------|
| Quiet <sup>1</sup> | 6         | 100.0%              |
| Not quiet          | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Two “quiet” responses are from people who said either there’s no one else in the home usually, or they have bad hearing, so the question isn’t as pertinent to them.

**Q30b: Would you say the house is quiet externally from inside to the outside of the house?**

Table 38

*Noise Level Between Outside and Inside of Home*

| Variable               | Frequency | Percent of <i>n</i> |
|------------------------|-----------|---------------------|
| Quiet <sup>1</sup>     | 4         | 66.6%               |
| Not quiet <sup>2</sup> | 2         | 33.3%               |



Note.  $n = 6$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner said the home is quiet but their hearing is bad so it's not that important. Another homeowner said it's quiet other than the train that goes right by their house, but it would be loud no matter what.

<sup>2</sup>Two people said they can hear their neighbors, but one said their neighbors could just be really loud, and the other said they can hear their neighbor's music when they play it loud in the summer but that it's usually fine.

**Q31: How is the air quality in this home?**

Table 39

*General Feelings About Air Quality*

| Variable              | Frequency | Percent of $n$ |
|-----------------------|-----------|----------------|
| Very positive         | 0         | 0.0%           |
| Positive              | 3         | 50.0%          |
| Neutral <sup>1</sup>  | 2         | 33.3%          |
| Negative <sup>2</sup> | 1         | 16.7%          |

Note.  $n = 6$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Two people said the air quality was "fine" overall, but listed some issues they have had. One said that at first the home smelled like formaldehyde from the glue in the building materials, and it gave her headaches, but that now it's fine. The other homeowner also said she had to get rid of a chemical smell at first, and the forced air in the winter is very dry, and recommended they add a humidifier component to the furnace.

<sup>2</sup>One homeowner complained about it being very dry in the wintertime because of the forced air from the furnace.

**Q31a: How does the air quality in this home compare to your previous home?**

Table 40

*Air Quality in Current Home Compared to Previous Home*

| Variable             | Frequency | Percent of $n$ |
|----------------------|-----------|----------------|
| Better <sup>1</sup>  | 2         | 33.3%          |
| Neutral <sup>2</sup> | 4         | 66.7%          |
| Worse                | 0         | 0.0%           |

Note.  $n = 6$ . Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person said this home definitely has better air quality than her last home, which had black mold in it. Another homeowner said there's no longer any smokers in her current home, and also that there's less road dust because the home is more tightly insulated.

<sup>2</sup>Two people didn't specify any differences at all. One person thinks their home now is too dry with the heat on, but so was their last place. Another homeowner thinks the home now has dryer heat, but the last home was drafty, and so they don't specify if one is better than the other.

**Q32: Do you think this new home has positively or negatively affected your health or the health of the other people living in the home? If so, how?**

Table 41

*Impact of Current Home on Health of People Living in Home*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Positive <sup>1</sup> | 3         | 50.0%               |
| Neutral               | 1         | 16.7%               |
| Negative              | 0         | 0.0%                |
| Not sure              | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person thinks this home is healthier because her last home had black mold growing that made her sick. Another person says their stress level is reduced, and they feel that owning their own space gives them a greater sense of stability.

**Q33a: How has it been living with the ventilation system?**

Table 42

*General Feelings About Ventilation System*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Very positive         | 0         | 0.0%                |
| Positive              | 1         | 16.7%               |
| Neutral <sup>1</sup>  | 3         | 50.0%               |
| Negative              | 0         | 0.0%                |
| Not sure <sup>2</sup> | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Two people mention that they use the furnace to circulate air, and one of them also uses a ceiling fan, and overall that seems to work fine. A third homeowner said that at first the heater (furnace) was very loud and kept her up at night, but now she’s gotten used to it.

<sup>2</sup>Two people simply said they don’t know much about their ventilation system, they aren’t sure how it affects them.

**Q33b: How has it been living with the hot water system?**

Table 43

*General Feelings About Hot Water System*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Very positive         | 0         | 0.0%                |
| Positive <sup>1</sup> | 5         | 83.3%               |
| Neutral <sup>2</sup>  | 1         | 16.7%               |
| Negative              | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>A “positive” response was coded if respondent said the hot water system was “good” or overall seemed to think it worked well and they like it.

<sup>2</sup>A “neutral” response was coded for the response that the system is “fine.”

~~~~Question 33c is not relevant for ENERGY STAR homes~~~~

**Q33c: How has it been living with the wall mounted minisplit air source heat pump used for heating and cooling?**

~~~~~

**Q33d: To what extent do you notice the systems on a daily basis?**

Table 44

*General Feelings About Living with Systems (Ventilation/Furnace, Hot Water)*

| Variable                                     | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Easy to maintain/not noticeable <sup>1</sup> | 4         | 66.7%               |
| Noisy furnace but has gotten used to it      | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Almost every homeowner discussed the ease of cleaning filters when necessary.

**Q34: Are there any things you would change about the layout of the home or how it was built that would improve the home?**

Table 45

*Opinions About Layout of Home: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Likes the layout overall  | 3         | 50.0%               |
| Would change spacing between living room and kitchen <sup>2</sup> | 2         | 33.3%               |
| Would move the laundry room <sup>3</sup>                          | 2         | 33.3%               |
| Would make it easier to access drawers and cabinets               | 1         | 16.7%               |
| Would change or improve lighting and fixtures                     | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 9.

<sup>2</sup>One homeowner suggested they might put up a half wall to create more of a separation between the living room and kitchen to make it feel like there are more rooms in home. A second homeowner would move the island between the two rooms more into the kitchen to give more space to the living room.

<sup>3</sup>Two homeowners do not like the placement of the washer and dryer, and would move them somewhere more out-of-the-way.

**Q35: What are your monthly housing costs (not including park rent or land payments)?**

Table 46

*ENERGY STAR Monthly Housing Costs with Qualifications<sup>1</sup>*

| Interview Code | Monthly Housing Cost | Qualifications   |
|----------------|----------------------|--|
| MH115          | \$441.66             | Homeowner receives state fuel assistance, which lowers gas costs   |
| MH116          | \$913.47             | None   |
| MH118          | \$579.67             | Uncertain if HD <sup>2</sup> applies <sup>3</sup>                  |
| MH120          | \$655.50             | No HD applicable   |
| MH121          | \$552.00             | No HD applicable; car insurance included with homeowners insurance |
| MH122          | \$605.42             | No HD applicable   |

*Note.* *n* = 6.

<sup>1</sup>All monthly housing costs are estimated based on figures provided by homeowners including mortgage costs, homeowners insurance, property taxes (adjusted for post-Homestead Declaration numbers, if applicable), gas and electricity bills, unless otherwise specified in the “Qualifications” column. In many cases, annual figures and approximations were provided, and monthly costs were calculated accordingly.

<sup>2</sup>HD = Homestead Declaration.

<sup>3</sup>The homeowner was only able to say their taxes were “under \$1000” and did not say whether or not they received any tax adjustment from the Homestead Declaration; their annual taxes were recorded as \$1000 as the closest approximation to the accurate amount, and monthly taxes were calculated from this.

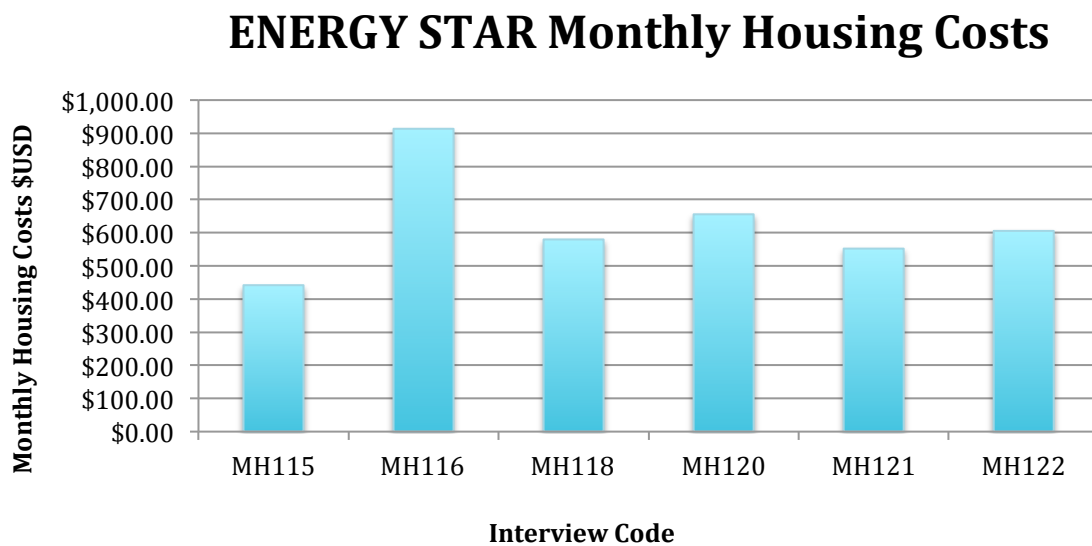


Figure 4. Average monthly housing costs for ENERGY STAR homeowners.

Note.  $n = 6$ .

<sup>a</sup>Monthly housing costs include average monthly mortgage, homeowner’s insurance, property taxes (after the Homestead Declaration tax adjustment, if applicable), electric bills, and gas bills.

## ENERGY STAR Monthly Housing Costs: Segmented Expenses

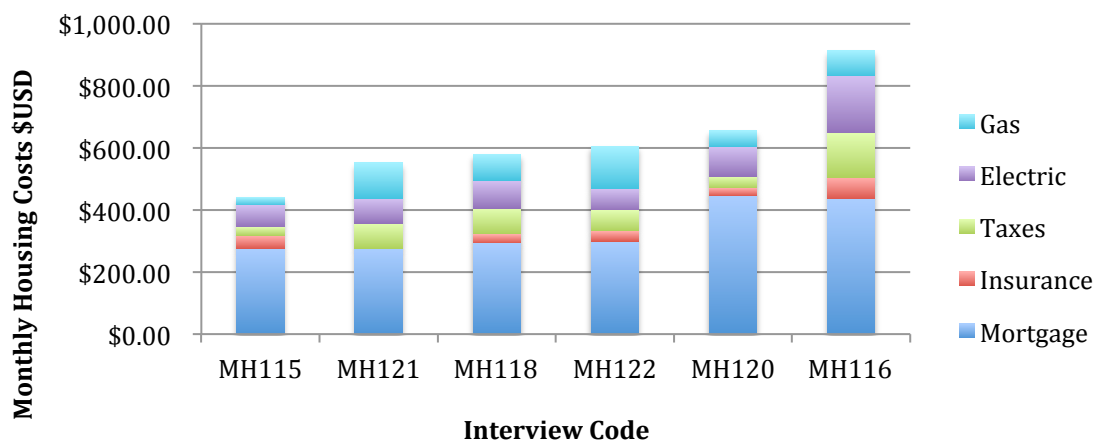


Figure 5. Average monthly housing costs for ENERGY STAR homeowners, segmented by expense.

Note.  $n = 6$ .

<sup>a</sup>Monthly housing costs include average monthly mortgage, homeowner's insurance, property taxes (after the Homestead Declaration tax adjustment, if applicable), electric, and gas bills.

<sup>b</sup>MH121: Costs for insurance is recorded as \$0, as it is included in the monthly mortgage price – homeowner was unable to separate out the different expenses.

Q35a: What is your monthly mortgage?

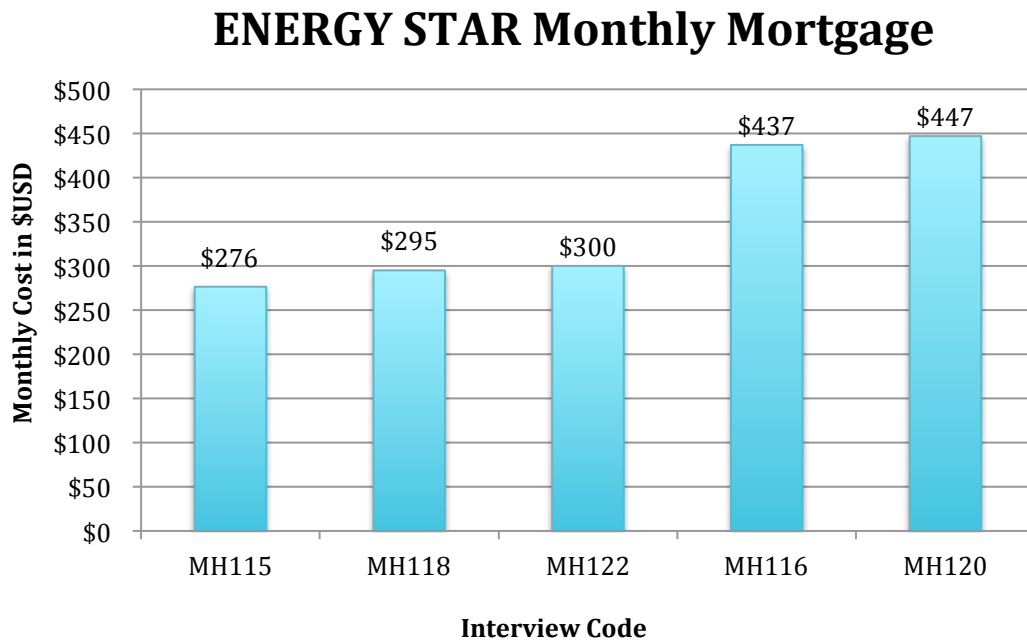


Figure 6. Average monthly mortgage costs for ENERGY STAR homeowners.

Note.  $n = 5$ .

<sup>a</sup>Monthly mortgage costs are rounded to nearest dollar.

<sup>b</sup>One homeowner was excluded from chart, as they were unable to separate their mortgage and insurance costs into different items.

<sup>c</sup>Homeowner MH116 stated that part of the unpaid mortgage from her previous home was rolled into her current mortgage, thus raising the monthly costs.

Q35b: What is your monthly homeowners insurance?

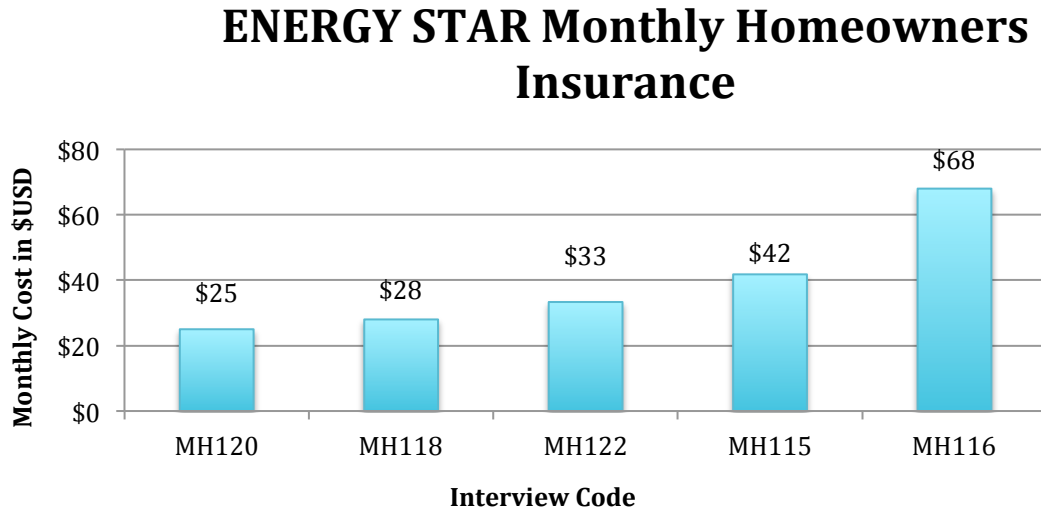


Figure 7. Average monthly homeowners insurance costs for ENERGY STAR homeowners.

Note.  $n = 5$ .

<sup>a</sup>Monthly insurance costs are rounded to nearest dollar.

<sup>b</sup>One homeowner was excluded from chart, as they were unable to separate their mortgage and insurance costs into different items.

Q35c: What is your monthly electricity bill?

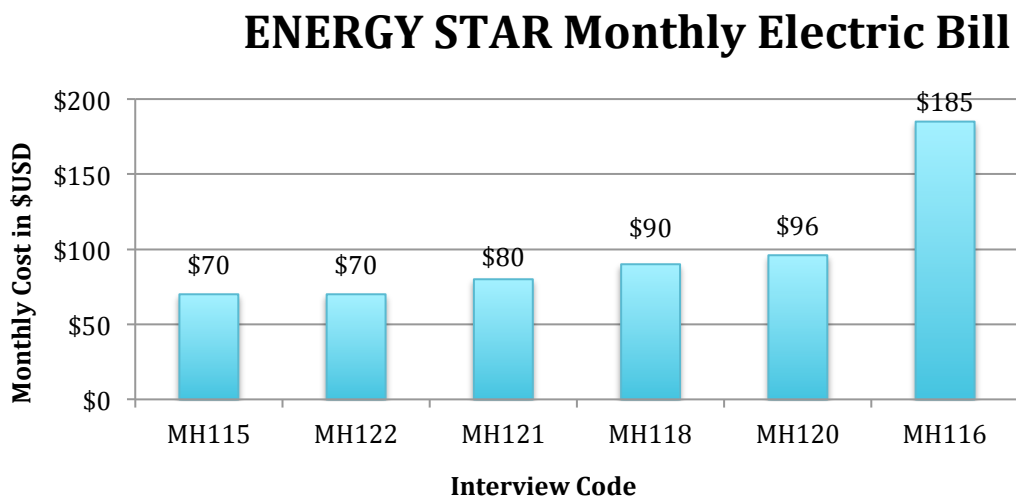


Figure 8. Average monthly electricity costs for ENERGY STAR homeowners.

Note.  $n = 6$ .

<sup>a</sup>Monthly electricity costs are rounded to nearest dollar.



**Q35d: What are your monthly energy costs from fuel oil, propane gas, or other fuel sources?**

### ENERGY STAR Monthly Gas Bill

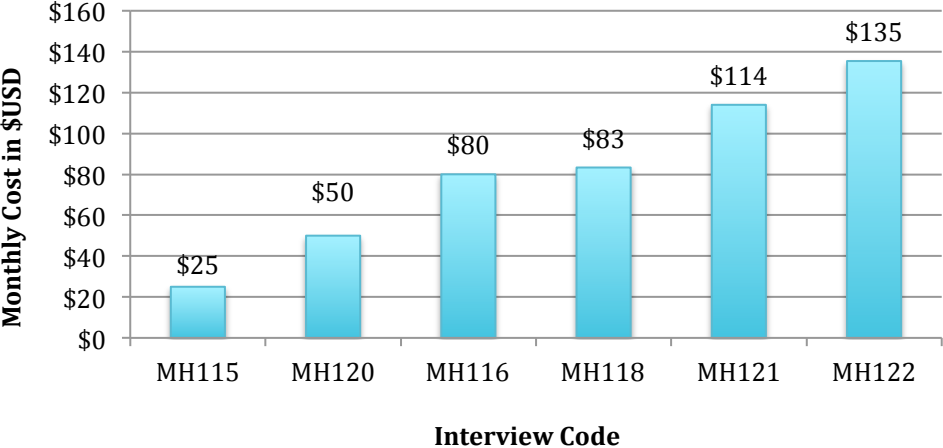


Figure 9. Average monthly gas costs for ENERGY STAR homeowners.

Note. n = 6.

<sup>a</sup>Monthly gas costs are rounded to nearest dollar.

<sup>b</sup>One homeowner, MH115, receives state fuel assistance, which lowers her gas costs.

**Q35e: What are your monthly costs for any maintenance or repairs?**

Table 47

*Monthly Costs for Maintenance or Repairs*

| Variable                 | Frequency | Percent of n |
|--------------------------|-----------|--------------|
| \$0                      | 2         | 33.3%        |
| Under \$250 <sup>1</sup> | 1         | 16.7%        |
| \$251-500 <sup>2</sup>   | 2         | 33.3%        |
| \$501-750                | 0         | 0.0%         |
| \$751-1000 <sup>3</sup>  | 1         | 16.7%        |

Note. n = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One respondent had to replace the smoke detector, and was remiss it was not covered by the warranty, and that Village Homes did not pay for it.

<sup>2</sup>One respondent spent \$500/600 to replace a motor in the furnace, but was reimbursed by Fectau Homes for \$200 of that cost, and mentioned that Fectau fixed cracks in the ceiling free of charge, and an issue with their stove was covered under warranty. A second respondent spent about \$250 to install screen

doors, and another \$25-34 to fix a fan, and believed those should have been covered by Fectau Homes, though they mentioned that other fixes have been covered by Fectau.

<sup>3</sup>One homeowner paid \$900 to fix damage to insulation under the house after her son accidentally flooded the bathroom. They recognized this was a fluke accident, and have not had to pay for any other maintenance.

**Q35f: What are your monthly property taxes? And do you take advantage of the Homestead Declaration?**

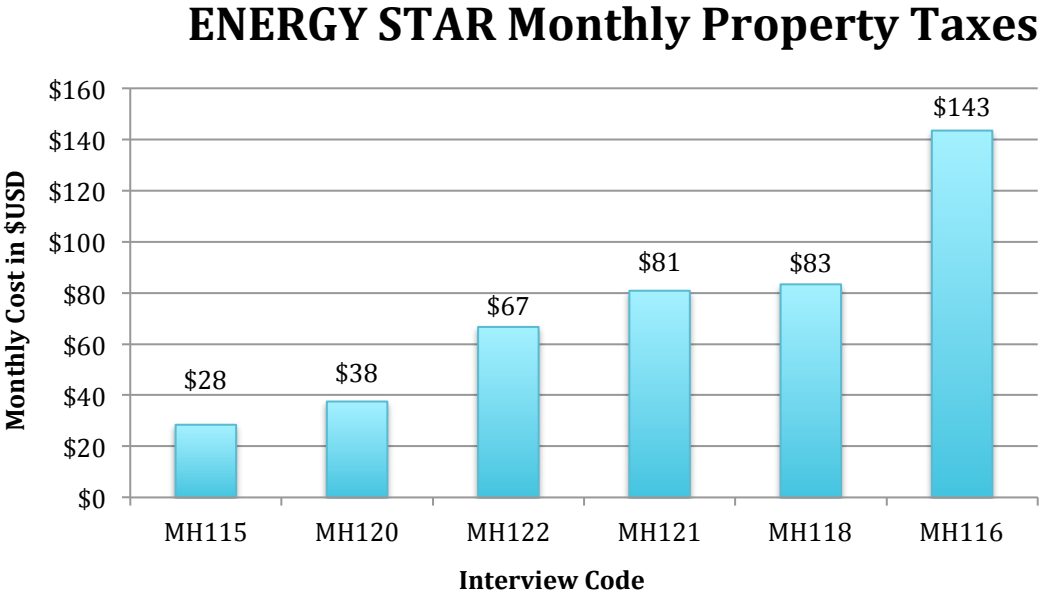


Figure 10. Average monthly property taxes paid by ENERGY STAR homeowners.

Note. n = 6.

<sup>a</sup>Monthly property taxes are rounded to nearest dollar.

<sup>b</sup>Most respondents reported property taxes for the year, so monthly property taxes were calculated from that amount.

<sup>c</sup>The amounts provided in this chart are the amounts paid by ENERGY STAR homeowners, i.e. they've been adjusted for any homeowners who take advantage of the Homestead Declaration.

<sup>d</sup>Two homeowners received tax adjustments through the Homestead Declaration: MH115 and MH116. The taxes are much lower for MH115 because of this adjustment. The taxes for MH116 are also lower than they would have been, but in general the property taxes are higher for this homeowner because their home is on their privately owned land.

<sup>e</sup>One homeowner, MH120, provided a range of \$400-500 a year for their property taxes. The average of \$450 per year was used to calculate the monthly average of \$38.

<sup>f</sup>One homeowner, MH118, simply stated their property taxes were just under \$1000 a year, so the figure \$1000 was used to calculate a monthly cost of \$83. It is uncertain whether or not the Homestead Declaration was applied to this amount, or if the homeowner would pay less in property taxes because of an unreported property tax adjustment.

Table 48

*Utilization of Homestead Declaration*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Yes – used Homestead Declaration <sup>1</sup>                    | 3         | 50.0%               |
| No – did not use Homestead Declaration                           | 2         | 33.3%               |
| Plans to use Homestead Declaration, but has not yet <sup>2</sup> | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner stated they think they get a property tax adjustment, though they did not know the name “Homestead Declaration.” It is assumed here that this is what was applied to their taxes, though they did not specify how much this adjustment was for. The two other homeowners received tax reductions of \$254 and \$730 per year, or approximately \$21 and \$61 per month, respectively.

<sup>2</sup>One homeowner stated they had not spent a full year in the home yet when the past year’s Homestead Declaration adjustments were made, so it could not be applied, but they will try to apply the tax adjustment this year.

**Q36a: How do your monthly housing costs in this new house compare to your previous living arrangements? Are they higher or lower?**

Table 49

*Monthly Housing Costs in Current Home Compared to Previous Home*

| Variable              | Frequency | Percent of <i>n</i> |
|-----------------------|-----------|---------------------|
| Higher <sup>1</sup>   | 2         | 33.3%               |
| Lower <sup>2</sup>    | 3         | 50.0%               |
| Same                  | 0         | 0.0%                |
| Not sure <sup>3</sup> | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One person who said their current monthly housing costs are higher than before clarified said that they are paying multiple bills as part of the mortgage, and it’s a lot. A second homeowner said that overall their costs are greater now because they’re paying for heat, which was previously included with rent in an apartment.

<sup>2</sup>One person who thinks they’re paying less now than before specified that things are much better now, and they “can actually eat” now.

<sup>3</sup>One homeowner initially said they thought they were paying less now than before, but after clarifying how their expenses had changed, said this house might be costing them more than before, but because they (a couple) were sharing an apartment with a roommate previously, it’s hard to tell how rent and bills before compare to mortgage, lot rent, and bills now.

**Q36b: In what way have they changed?**

Table 50

*Monthly Costs in Current Home Compared to Previous Home: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Energy bills (utilities) are lower               | 3         | 50.0%               |
| Energy bills (utilities) are higher <sup>2</sup> | 3         | 50.0%               |
| Mortgage is lower <sup>3</sup>                   | 4         | 66.7%               |
| Mortgage is higher <sup>4</sup>                  | 2         | 33.3%               |
| Lot rent is higher <sup>5</sup>                  | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 13.

<sup>2</sup>Heat and/or electricity were included in the rent paid at two respondents' previous apartments, so it's more expensive now.

<sup>3</sup>One respondent specified that everything combined (mortgage, taxes, insurance, bills) is half of what just her rent alone was at her last place, and so they're very happy now with the cost of this new home.

<sup>4</sup>One homeowner has to pay three different entities back for her mortgage – one regular mortgage payment to the bank, a second to a different bank to pay back a portion of the down payment loan, and a third to the home dealer for the slab.

<sup>5</sup>One homeowner and his wife said that their mortgage is cheaper than their rent was, when they previously shared an apartment with a roommate, but when add the lot rent to the mortgage, they think it's a little more expensive now.

~~~~Following question was merged with Q36a~~~~

**Q37: Overall, do you think this new house is costing you more or less than your previous home?**

~~~~~

**Q38: Do you think that this new home is giving you a better value for your payments than your previous home?**

Table 51

*Value for Costs in Current Home Compared to Previous Home*

| Variable                      | Frequency | Percent of <i>n</i> |
|-------------------------------|-----------|---------------------|
| Better value now <sup>1</sup> | 5         | 83.3%               |
| Same as before                | 0         | 0.0%                |
| Not sure <sup>2</sup>         | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>Three homeowners mentioned that they're happy to be paying money towards ownership and not just paying rent to someone else. One homeowner specified they think it's a better value because of its efficiency and that it's comfortable.

<sup>2</sup>One response was coded as "not sure" because the homeowner has a lot of problems in the house that still need to be resolved, and they think it could be a better value than their last home if it were fixed up.

**Q39a: What were most helpful parts in the process of buying your house?**

Table 52

*Helpful Parts of Buying Process: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Working with home dealer <sup>2</sup>             | 4         | 66.7%               |
| Working with Champlain Housing Trust <sup>3</sup> | 2         | 33.3%               |
| Working with Ledyard Bank <sup>4</sup>            | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 7.

<sup>2</sup>Three people said working with Fectau Homes was really helpful, and that they did a good job helping homeowner deal with the banks and with Champlain Housing Trust. One person went through Village Homes and said they were helpful with Champlain Housing Trust and the bank.

<sup>3</sup>One homeowner said they appreciated the first-time homeowner classes that Champlain Housing Trust had her take, and another person simply said CHT was great overall.

<sup>4</sup>One person said that Ledyard, the bank that gives homeowners a closing credit, was very helpful in explaining all the paperwork to her, especially the lawyer from Ledyard.

**Q39b: What were most difficult parts in the process of buying your house?**

Table 53

*Difficult Parts of Buying Process: Multiple Response Variables<sup>1</sup>*

| Variable  | Frequency | Percent of <i>n</i> |
|---|-----------|---------------------|
| Dealing with banks <sup>2</sup>                 | 3         | 50.0%               |
| Dealing with paperwork and process <sup>3</sup> | 3         | 50.0%               |
| Classes required to get mortgage <sup>4</sup>   | 2         | 33.3%               |
| No one to help in process                       | 1         | 16.7%               |
| Dealing with home dealer <sup>5</sup>           | 1         | 16.7%               |
| Making a final decision                         | 1         | 16.7%               |

|                                 |   |       |
|---------------------------------|---|-------|
| Physically getting home to site | 1 | 16.7% |
|---------------------------------|---|-------|

*Note. n = 6.*

<sup>1</sup>Total Variable Responses = 12.

<sup>2</sup>One homeowner said the bank originally escrowed the mortgage wrong, and it was a hassle to get it straightened out and a burden to have to pay a lot more their second year to make up the difference. A second homeowner had trouble working with VSECU because she gets paid in cash from waitressing and found it difficult to get approved for mortgage loans. A third person also found it hard to get a mortgage because she is single and needed her father who lives far away to co-sign.

<sup>3</sup>Three people mentioned having to jump through a lot of hoops to get the mortgage and all paperwork straightened out, and that the process felt like it took a long time.

<sup>4</sup>Two homeowners mentioned the first-time homeowner classes through CHT were a challenge, though one person did say that they found the classes helpful overall.

<sup>5</sup>One homeowner went through Village Homes and felt like they were not very helpful, that they were just after a sale.

#### **Q40: Were there programs or incentives that helped you afford this new home?**

Table 54

*Programs or Incentives for a More Affordable Home: Multiple Response Variables<sup>1</sup>*

| Variable                                       | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Grants from housing or land trust <sup>2</sup> | 7         | 116.7%              |
| Bank grants or loans <sup>3</sup>              | 2         | 33.3%               |

*Note. n = 6.*

<sup>1</sup>Total Variable Responses = 9.

<sup>2</sup>All six respondents mentioned receiving grants from Champlain Housing Trust, and one person also got a grant from the Vermont Land Trust.

<sup>3</sup>One homeowner got a loan from Merchant's Bank that helped her cover the down payment, and she also got a closing credit from Ledyard Bank.

#### **Q41: Is this your first time managing a home mortgage?**

Table 55

*First Home Mortgage*

| Variable                   | Frequency | Percent of <i>n</i> |
|----------------------------|-----------|---------------------|
| No – had a mortgage before | 4         | 66.7%               |
| Yes – first mortgage       | 2         | 33.3%               |

*Note. n = 6. Percentages may not sum to an even 100% due to rounding.*

**Q41a: How do you feel about managing this mortgage? Is it a strain? If so, how?**

Table 56

*Difficulty Managing Home Mortgage*

| Variable                  | Frequency | Percent of <i>n</i> |
|---------------------------|-----------|---------------------|
| Not a strain <sup>1</sup> | 5         | 83.3%               |
| A strain <sup>2</sup>     | 1         | 16.7%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner was frustrated initially because the bank escrowed their mortgage wrong, and their second year in the home they had to pay a much higher mortgage than expected, but now it has gone down and is not a strain. Another homeowner mentioned that the CHT homeownership class helped her figure out how to budget correctly, and seems happy about it.

<sup>2</sup>One homeowner is paying three separate banks for her mortgage payments (one regular mortgage, one paying back part of the down payment, and another for the slab), and finds it a bit of a strain.

**Q42Ea: On a scale of 1-5, with 5 meaning the most important, outside of what it saves you in personal expenses, how important is energy conservation to you?**

Table 57

*Importance of Energy Conservation in Home*

| Variable                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--------------------------|-----------|---------------------|--------------|
| 5 – Very important       | 4         | 66.7%               | 4.33         |
| 4 - Important            | 1         | 16.7%               |              |
| 3 – Neutral              | 0         | 0.0%                |              |
| 2 – Pretty unimportant   | 1         | 16.7%               |              |
| 1 – Not important at all | 0         | 0.0%                |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q42Eb: On a scale of 1-5, with 5 meaning the most, familiar are you with the concept of a "Net Zero" house?**

Table 58

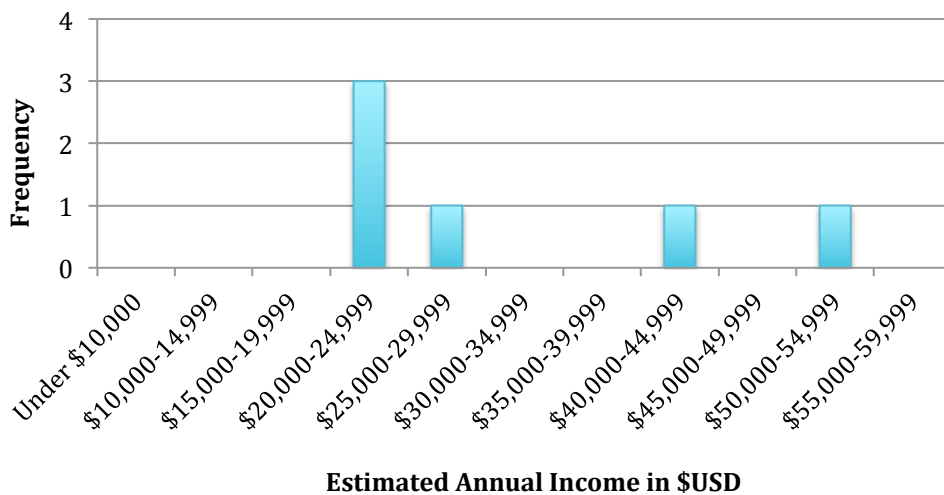
*Level of Understanding of "Net Zero" Concept*

| Variable                                 | Frequency | Percent of <i>n</i> | Overall Mean |
|--|-----------|---------------------|--------------|
| 5 – Complete understanding of "Net Zero" | 0         | 0.0%                | 1.83         |
| 4 - Good understanding of concept        | 1         | 16.7%               |              |
| 3 – Very basic understanding of concept  | 1         | 16.7%               |              |
| 2 – Barely understand concept            | 0         | 0.0%                |              |
| 1 – Never heard of "Net Zero"            | 4         | 66.7%               |              |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q43: What is your best estimate of your annual household income?**

### ENERGY STAR Estimated Annual Household Income



*Figure 11.* Estimated annual household income.

*Note.* *n* = 6.



Table 59

*Estimated Annual Household Income*

| Variable        | Frequency | Percent of <i>n</i> |
|-----------------|-----------|---------------------|
| Under \$10,000  | 0         | 0.0%                |
| \$10,000-14,999 | 0         | 0.0%                |
| \$15,000-19,999 | 0         | 0.0%                |
| \$20,000-24,999 | 3         | 50.0%               |
| \$25,000-29,999 | 1         | 16.7%               |
| \$30,000-34,999 | 0         | 0.0%                |
| \$35,000-39,999 | 0         | 0.0%                |
| \$40,000-44,999 | 1         | 16.7%               |
| \$45,000-49,999 | 0         | 0.0%                |
| \$50,000-54,999 | 1         | 16.7%               |
| \$55,000-59,999 | 0         | 0.0%                |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

**Q44: Finally, are there any other things we missed that are important to you about this home?**

Table 60

*Additional Positive and Negative Comments About Home: Multiple Response Variables<sup>1</sup>*

| Variable   | Frequency | Percent of <i>n</i> |
|--|-----------|---------------------|
| Positive Comments                                |           |                     |
| Overall happy - nothing more to say              | 1         | 16.7%               |
| Likes that home is tied down                     | 1         | 16.7%               |
| Sense of freedom to own your home                | 1         | 16.7%               |
| Home has no drafts or leaks                      | 1         | 16.7%               |
| Negative Comments                                |           |                     |
| Homes should be built better <sup>2</sup>        | 2         | 33.3%               |
| Would upgrade finishes and features <sup>3</sup> | 1         | 16.7%               |

*Note.* *n* = 6.

<sup>1</sup>Total Variable Responses = 7.

<sup>2</sup>One person thinks the builders, Commodore Homes, did a bad job, and she even wrote to the company expressing her disappointment in how they built the home and the bad job they've done in fixing any problems. Another homeowner just mentioned that the windows were not sealed well and are drafty.

<sup>3</sup>One homeowner said they would upgrade their home if they could and do more with the options available, for example, putting up sheetrock walls.

**Q45: If someone approached you who was interested in buying a new home like yours, what would you tell them about your home?**

Table 61

*Recommendation for Others Looking to Buy ENERGY STAR Home*

| Variable                           | Frequency | Percent of <i>n</i> |
|------------------------------------|-----------|---------------------|
| Would recommend <sup>1,2</sup>     | 4         | 66.7%               |
| Would not recommend <sup>1,3</sup> | 2         | 33.3%               |

*Note.* *n* = 6. Percentages may not sum to an even 100% due to rounding.

<sup>1</sup>One homeowner who would recommend the home and the two homeowners who would not emphasized the need to do thorough research before buying a home like this.

<sup>2</sup>One homeowner thinks it's really important to figure out how to own your own home, and a home like hers is just one way to do so, and she thinks it's worth the money you spend.

<sup>3</sup>One homeowner who would not recommend the home does say she likes the ENERGY STAR features of the home overall, and would get solar panels if she could.

**Q46: What is the HUD identification code for this home?**

Table 62

*HUD Identification Codes*

|   |
|---|
| HUD ID Code/Model Number                                    |
| RAD1513593  |
| RAD1506383  |
| NTA1616809  |
| RAD1506531  |
| No HUD ID/Model # provided is Eastland-A4146-A <sup>1</sup> |

*Note.* *n* = 6.

<sup>1</sup>Manufacturer is Colony Homes.

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