



July 6, 2021

REPORT #E21-424

Manufactured Homes Market Progress Evaluation #1

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Executive Summary

This report presents findings from the first Market Progress Evaluation Report (MPER) for the Northwest Energy Efficiency Alliance’s (NEEA) Manufactured Homes program. NEEA contracted with Apex Analytics (Apex) to investigate five key research objectives:

- › Review the program’s logic model to assess whether it accurately represents the program’s theory of change.
- › Assess program progress toward market transformation based on four key market progress indicators (MPIs).
- › Assess the persistence of the Northwest Energy Efficient Manufactured Homes (NEEM) program’s NEEM+ designation in the market.
- › Provide ongoing information and feedback to the program implementation team for adaptive management.
- › Review the NEEM 1.1 baseline memo to verify NEEA’s influence on NEEM 1.1 market share.

To address these objectives, Apex reviewed program documents and data and conducted in-depth interviews with four populations, listed in Table 1.

Table 1: In-Depth Interview Populations

Population	Number of Respondents
Program staff	4
Utility program administrators	4
Manufactured home manufacturers	5
Manufactured home retailers	20

Key Findings

Limited customer awareness and demand for NEEM+ homes are the greatest barriers to expanded NEEM+ availability. Current high overall demand for manufactured homes compounds this challenge. Manufacturers described a variety of challenges around building NEEM+ homes but indicated that they could overcome these challenges if there was sufficient demand for NEEM+ to justify the effort involved. Manufacturers currently face high demand (for manufactured homes in general) and are focused on filling existing orders and maintaining satisfaction among their current customers. They are not motivated to develop and actively promote new offerings like NEEM+ homes.

An updated U.S. Department of Energy/Housing and Urban Development (DOE/HUD) energy code will not likely impact uptake of NEEM+ homes unless it is substantially more stringent than the current code. This may be difficult to achieve given limited adoption of efficient practices outside the Northwest. An energy code that requires manufactured homes to meet efficiency requirements similar to the current ENERGY STAR specification would leave NEEM+ as an established, above-code specification, positioned to become an updated ENERGY STAR specification.¹ Thus, NEEM+ might apply to a wider range of homebuyers seeking increased efficiency but not interested in a premium option, and NEEM+ could leverage the greater awareness of the ENERGY STAR brand. Nonetheless, manufacturers were skeptical that any federal code would be stringent enough to impact building practices in the Northwest. Manufactured homes in the Northwest are typically built to higher efficiency standards than homes in other parts of the country, and manufacturers focused on maintaining low costs are active in federal rulemaking processes.

Retailers play a key role in building awareness and demand for NEEM+, and they seek sales tools that help to illustrate the differences between NEEM+ and standard homes and demonstrate the long-term cost savings of NEEM+. Manufacturers emphasized the importance of educating and motivating retailers to promote NEEM+ homes. Retailers, in turn, noted that there are few visible differences between a NEEM+ home and an ENERGY STAR home, and suggested that displays to visually demonstrate items like insulation levels and window efficiency would be helpful. Both retailers and manufacturers emphasized that information on expected cost savings from upgrading to a NEEM+ home could be compelling to homebuyers, particularly those in more extreme climates. Retailers and manufacturers also noted that the incentives offered by utilities to homebuyers are an effective sales tool, allowing them to offer the long-term savings benefits at a lower up-front cost.

Conclusions & Recommendations

Conclusion 1: Continued program support is necessary to establish NEEM+ in the manufactured homes market. While current manufacturers would continue to offer NEEM+ homes in the short term without program support, manufacturers and most retailers would not actively promote them and NEEM+ market share would decline. Eventually, market share declines would reach a level at which manufacturers would discontinue their NEEM+ offerings. Adoption of a new, stringent DOE/HUD energy code for manufactured homes and an updated ENERGY STAR specification to the NEEM+ level would make market conditions more favorable for NEEM+. Without

¹ NEEA initially designed the program to position NEEM+ in this way, anticipating an energy code update in 2016. The program shifted its focus to promoting NEEM+ as an above-ENERGY STAR specification when progress on the code update stalled with the transition to a new federal administration at the beginning of 2017.

program support, however, NEEM+ may fade from the market before a new DOE/HUD energy code takes effect.

- › **Recommendation 1: NEEA should continue to support the manufactured homes market to the extent needed to maintain NEEM+ availability until a standard update and ENERGY STAR specification revision occur.** Given the level of effort needed to build retailer and homebuyer awareness and create demand, and the challenges the current market environment poses, it may not be practical for NEEA to establish NEEM+ as a self-sustaining brand prior to the adoption of an updated DOE/HUD standard. However, maintaining NEEM+ availability in the market at its current level or higher will be important as NEEA works to ensure the new standard and updated specification are stringent enough to push the market. NEEA may be able to maintain NEEM+ at something close to its current level by continuing manufacturer incentives, retailer support, and consumer marketing in a limited capacity.²

Conclusion 2: Utility incentives can play an important role in increasing NEEM+ uptake. Incentives have the potential to build the type of retailer awareness and customer demand that manufacturers and retailers reported were necessary to increase the prevalence of NEEM+. Both manufacturers and retailers reported that the types of incentives offered by utilities to homebuyers for purchasing NEEM+ homes are an effective sales tool. A smaller number of utilities also offer incentives to salespeople for sales of NEEM+ homes, another tactic that manufacturers suggested could be effective in increasing uptake. Retailers' positive response to NEEA's sales challenge further supports the potential for retailer incentives. The complexity of the manufactured homebuying process and inconsistency of incentive offerings across the utility territories a retailer serves are barriers to utility incentive uptake.

- › **Recommendation 2: NEEA should work to coordinate utility incentive efforts across the Northwest.** Many retailers serve customers across a range of utility territories, and tools like the Rebate Finder on the NEEM website could help them identify the offerings available to individual customers. NEEA should continue to provide and seek opportunities to expand these tools. It is also important for NEEA to ensure retailers are aware these tools are available.

Conclusion 3: Given the current high demand for manufactured homes, retailers and manufacturers are less likely to seek out new offerings, like NEEM+. A key benefit of offering NEEM+ homes for retailers and manufacturers is the opportunity

² For example, NEEA could set limited annual incentive caps for each manufacturer, a strategy that program staff reported considering.

to differentiate themselves from their competitors by demonstrating a focus on quality. Retailers and manufacturers both also described NEEM+ as a potentially compelling feature to home buyers, offering the potential for energy cost savings for a relatively small increase in the monthly mortgage payment. Despite these benefits, retailers and manufacturers may be unlikely to seek out information on NEEM+ in the current market conditions. Rather than seeking to attract new customers, retailers are focused on meeting existing demand.

- › **Recommendation 3: NEEA should proactively provide retailers and manufacturers with existing tools and information on NEEM+ cost savings and consider expanding those resources.** The information on the NEEM+ website addresses many of the points retailers and manufacturers raised about cost savings, including a comparison of monthly cost savings relative to the incremental increase in a homebuyer's mortgage payment from adding the NEEM+ option. NEEA could expand on this resource with a tool that would allow retailers to generate customized savings estimates for particular customers based on inputs like the climate where the home will be located, the fuels the home will use and their costs, and the customer's mortgage rate. Program staff should proactively provide retailers with these tools, rather than simply posting them for retailers to access.

Conclusion 4: Manufactured home communities' adoption of NEEM+ could significantly boost demand for qualified homes, leading to greater market acceptance, and better positioning NEEM+ for adoption as an ENERGY STAR specification. Manufactured home communities purchase homes in high volumes. Filling an order for tens or hundreds of homes for a manufactured home community would require manufacturers to develop and solidify their NEEM+ production capacity. An increase in demand for NEEM+ homes could also lead additional manufacturers to develop NEEM+ offerings in an effort to remain competitive. This increased market capacity to produce NEEM+ homes would help to justify adoption of NEEM+ as an ENERGY STAR specification.

- › **Recommendation 4: NEEA should investigate market intervention opportunities to encourage community developers to adopt NEEM+ homes.** Manufactured home communities placing large orders for NEEM+ homes could significantly increase NEEM+ production capacity and advance NEEM+ toward becoming a self-sustaining offering in the market. As a result, it would be worthwhile for NEEA to begin developing relationships with manufactured-home community developers and assess what opportunities exist to encourage them to specify NEEM+ homes.

1. Introduction

This report presents findings from the first Market Progress Evaluation Report (MPER) of the Northwest Energy Efficiency Alliance's (NEEA) Manufactured Homes Program. NEEA contracted with Apex Analytics (Apex) to assess the program's logic model and progress toward logic model outcomes (by tracking specific market progress indicators), review baseline assumptions, provide general feedback to support adaptive management and program improvement, and address additional research questions related to the sustainability of the NEEM+ brand in the market.

1.1 Program Description

Anticipating adoption of increased efficiency standards for manufactured homes in 2016, NEEA began working with the Northwest Energy Efficient Manufactured Homes (NEEM) program in support of an effort to develop and maintain an advanced efficiency specification for manufactured homes that is more stringent than the current ENERGY STAR level. These efforts built on a specification that Bonneville Power Administration (BPA) developed in 2011 and 2012, known as the high-performance manufactured home (HPMH) specification.

The HPMH specification was based on the end-state vision for site-built homes, roughly 60% more efficient than 2006 code-built homes and substantially more stringent than the then-current ENERGY STAR specification for manufactured homes. BPA developed a savings rate, which the Regional Technical Forum (RTF) approved, and established financial incentives followed by a research effort that involved working with factories to build homes to the specified level of performance, followed by detailed monitoring funded by NEEA. The factory learnings and energy savings became the basis for renewed collaboration with the manufactured home industry during the substantial industry slowdown that occurred during the financial recession of 2009–2015.

The advanced specification that NEEA and Northwest Energy Works ultimately developed was originally called NEEM 2.0, to differentiate it from the earlier NEEM 1.1 specification, which is the current ENERGY STAR level in the Northwest. NEEA later rebranded NEEM 2.0 to become NEEM+. NEEA originally planned to position this specification to become a new ENERGY STAR level when the updated code pushed baseline efficiency levels to or near the current ENERGY STAR level. To that end, NEEA initially sought to demonstrate manufacturer capability to produce homes meeting NEEM+ requirements with little to no impact on production line speed.

Progress on the updated federal energy code for manufactured homes, which was nearly complete at the end of 2016, stalled with the transition to the Trump administration in early 2017. At that time, NEEA shifted the program's focus to promoting NEEM+ as an above-ENERGY STAR, high-efficiency option. Figure 1 lists

key activities the program has undertaken to drive uptake of NEEM+ homes. With the program’s shift in focus, it has increased its efforts to drive demand for NEEM+ homes.

Figure 1: Key Manufactured Homes Program Activities

Activities to Build Supply of NEEM+ Homes	Manufacturer outreach to encourage development of NEEM+ offerings.
	Manufacturer training & technical support to help manufacturers build to NEEM+ specifications.
	Manufacturer incentives to reduce the cost of the NEEM+ option, typically passed through to the homebuyer.
Activities to Drive Demand of NEEM+ Homes	Retailer training & technical support to inform salespeople about the availability and benefits of NEEM+.
	Retailer marketing materials to call attention to NEEM+ homes and their features and help retailers inform customers about NEEM+.
	Display-home incentives to encourage retailers to include NEEM+ options among the display homes on their lots.
	Consumer marketing , including print and online advertising, to increase consumer awareness and drive visitors to the NEEM website.

In addition to the ongoing efforts listed in Figure 1, NEEA has undertaken short-term promotions to increase awareness and uptake of NEEM+ homes. These efforts include the auto-upgrade promotion in late 2018, in which NEEA paid the full incremental cost to upgrade all of the ENERGY STAR homes in one manufacturer’s queue to NEEM+ in order to build the manufacturer’s capacity to produce NEEM+ homes. NEEA also implemented a sales challenge in 2019, offering escalating incentives to retail sales staff based on the number of NEEM+ homes they sold, as a way to build retailer awareness of NEEM+ and increase the range of retailers promoting NEEM+ homes.

Three manufacturers currently offer NEEM+ homes. In 2020, 73 NEEM+ homes were sold in the Northwest, accounting for approximately 2% of all manufactured home sales.

1.2 Research Objectives

NEEA defined five higher-level research objectives for this MPER, with more specific research questions within each objective (Table 2).

Table 2: Research Objectives

Research Objective	Research Questions
Review the program’s logic model to assess whether it accurately represents the program’s theory of change.	Are major market barriers accurately conveyed?
	Are key market intervention activities identified?
	Do activities target the appropriate barriers and map logically to market transformation outcomes?
	Are outcomes evaluable?
Assess program progress toward market transformation based on four key market progress indicators (MPIs).	Are northwest (NW) NEEM program manufacturers able to build to the NEEM+ spec?
	Is the incented incremental cost of NEEM+ less than 5% greater than the cost of comparable NW manufactured homes (MH)?
	Are factory trainings in NEEM+ construction held, and are test homes built?
	Have manufactured homes retailers increased their sales of NEEM+ homes?
Assess the persistence of NEEM+ in the market.	How persistent will NEEM+ be in the market without NEEA’s support?
	What additional support, if any, is necessary for the market to adopt NEEM+ in a persistent way? How much longer would NEEA’s intervention be needed to achieve market transformation?
	Would utility interventions continue if NEEA’s support ended, and would that utility support be sufficient to transform the market?
	How can NEEA gracefully exit the market? What form would a slow withdrawal take?
Provide ongoing information and feedback to the program implementation team for adaptive management.	
Review NEEM 1.1 baseline memo to verify NEEA’s influence on NEEM 1.1 market share.	

1.3 Research Approach

Apex conducted four data collection activities to address the research objectives for this MPER. These activities are discussed below.

1.3.1 Staff Interviews & Document Review

Apex reviewed key program documents including prior evaluation and market research, internal Milestone documents, and marketing materials to gain a background understanding of the program. We then conducted interviews with four key NEEA and Northwest Energy Works staff members involved in managing and implementing the program to ensure our understanding was up-to-date, fill in gaps, and gather their perspectives on the program and the manufactured home market.

1.3.2 Utility Program Administrator Interviews

Apex interviewed staff members from four Northwest program administrators with programs actively promoting NEEM+ homes. These interviews sought to understand program administrators' offerings related to NEEM+, their experience with NEEM+ homes, and their interaction with NEEA's NEEM+ program. The interviews also explored how utility programs might adapt if NEEA were no longer supporting the manufactured home market. Apex worked with NEEA staff to identify program administrators to include in these interviews.

1.3.3 Manufacturer Interviews

Apex staff interviewed a total of five manufactured home manufacturers: the three manufacturers who currently offer NEEM+ homes; and two non-participating manufacturers who were aware of and had considered offering NEEM+, but do not currently do so. Apex identified contacts for these interviews with help from Northwest Energy Works.

1.3.4 Retailer Interviews

Apex staff conducted interviews with 20 manufactured home retailers located throughout the Northwest,³ including both retailers that sell NEEM+ homes and those that do not. Northwest Energy Works provided introductions to 10 retailers, 7 of whom were among the sample of 20 interviewed retailers. Apex recruited the majority of the remaining retailer respondents from the 47 retailers listed on the Northwest Energy Works website, with a few additional respondents from among the 585 businesses in the Northwest listed in the Mergent Intellect business database under NAICS code 459390: Manufactured (Mobile) Home Dealers.⁴

2. Logic Model Review

NEEA's logic model for the Manufactured Homes program lists five barriers to uptake of NEEM+ homes, each of which is associated with a program activity,

³ Eleven of the interviewed retailers were located in Washington, six in Oregon, two in Idaho, and one in Montana.

⁴ <https://www.mergentintellect.com/>

outputs, and market transformation outcomes. This section presents findings from the MPER research related to each barrier and its associated activities and outcomes. NEEA’s logic model and specific recommendations to adapt the model to reflect the barriers, activities, and associated logic more clearly are presented in Appendix A.

2.1 Limited Product Availability

2.1.1 Background

NEEA’s logic model identifies limited availability as a barrier to increased uptake of NEEM+ homes. In response, the logic model states that NEEA will collaborate with factories and the NEEM Program to establish the NEEM+ specification. Table 3 provides the logic model’s flow related to product availability.

Table 3: Product Availability Logic

Barriers		Limited Product Availability
Activities		Collaborate with factories and NEEM program to establish NEEM+ specification.
Outputs		<ul style="list-style-type: none"> Manufacturers agree upon NEEM+ RTF Unit Energy Savings for NEEM specification Pilot projects Product performance validation Consumer satisfaction validation
Outcomes	Short Term	NW NEEM program (manufacturers) agree upon a specification.
	Medium Term	Six factories offer NEEM+ homes.
	Long Term	Top retailers stock NEEM+ homes on lots.

2.1.2 Assessment

Product availability remains an important barrier to NEEM+ uptake, although other underlying barriers limit availability. Further, the program’s activities to address those barriers have evolved since the NEEM+ specification was developed and adopted as a measure by the RTF.⁵ While the program has made some minor modifications to the specification, staff reported primarily seeking to hold the

⁵ The RTF is an advisory committee to the Northwest Power and Conservation Council that works to standardize measurement of energy savings throughout the Northwest, in part by developing deemed energy savings values for energy efficiency measures.

specification steady while they sought to recruit additional manufacturers and increase uptake. Staff stated that too many changes to the specification could increase costs of NEEM+ homes and cause manufacturers to lose interest.

Three manufacturers currently offer NEEM+ homes. These manufacturers offer NEEM+ as an option on all of their floor plans, with limited exceptions for cases in which structural limitations prevent them from meeting the NEEM+ specifications.⁶ The manufacturers offering NEEM+ built 30% of the new manufactured homes sold in Oregon in 2020.⁷ Across the Northwest, NEEM+ homes accounted for approximately 4% of the manufactured homes sold in 2020.

Increasing availability of NEEM+ homes would require existing manufacturers to increase their NEEM+ production or new manufacturers to begin offering NEEM+ options. Manufacturer interviews identified two underlying barriers preventing that from occurring: a lack of consumer demand for NEEM+, and current market conditions.

2.1.2.1 Limited Consumer Demand Reduces Availability

A lack of consumer demand for NEEM+ homes is the most important factor preventing new manufacturers from producing NEEM+ homes and existing manufacturers from increasing their NEEM+ production. Manufacturers described a variety of challenges in producing NEEM+ homes, with procuring qualified windows the most

Window Availability
<p>Manufactured home manufacturers seek to use the same types of materials across multiple home types. This allows them to streamline their processes and reduces costs through bulk purchasing. As a result, manufacturers are reluctant to add the new window models needed to meet the NEEM+ specification to their inventory. In addition, many Northwest manufacturers buy windows from a common supplier, which has been unable to mass produce qualified windows and offer them at a competitive price. The manufacturer producing the largest volume of NEEM+ homes takes a different approach, purchasing windows on a per-home basis from more traditional (single family) residential window manufacturers.</p>

significant (see sidebar). Nonetheless, manufacturers suggested they could overcome these challenges if consumer demand for NEEM+ homes was sufficient to motivate them to do so.

⁶ For example, manufacturers noted that it may not be possible to meet the NEEM+ attic insulation requirements in homes with lower roof heights and roof pitches.

⁷ Based on analysis of Oregon Manufactured Home Ownership Document System data (https://aca-oregon.accela.com/OR_MHODS/). New manufactured homes were classified as those sold in 2020 with production year listed as 2019, 2020, or 2021. Similar databases for other NEEA states were not easily available.

“Trust me, from the business side, if enough people were calling and asking for it, we would figure out how to do it.”

-Manufacturer

2.1.2.2 High Demand Strains Manufacturer Capacity

Current market conditions further limit new manufacturers’ interest in developing NEEM+ offerings. Expanding their offerings and providing an option that could help to differentiate their products, like NEEM+, could help manufacturers attract new customers. However, the current demand for manufactured homes is at or above manufacturers’ capacity to produce. Manufacturers reported order backlogs ranging from six months to more than a year. Manufacturers cited a range of reasons for this strong demand, including low vacancy rates and high prices for rental housing, along with low interest rates and more favorable financing for manufactured homes. Some manufacturers, particularly those in Oregon, also reported demand for homes to replace those lost in recent Northern California and Oregon wildfires. These manufacturers, however, noted that these home replacements came on top of already strong demand.

“We have been building [homes to replace those lost to wildfire in] Paradise [CA] for a couple of years now. That’s part of the reason we have gone a little crazy. But even without any of that business, it still would be really strong.”

-Manufacturer

As a result, manufacturers’ primary concerns are around ensuring they have sufficient labor to meet their needs and serve their existing customers, rather than attracting new customers or upselling customers on new features. One manufacturer noted a general effort within their company to consolidate offerings as a way to meet demand more efficiently.

“We’re not looking to expand our offering. We can’t keep up with the demand we have already. We’re basically going in the opposite direction, trying to limit our offering so we can get more efficient and build more houses that way”

-Manufacturer

2.2 DOE/HUD Rulemaking

2.2.1 Background

NEEA and Northwest Energy Works originally conceived of the NEEM+ specification as a way to demonstrate the potential for an above-standard efficiency specification. That specification would gain market share once the U.S. Department of Energy (DOE) and Department of Housing and Urban Development (HUD) updated the code requirements for energy efficiency in manufactured homes to a level approaching the current ENERGY STAR specification. NEEA anticipated that the ENERGY STAR specification would be updated when the new code takes effect to continue to provide a high efficiency option. NEEA lists the lack of an updated specification as a barrier in its logic model (Table 4).

Table 4: DOE/HUD Rulemaking Logic

Barriers		DOE/HUD Rulemaking
Activities		Engage in federal rulemaking.
Outputs		<ul style="list-style-type: none"> • Data from NW programs • Letters of advocacy to DOE and HUD providing data of NW experience and success
MT Outcomes	Short Term	Draft updated HUD code rule is published.
	Medium Term	Updated HUD code goes into effect.
	Long Term	Future HUD code measures are recommended by the Manufactured Housing Consensus Committee (MHCC) to HUD.

2.2.2 Assessment

The lack of an updated energy efficiency code for manufactured homes remains a barrier to increased adoption of NEEM+ homes, although opportunities for the program to act in support of a code change have been limited. Program staff reported that the process of adopting a revised standard was nearly complete in 2016, at the end of the Obama administration.⁸ However, the Trump administration did not advance the standard. NEEA has been monitoring rulemaking activity. NEEA has also been gathering data that could help to support more stringent standards by demonstrating that manufacturers can produce more efficient homes and that there is demand for them in the market.

⁸ HUD has traditionally regulated manufactured housing. The 2007 Energy Independence and Security Act (EISA) required DOE to issue efficiency standards for manufactured homes.

Both program staff and manufacturers noted that, by raising baseline efficiency levels, the incremental cost to upgrade from a standard home to a NEEM+ home would decrease. Program staff also noted that, if the revised standard were close to the current ENERGY STAR specification, NEEM+ would be the primary specification for manufacturers seeking to offer a premium, above-standard efficiency specification. If NEEM+ became the new ENERGY STAR specification, it would further gain from ENERGY STAR's brand recognition.

“Here we are, trying to put an even higher-tiered specification on top of ENERGY STAR’s back, and...that is a much bigger challenge without getting that push from [federal standards].”

-Program Staff

While the Biden administration is more friendly to regulation than the Trump administration, both program staff and manufacturers reported that challenges to adoption of a stringent efficiency standard for manufactured homes remain. Two program staff members anticipated that adopting revised efficiency standards would require a significant amount of renegotiation with industry actors, whose views are likely to have shifted since the revisions proposed during the Obama administration were developed.

Manufacturers were also skeptical that any revised efficiency standards adopted on the federal level would be stringent enough to make a significant impact on homes produced in the Northwest. Both manufacturers and program staff reported that even non-qualified manufactured homes in the Northwest are typically built to more stringent efficiency standards than homes built in other regions. As a result, it may be difficult to gain support for a nationwide code update that would be as stringent as the current ENERGY STAR level.

“I don’t think the HUD code will ever get to a point where even our lowest standard energy home would not meet their requirement, because they are national.”

-Manufacturer

2.3 Unclear Value Proposition (Homebuyers)

2.3.1 Background

The 2019 Manufactured Homes Program Assessment found that an unclear consumer value proposition for NEEM+ homes relative to ENERGY STAR homes, leading to low consumer demand for NEEM+ homes, was a key factor preventing more manufacturers from offering NEEM+. Marketing efforts have become an

increasingly important part of the program as the NEEM+ specification has become established and the DOE/HUD code rulemaking has remained stalled.

Throughout the program, NEEA has provided manufactured home retailers with collateral materials promoting efficient manufactured homes. More recent marketing efforts include consumer-facing marketing campaigns, both through advertisements in community newspapers and through a variety of online channels. NEEA has also worked with Northwest Energy Works to update and enhance branding for the NEEM program and helped Northwest Energy Works improve the user experience on the NEEM website.

Table 5 summarizes NEEA’s logic around overcoming an unclear consumer value proposition through marketing.

Table 5: Value Proposition Logic

Barriers		Unclear Value Proposition
Activities		Marketing
Outputs		<ul style="list-style-type: none"> • Marketing strategy • Marketing materials • Messaging study • Validate durability features of NEEM+
MT Outcomes	Short Term	Homebuyers visiting retailers are provided with clear information on NEEM+ value and opportunity.
	Medium Term	Retailers and other market actors promote NEEM+ value proposition. The NEEM+ website lists four components of the value proposition: energy cost savings, increased comfort, improved resale value, and utility rebates.
	Long Term	Demand for NEEM+ homes increases.

2.3.2 Assessment

This MPER largely supports the finding that low consumer demand was a key factor preventing more manufacturers from offering NEEM+, although retailer and manufacturer interviews suggest that a lack of consumer awareness may be a more significant barrier than an unclear value proposition. Retailers and manufacturers both noted that, while customers may be aware of ENERGY STAR, few are familiar with NEEM or NEEM+ and the benefits of a NEEM+ home over an ENERGY STAR home.

“I will say ‘ENERGY STAR,’ or, ‘it is an ENERGY STAR-NEEM package.’ Most folks don’t know NEEM, they’ll ask ‘who is NEEM?’”

-Retailer

As noted above, NEEA has increased its focus on consumer marketing through the program with an online consumer awareness campaign that has successfully driven traffic to Northwest Energy Works’ website and, from there, to websites of retailers offering NEEM+ homes.⁹ Nonetheless, both program staff and manufacturers reported that retailers were a critical channel in increasing customer awareness of NEEM+. The program has undertaken marketing activities to support retailers’ ability to sell NEEM+ homes.

Interviews with retailers and manufacturers suggest two key approaches that could help increase consumer awareness of NEEM+ and communicate the value proposition: making NEEM+ upgrades more visible and communicating the cost/benefit impact of upgrading to NEEM+.

2.3.2.1 Increasing Visibility of NEEM+

Retailers and manufacturers reported that there are few visible differences inside a model home when comparing a NEEM+ home and an ENERGY STAR home, making it more difficult to draw consumers’ attention to the upgrades and build awareness of the value of NEEM+.¹⁰

“Remember, [homebuyers] can’t see anything, so [the retailer has] to put it on the board and show them what’s in it. There is nothing [homebuyers] really see except that goofy thermostat.”

-Manufacturer

“There is no way to tell Energy Star versus NEEM+ except one distinct item and most don’t notice it, and it happens to be that they have that smart thermostat in the NEEM+.”

-Retailer

⁹ The campaign generated more than 1,000 monthly page views for the NEEM+ website during months when it was active, relative to fewer than 100 monthly page views during months when it was inactive. Approximately 10% of those website visitors clicked a link to visit a retailer website.

¹⁰ One retailer reported, however, that NEEM+ homes are more soundproof than standard homes, a difference that is notable in display homes placed at dealerships that are on major highways.

NEEA provides retailers with marketing collateral materials, including placards and table tents they can place throughout qualified display homes pointing out the various features and benefits of NEEM+. Retailers suggested additional opportunities to visually demonstrate the differences between NEEM+ and standard homes, noting that they had used similar displays to help customers understand technical details in other applications. For example, one retailer reported using two cross-section window displays to highlight the differences in window thickness between two home models, rather than talking about window u-factors. Another retailer described a cutaway wall display with a plexiglass cover that illustrated the difference in insulation thickness corresponding to different R-values, as well as differences between 2x4 and 2x6 construction. A third retailer suggested a large, cutaway diagram showing differences between a NEEM+ home and a standard home would be helpful.

“Well, it is easy to sell those lifetime Cascade brand windows. I have a Kinro [window] cross-section and a Cascade [window] cross-section, which is thicker than Kinro, and it just sells itself. That is the type of tangibles we are looking for something they can see, touch, and feel.”

-Retailer

2.3.2.2 Communicating Energy Cost Savings Benefits

Both manufacturers and retailers reported that energy cost savings estimates would be helpful in selling NEEM+ homes. The interviewed manufacturers were not aware of existing materials that would help estimate energy cost savings related to NEEM+, and some retailers reported difficulty in finding estimates or examples to provide customers.¹¹

“That cost of ownership will be a budgetary driving factor to get people to choose investing upfront. Dollars are the most effective motivator.”

-Manufacturer

¹¹ The NEEM website includes an example cost comparison showing upgrade costs and savings for an ENERGY STAR home and a NEEM+ home relative to a code-built home (<https://www.neemhomes.com/smart-investment>). None of the interviewed retailers or manufacturers mentioned this resource in open-ended responses.

“We have to create value in that cost: how they can save throughout the year on their energy in a way that is easy for them to understand. I can tell them all day long the R-factors and so on, but what do they save?”

-Retailer

Retailers noted that cost savings were most relevant for homebuyers in colder climates. Similarly, a manufacturer noted that one of their retailers that sells a higher volume of NEEM+ homes often sells to customers siting homes in snowy environments.

Finally, one retailer noted that a NEEM+ upgrade differed from other home upgrades that customers might consider in that it would be considerably more difficult and costly to upgrade efficiency once the home was built. Homeowners can install cosmetic upgrades, like granite countertops or tile backsplashes, more easily than efficiency upgrades after the home is built.

2.4 Knowledge/Capability (Manufacturers, Retailers, Appraisers)

2.4.1 Background

An important aspect of the program is the outreach and support that Northwest Energy Works provides to retailers and manufacturers to inform them about NEEM+ and help them effectively build and sell efficient homes (Table 6). Northwest Energy Works staff periodically visit manufacturers and retailers throughout the region to inform them about the program and are available as needed to respond to retailers’ and manufacturers’ questions. Northwest Energy Works staff also help manufacturers train their staff in the skills and techniques needed to build NEEM+ homes.

Table 6: Knowledge/Capability Logic

Barriers	Knowledge/Capability (Manufacturers, Retailers, Appraisers)
Activities	Provide market actors with support to build expertise in building and selling NEEM+.
Outputs	<ul style="list-style-type: none"> • NEEM+ market strategy • Factory training and materials • Retailer training and materials • Appraisal support materials

Barriers		Knowledge/Capability (Manufacturers, Retailers, Appraisers)
MT Outcomes	Short Term	Manufacturers build NEEM+ test homes and conduct factory trainings.
	Medium Term	Manufacturers, retailers, and appraisers recognize NEEM+.
	Long Term	Retailers and financiers promote/recognize value of NEEM+ homes.

2.4.2 Assessment

This MPER assessed knowledge and capability of selling NEEM+ homes among retailers and manufacturers.

2.4.2.1 Manufacturers are able to build to NEEM+ specifications and appreciate program support

While it increases labor requirements, building NEEM+ homes does not require manufacturers to develop significant new skills. The interviewed manufacturers reported that meeting the NEEM+ specification requires them to alter some of their typical building practices, particularly around the building shell. Manufacturers stated that these changes in practices generally did not require staff to learn significant new skills. Nonetheless, two participating manufacturers reported that building NEEM+ homes requires additional labor; staff spend more time ensuring the building envelope is properly sealed. In addition, since these manufacturers do not build enough NEEM+ homes for the practices to become routine, supervisors spend additional time ensuring that the homes are built correctly, to the specifications.

Northwest Energy Works provides manufacturers with a wide variety of training and technical support, often on an informal, as-needed basis. Manufacturers described Northwest Energy Works staff as highly responsive to their questions and very knowledgeable. Northwest Energy Works staff reported visiting each of the nine manufacturers in the region that produce either ENERGY STAR or NEEM+ homes at least four times per year, with most manufacturers receiving six to eight visits per year. During each visit, Northwest Energy Works staff conduct informal training with staff on the production line, covering a range of topics related to installing energy efficiency measures. Northwest Energy Works staff also reported frequent email contact with manufacturers, estimating they have at least 50 email exchanges with each participating manufacturer per year to answer questions or share advice.

“[Northwest Energy Works] has been great to give us the guidance necessary to make sure we don’t build anything out of compliance.”

-Manufacturer

“It’s a true partnership. [A Northwest Energy Works staff member] is there to help and do anything he can, and he is passionate about what he does.”

-Manufacturer

Manufacturers reported that Northwest Energy Works staff will work with their new staff members to ensure they install efficiency measures correctly. One manufacturer noted that there is currently a pent-up demand for training as the building products sales representatives that typically provide training have stopped coming to factories due to the pandemic.

Finally, manufacturers appreciated the support that Northwest Energy Works provides to other market actors. One manufacturer noted that Northwest Energy Works had written letters and worked with code officials in municipalities with stringent code requirements to assure them that NEEM+ homes would meet those requirements. Manufacturers also recognized the benefit of Northwest Energy Works’ outreach to retailers.

“[Northwest Energy Works outreach to municipalities and retailers] can free us up to sell homes and help sell the energy efficiency of the home, it ensures that message gets spread, and from an expert in the field.”

-Manufacturer

MPI: Are NW NEEM program manufacturers able to build to the NEEM+ spec?

Yes. Building to the NEEM+ spec requires changes in practices, but staff do not need significant new skills. Manufacturers have been able to overcome challenges around building product availability.

MPI: Are factory trainings in NEEM+ construction held and are test homes built?

Yes. Northwest Energy Works provides a variety of technical support, including staff training, typically in an informal, on-the-job setting. Northwest Energy Works staff visit each participating manufacturer four to eight times per year to provide training in person, in addition to frequent email exchanges.

2.4.2.2 Program support has helped increase retailer awareness

Three-fourths of the interviewed retailers (15 of 20) were aware of NEEM+, although three of the five that were not aware were among the higher-volume

retailers.¹² The retailers that were not aware of NEEM+ did not understand the distinction between NEEM+ and ENERGY STAR, although they were receptive to additional information clarifying the differences.

Manufacturers emphasized the importance of training retailers in driving NEEM+ uptake. Manufacturers noted that retailers are the actors interacting directly with end-users and stated that retailers must be both motivated to promote NEEM+ and confident in its benefits in order to sell it effectively.

“We can talk as much as we want, but the real selling has to be done at the retail level because they are talking to the end-user, the customer...they have to feel good that, if I’m selling this, here’s why it’s worth the money.”
-Manufacturer

Manufacturers suggested that retailer incentives could be an effective way to promote NEEM+.

“You’ve got to drive [retail salespeople] to do things. But if you want [them] to really understand your product and programs, incentivize them a little bit.”
-Manufacturer

Consistent with this suggestion, NEEA undertook a sales challenge at the end of 2019 to build retailer awareness. During the challenge, NEEA offered escalating prizes to salespeople based on the number of NEEM+ homes they sold. NEEA staff reported that this challenge helped to make retailers more familiar with NEEM+ and spread awareness of NEEM+ among a wider range of retailers. While multiple staff members stated that the sales challenge had succeeded in building retailer awareness of NEEM+, one noted that many of the salespeople who received the largest rewards were already committed to selling NEEM+.

The interviewed retailers that participated in the sales challenge confirmed that it helped to increase their knowledge of NEEM+ homes

MPI: Have manufactured homes retailers increased their sales of NEEM+ homes?
Yes. NEEM+ sales in the Northwest increased from 42 homes in 2019 to 73 homes in 2020.

¹² Apex defined high-volume retailers as those with annual sales listed in our Mergent Intellect industry database export of greater than \$600,000. Nine of the twenty retailers interviewed qualified as high-volume retailers under this definition.

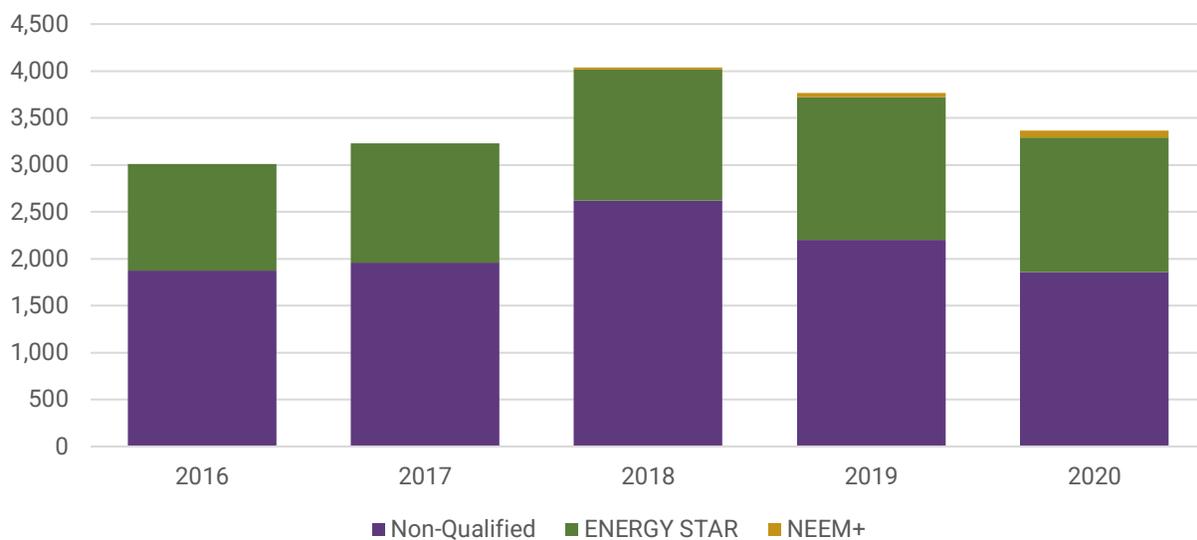
and ability to sell them. One retailer noted that sales staff often have competitive personalities and appreciated the feedback the challenge provided, along with the marketing collateral materials the program provided. Another noted that, while sales staff respond to cash incentives, other, smaller items can also be effective.

“Salespeople, if they know they will get a stipend, they are happy to push [NEEM+]...They also had little gifts, just to get started...All of my people on my staff got all that stuff, they were going for it.”

-Retailer

The effects of the sales challenge and other efforts to build retailer awareness of NEEM+ homes are reflected in an increase in uptake for NEEM+ homes between 2018 and 2020. The first NEEM+ home sales occurred in 2018, with 28 NEEM+ homes sold in the Northwest that year. In 2019, regional NEEM+ sales increased to 42 homes, and sales jumped to 73 homes, accounting for approximately 2% of all regional manufactured home sales, in 2020. Figure 2 shows manufactured home sales in the Northwest by efficiency tier between 2016 and 2020.

Figure 2: Northwest Manufactured Home Sales by Efficiency Tier, 2016–2020



Data provided by Northwest Energy Works

NEEA also received feedback from retailers that manufactured home buyers rarely order alterations to the display homes manufacturers keep on their lots. As a result, NEEA began offering incentives to encourage retailers to use NEEM+ homes as their display homes. Manufacturers and retailers provided little direct feedback on this

approach, although multiple manufacturers cited certain retailers’ decisions to include NEEM+ display homes as an example of their commitment to efficiency and NEEM+. This suggests that greater retailer uptake of NEEM+ display homes could send a message to manufacturers that demand could increase.

2.5 Incremental Cost

2.5.1 Background

Manufactured homes are often affordable housing for customers who may not be able to purchase other types of homes. As such, some manufactured home buyers are sensitive to any type of price increase. In addition, competition between manufactured home retailers and manufacturers can be intense, further motivating some to avoid any actions that might increase costs.

NEEA developed an upstream incentive system, providing manufacturers with an incentive for producing NEEM+ homes, which manufacturers typically pass through to retailers and home buyers. NEEA also works with Northwest utilities that offer customer-facing rebates for NEEM+ homes. Table 7 summarizes NEEA’s logic around overcoming incremental cost barriers.

Table 7: Incremental Cost Logic

Barriers		Higher First Cost
Activities		Establish a regional upstream incentive system for NEEM+.
Outputs		<ul style="list-style-type: none"> Regional incentive strategy (upstream and downstream) Appraisal training and value validation materials Geotagging NEEM homes Post HUD code upgrade strategy to keep utilities involved
MT Outcomes	Short Term	Homebuyers can purchase a NEEM+ home for small incremental cost over HUD code performance level.
	Medium Term	Incremental cost decreases with economies of scale and design improvements.
	Long Term	Retailers stock NEEM+ homes on lots. Retailers and financiers promote/recognize value of NEEM+ homes.

2.5.2 Assessment

2.5.2.1 Incremental cost is less of a concern for buyers considering NEEM+

Retailers and manufacturers suggested that the incremental cost to the homebuyer for a NEEM+ home typically ranges from \$2,000 to \$5,000, with the cost increasing with home size.¹³ The average purchase price of a new manufactured home sold in Oregon in 2020 was \$105,540, suggesting that incremental costs range from approximately 2% to 5% of the total, before any utility incentives.¹⁴ One manufacturer noted that this increase in price results in a relatively small increase in a typical homebuyer’s mortgage payment.

NEEM+ homes are a high-end, niche product in the manufactured home market. Offering NEEM+ homes allows manufacturers and retailers to differentiate themselves from their competition as providing the highest-quality product.

MPI: Is the incented incremental cost of NEEM+ less than 5% greater than the cost of comparable NW MH?

Yes. The incremental cost before incentives ranges from 2% to 5% of the total cost of the home. Incentives vary but, on average, would reduce the incremental cost to roughly 0.5% to 2.5% of the total cost of the home.

“We pride ourselves in doing something better than the other guys. NEEM+ is better than ENERGY STAR. It differentiates you between the old homes of the past and people who are building your basic shade and shelter.”

-Manufacturer

“Our dealers are a little different than some of the other retailers out there.... They want to show customers the value [in NEEM+ homes], it differentiates them from the competition.”

-Manufacturer

Manufacturers acknowledged that, as affordable housing, some homebuyers are resistant to any increase in cost of a manufactured home. However, manufacturers reported that the homebuyers interested in NEEM+ are typically less price sensitive.

¹³ One manufacturer’s option catalog lists the cost of upgrading to NEEM+ as \$56 per linear foot for single-wide homes, \$72 per linear foot for double-wide homes, and a flat \$4,995 for triple-wide homes.

¹⁴ Based on sales of 680 homes that did not include land. Single-wide homes (n=125) averaged \$64,189, double-wide homes (n=530) averaged \$112,463, and triple-wide homes (n=23) averaged \$170,753.

According to manufacturers, the types of buyers interested in NEEM+ may be comparing the cost of a manufactured home to that of a site-built home.

“With site-built housing pricing being so much higher than what we produce in factory-built homes, I don’t think that the pricing friction to do a NEEM+ home is a dealbreaker for most consumers.”

-Manufacturer

Manufacturers also noted a general trend of increasing prices for manufactured homes. Manufacturers cited two factors as driving this increase in costs. First, manufacturers are designing homes to resemble site-built homes more closely and to incorporate more amenities and higher-end materials. Second, supply disruptions due to the COVID-19 pandemic have increased the costs of building materials. Manufacturers reported that these trends in increasing costs have not driven away buyers; instead, demand remains very high.

One manufacturer described an experience that further suggests price sensitivity may play a limited role in uptake of efficient manufactured homes. This manufacturer, which does not offer NEEM+ homes, reported cutting the price of their ENERGY STAR homes but seeing limited increase in demand, suggesting that other barriers may be more significant than the incremental cost.

2.5.2.2 Downstream incentives remain an effective sales tool

Utilities in the Northwest offer three types of incentives for the purchase of ENERGY STAR and NEEM+ manufactured homes (Figure 3). All of the utilities that offer incentives to support NEEM+ homes also offer incentives for ENERGY STAR homes.

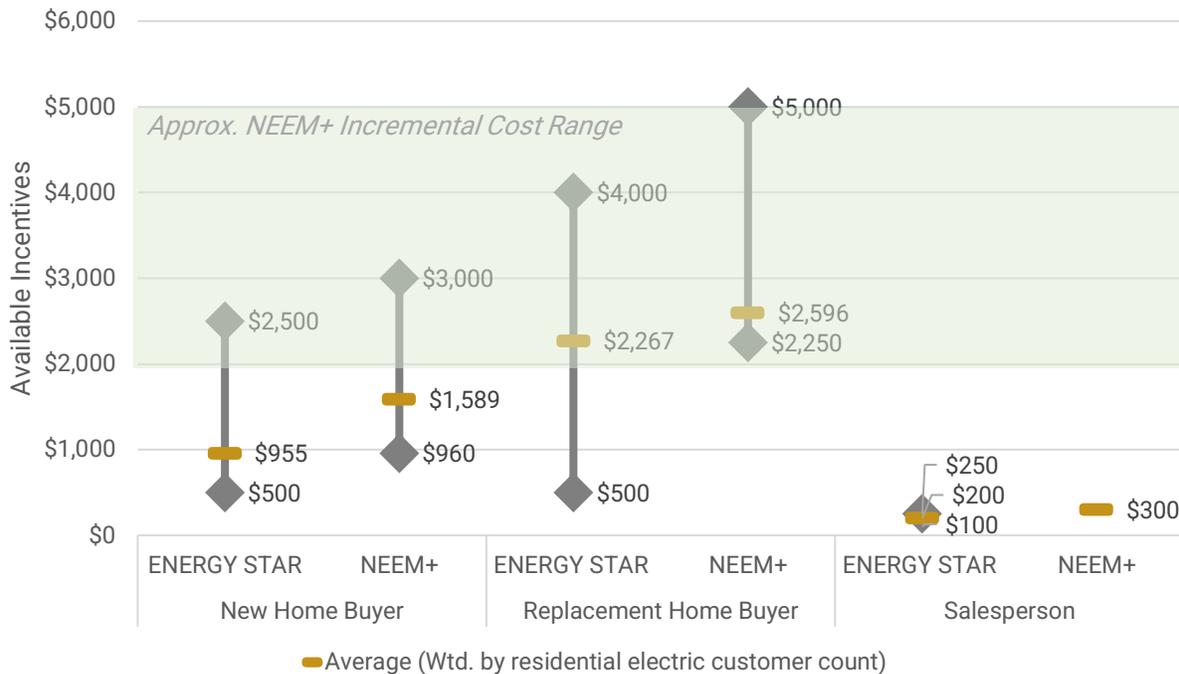
Figure 3: Utility Incentives for Efficient Manufactured Homes

New Homebuyer Incentives 	Replacement Homebuyer Incentives 	Salesperson Incentives 
Available to:		
Any homebuyer purchasing a new manufactured home meeting efficiency qualifications	Homebuyers replacing an older manufactured home with a new model, planning to decommission the existing home	Manufactured home dealer sales staff selling manufactured homes to customers in participating utility service areas
Incentives for ENERGY STAR homes offered by:		
113	52	32
utilities, representing:		
76%	20%	33%
of Northwest electric customers.		
Incentives for NEEM+ homes offered by:		
82	49	26
utilities, representing:		
52%	20%	17%
of Northwest electric customers.		

Source: Northwest Energy Works incentive tracking data, as of March 21, 2021.

The incentives that utilities offer for NEEM+ homes cover a substantial portion of the incremental cost, averaging more than \$1,500 for a new homebuyer and more than \$2,500 for a manufactured home replacement (Figure 4).

Figure 4: Northwest Utility Manufactured Home Incentive Amounts



While manufacturers suggested that incremental costs may not be a primary barrier to uptake of NEEM+ homes, both manufacturers and retailers reported that homebuyer incentives were nonetheless valuable as a sales tool. Manufacturers described return on investment, in terms of energy cost savings, as an effective way to promote efficient manufactured homes and noted that incentives support that message. One manufacturer also reported notably greater uptake of efficient homes in areas with active rebate programs.

“I think the people shopping for our homes and others are probably going to think along those same lines: Is the payout going to be adequate? If there is somebody giving me money to do it, or some way I can get [the incremental cost] close to nothing, they would be all for it.”

-Manufacturer

Retailers corroborated manufacturers’ reports that downstream incentives are an effective sales tool. Retailers reported they were more likely to address NEEM+ in the sales conversation when incentives were available and customers were more likely to select the NEEM+ option.

“It is a lot easier to sell to people [NEEM+] when they are on the fence. If you can tell them, ‘well, it is this price, but you get a \$1,000 rebate back, so you are only paying this for a much more energy efficient home.’”

-Retailer

Retailers noted, however, that it can be difficult to track the downstream rebate offerings available to customers in different areas. Some retailers kept tables tracking rebates available in different jurisdictions, and others expressed a desire for similar information. As the NEEM website includes a searchable database of regional utility rebates, there may be an opportunity to better inform manufactured home retailers about its availability.¹⁵

“What I would like is maybe literature on [rebates]. Unless you go to your electric company, you may not know exactly what those rebates will look like or what you expect to get back.”

-Retailer

One program staff member also noted that the structure of the homebuying process can pose a barrier to downstream rebates. While the salesperson may promote a rebate, their relationship with the customer ends once the contract to purchase the home is signed. A separate department within the retail organization works with the customer through the process of having the home built and sited, and they may not be aware of the rebate process.

2.5.2.3 Upstream incentives motivate initial manufacturer participation

Beginning in 2020, NEEA offers manufacturers an incentive of \$500 for each NEEM+ home they produce, reduced from the prior incentive of \$1,000 per home. Manufacturers reported passing these incentives through to retailers and consumers as a reduction in the cost of the NEEM+ option. Both manufacturers and program staff described these

Incentive Timing
Manufacturers and retailers commit to a home’s price at the time the customer places an order. Given current production backlogs of six months to a year, one manufacturer noted that changes in incentive offerings could leave manufacturers responsible for incentives that were available when the order was placed but are no longer available when the home is built.

¹⁵ <https://www.neemhomes.com/utility-rebates>

incentives as important in motivating initial manufacturer participation. One manufacturer stated that the availability of the incentive was a key factor in their willingness to overcome challenges around meeting the NEEM+ specification's building envelope requirements.

"I think [the incentive] was extremely important, especially when detailing NEEM+ added considerable difficulty to the exterior building envelope. [The incentive] encouraged the facility to take on that challenge."

-Manufacturer

3. Sustainability of NEEM+ in Manufactured Homes Market

A key question NEEA sought to address with this MPER was the extent to which NEEM+ homes would be self-sustaining in the market without NEEA's continued support. If NEEM+ homes were not yet self-sustaining in the market, NEEA sought to understand what additional changes in the market were needed and how much effort would be required to make those changes. Apex explored these questions in interviews with program staff, manufacturers, and retailers.

Manufacturer interviews suggest that NEEM+ homes would remain available, at least in the short term, without NEEA's support, although market share would likely decline. All the manufacturers currently building NEEM+ homes reported they would continue to do so without NEEA's support, as long as sufficient demand for NEEM+ homes remained. One manufacturer stated that, while they would offer the option for customers that requested it or for homes sited in jurisdictions that hold manufactured housing to the same building code requirements as site-built homes, they would not actively promote it. Manufacturers reported they would discontinue their NEEM+ offerings if too few customers asked for the option to justify maintaining the internal capability to build to NEEM+.

"I think it would be an only when needed item, instead of something salespeople would sell to all consumers, regardless of whether it's needed or not."

-Manufacturer

“Until I’m not selling it and people are not promoting it, it will be in my world. But if I don’t have anything to promote and people quit asking for it...then why am I going to offer it?”

-Manufacturer

New manufacturers would be unlikely to develop NEEM+ offerings without NEEA’s support. One participating manufacturer argued that, without incentives, there would be little motivation for new manufacturers to join the program, particularly given the current high demand for homes. This is consistent with participating manufacturers’ reports that the incentives were important in their decisions to begin offering NEEM+ homes.

“I don’t think there is enough horsepower with little old me and whoever else is doing it to make the program move. I’m not trying to get free money for incentives, but you’ve got to incentivize the thing to make it work out there.”

-Manufacturer

Similar to manufacturers, retailers currently offering NEEM+ reported they would continue to offer it as a way to differentiate themselves from their competition by providing the highest-quality homes, but saw NEEM+ as a deluxe offering rather than something appealing to the majority of buyers.

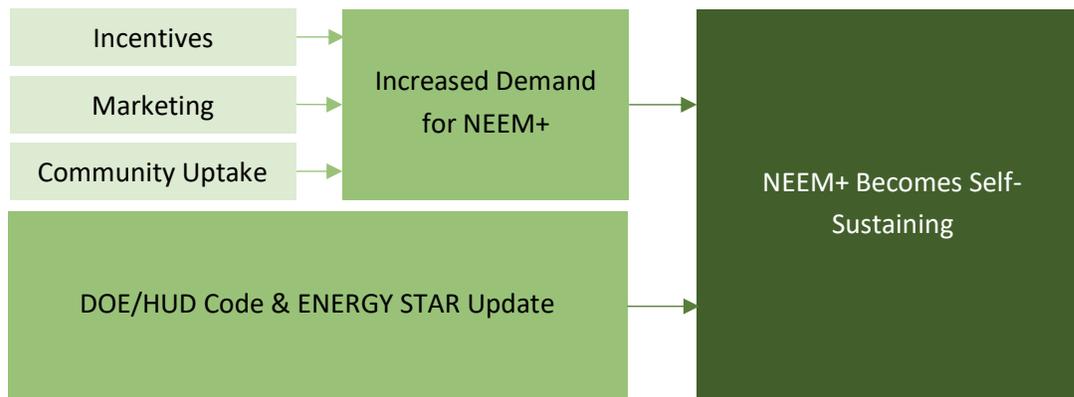
“Part of that high end process was to include NEEM+ in [our product offerings].”

-Retailer

Energy efficiency program administrators in the Northwest would also likely continue to offer customer incentives for NEEM+ homes if NEEA exited the market, although one large, interviewed program administrator noted that they do not have the resources to heavily promote NEEM+ homes without NEEA’s support. Another program administrator noted that there is value in the regional coordination that NEEA brings to NEEM+.

As illustrated in Figure 5, interview findings suggest two ways NEEM+ could become self-sustaining in the market: a significant increase in demand, or adoption of an updated energy efficiency code for manufactured homes.

Figure 5: Conditions for NEEM+ to Become Self-Sustaining



Manufacturers described three drivers that could increase demand for NEEM+ homes:

- › **Incentives:** Two manufacturers suggested that a large-scale incentive effort targeting home buyers, retailers, or both could help to drive demand, citing earlier efforts to promote ENERGY STAR homes in the Northwest.
- › **Marketing:** All three participating manufacturers described a need to increase customer awareness of NEEM+ and the benefits of adding the option to their homes, as well as the importance of educating retail salespeople about NEEM+.
- › **Manufactured home communities:** In some cases, developers purchase large numbers of homes for manufactured home communities. One manufacturer noted a community with 400 spaces being built in Coos Bay, Oregon, for example. This manufacturer noted that an order of that size specifying NEEM+ could have a significant impact in building manufacturers' capacity to build NEEM+ homes and awareness of NEEM+ throughout the industry. Other manufacturers noted that community developers generally sought lower-priced homes.¹⁶

Program staff acknowledged that an increase in demand would help to solidify NEEM+ in the market but suggested that an updated DOE/HUD energy code for manufactured homes could provide an alternate path to greater adoption. In that scenario, as long as there was sufficient NEEM+ availability and uptake to demonstrate the viability of the specification, NEEM+ could become the standard for above-code manufactured homes.

¹⁶ One exception is the Confederated Tribes of Umatilla's Lucky 7 Project. This project will include 38 homes, all of which will be NEEM+.

4. Baseline Review

This section summarizes the findings of Apex’s review of NEEA’s approach and assumptions to estimate a naturally occurring baseline market share for efficient manufactured homes against which it can assess the program’s progress. A more detailed baseline review is included in Appendix B.

NEEA chose to focus the baseline review for this MPER on the naturally occurring baseline market share of homes meeting the NEEM 1.1 specification, which is also the ENERGY STAR specification. Prior research reviewed NEEA’s baseline market share estimates for NEEM+ homes. NEEA anticipates that its efforts to promote NEEM+ homes could increase uptake of ENERGY STAR homes for three reasons; findings for each are summarized in Table 8.

Table 8: Rationale for Program Influence on ENERGY STAR Home Uptake

NEEA Rationale	Apex Finding
<p>NEEA’s marketing efforts promoting uptake of NEEM+ have drawn attention to manufactured home efficiency generally, increasing uptake of ENERGY STAR homes.</p>	<p>Data related to NEEA’s marketing campaigns support this assertion. Tracking metrics indicate that NEEA’s online marketing campaign drove traffic to the NEEM+ website and, from there, led customers to retailers’ websites. ENERGY STAR home sales appear to have increased in the months when the campaign was active, with sales up 25% in Q2 2019 and 16% in Q3 2019 relative to the previous year, despite an overall year-over-year decline in manufactured home sales.</p>
<p>Inserting NEEM+ into the market positions ENERGY STAR homes as a middle option, making them more attractive to customers than they would be if choices were limited to ENERGY STAR homes and code-built homes.</p>	<p>This logic is consistent with the concept of “compromise effects,” which research in business and behavioral economics supports.¹⁷ This research finds that consumers are more likely to select an option that is presented as the middle choice between two alternatives because it is difficult to assess value independently. Instead, people make comparisons to the other options available to assess the value of a particular choice.¹⁸</p>

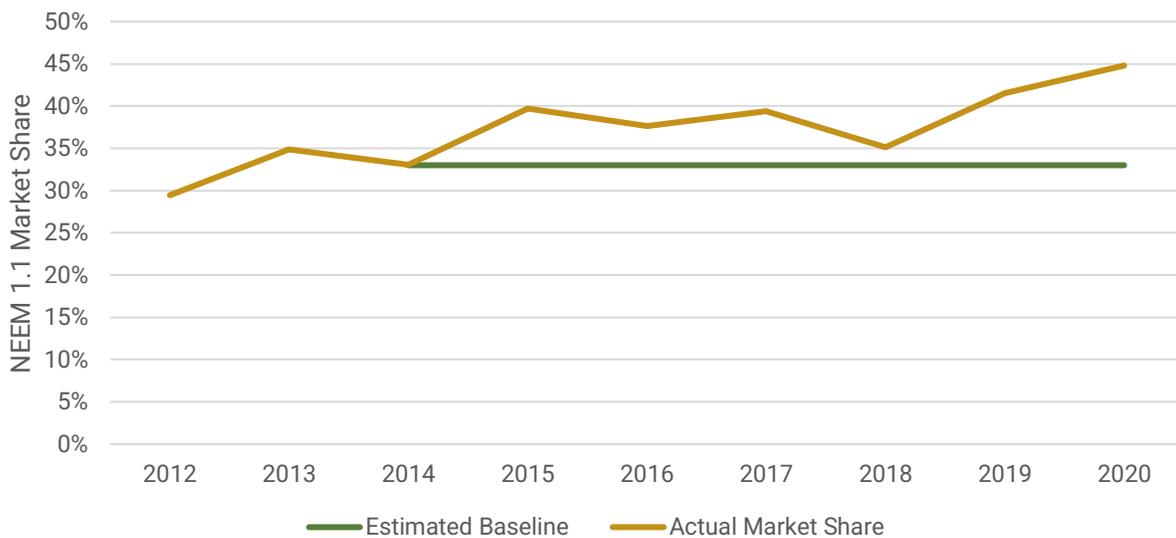
¹⁷ Itamar Simonson, “Choice Based on Reasons: The Case of Attraction and Compromise Effects,” *Journal of Consumer Research* 16, no. 2 (September 1989): 158–74; Ran Kivetz, Oded Netzer, and V Srinivasan, “Alternative Models for Capturing the Compromise Effect,” *Journal of Marketing Research* 41, no. 3 (August 2004): 237–57.

¹⁸ Dan Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions*, First (New York: Harper Collins, 2008).

NEEA Rationale	Apex Finding
<p>NEEA will have an opportunity to impact a revised DOE/HUD energy code for manufactured homes, bringing code closer to the current ENERGY STAR level and increasing market share.</p>	<p>It is reasonable to assume that NEEA will be able to use adoption of ENERGY STAR and NEEM+ homes to demonstrate the potential for more stringent energy efficiency codes. Unlike the previous rationale, which currently influences the market, this one will not take effect until a new code is adopted. Also, as noted above, interviewed manufacturers were skeptical that a code adopted at a national level would have a significant impact on most homes built in the Northwest, given the region’s already higher building practices. Nonetheless, even a smaller increase in efficiency standards would reduce the incremental difference between a code-built home and an ENERGY STAR home, likely increasing market share.</p>

NEEA assumes a flat naturally-occurring baseline market share of ENERGY STAR manufactured homes of 33%, which was the market share in 2014, the year before the initiative began. Figure 6 illustrates the actual market share of ENERGY STAR homes as well as NEEA’s baseline estimate.

Figure 6: ENERGY STAR (NEEM 1.1) Market Share 2012–2020



Note: Actual market share listed includes all homes that qualify for NEEM 1.1, including those that also qualify for NEEM+. NEEM+ market share was zero prior to 2018, 0.7% in 2018, 1.1% in 2019, and 3.7% in 2020. Source: Data provided by Northwest Energy Works to Apex.

Apex evaluated two aspects of NEEA’s baseline estimates, the shape of the curve and the estimated baseline value. Table 9 describes these elements and Apex’s assessment.

Table 9: Baseline Curve Components

Baseline Curve Component		Apex Assessment
Shape of Curve	NEEA assumes a flat baseline; naturally occurring market share does not change over time.	Apex investigated alternate baseline approaches but determined that they did not predict market share more accurately than the flat baseline NEEA currently uses. The decline in market share between 2015 and 2018 in particular is difficult to account for in a baseline curve. State-level market shares also did not show consistent trends.
Baseline Values	NEEA estimates a baseline level of 33%, based on market share in 2014, the year before the program began.	Apex recommends that NEEA begin claiming net market effects from NEEM 1.1 homes in 2019. The elements at the root of NEEA’s rationale for claiming savings became more prominent beginning in 2019. Earlier program activities focused on developing the specification and engaging manufacturers. Thus, 2018 market share (35%), or a multi-year average leading up to 2018, may be a more appropriate baseline market share estimate. ¹⁹

5. Conclusions & Recommendations

Apex draws the following conclusions and recommendations from this research:

Conclusion 1: Continued program support is necessary to establish NEEM+ in the manufactured homes market. While current manufacturers would continue to offer NEEM+ homes in the short term without program support, manufacturers and most retailers would not actively promote them and NEEM+ market share would decline. Eventually, market share declines would reach a level at which manufacturers would discontinue their NEEM+ offerings. Adoption of a new, stringent DOE/HUD energy code for manufactured homes and an updated ENERGY STAR specification to the NEEM+ level would make market conditions more favorable for NEEM+. Rather than a premium option, NEEM+ would become the primary specification for above-code homes, and an updated ENERGY STAR specification would eliminate retailers’ and homebuyers’ confusion between the NEEM+ and ENERGY STAR brands. Without program support, however, NEEM+ may fade from the market before a new DOE/HUD energy code takes effect.

¹⁹ NEEA engaged with Northwest Energy Works prior to the launch of the Manufactured Homes program in 2016. This engagement was outside the scope of this MPER. Thus, our baseline review did not account for any prior engagement in the manufactured homes market.

- › **Recommendation 1: NEEA should continue to support the manufactured homes market to the extent needed to maintain NEEM+ availability until a standard update and ENERGY STAR specification revision occur.** Given the level of effort needed to build retailer and homebuyer awareness and create demand, and the challenges the current market environment poses, it may not be practical for NEEA to establish NEEM+ as a self-sustaining brand prior to the adoption of an updated DOE/HUD standard. However, maintaining NEEM+ availability in the market at its current level or higher will be important as NEEA works to ensure the new standard and updated specification are stringent enough to push the market. NEEA may be able to maintain NEEM+ at something close to its current level by continuing manufacturer incentives, retailer support, and consumer marketing in a limited capacity.²⁰

Conclusion 2: Utility incentives can play an important role in increasing NEEM+ uptake. Incentives have the potential to build the type of retailer awareness and customer demand that manufacturers and retailers reported were necessary to increase the prevalence of NEEM+. Both manufacturers and retailers reported that the types of incentives offered by utilities to homebuyers for purchasing NEEM+ homes are an effective sales tool. A smaller number of utilities also offer incentives to salespeople for sales of NEEM+ homes, another tactic that manufacturers suggested could be effective in increasing uptake. Retailers' positive response to NEEA's sales challenge further supports the potential for retailer incentives. The complexity of the manufactured homebuying process and inconsistency of incentive offerings across the utility territories a retailer serves are barriers to utility incentive uptake.

- › **Recommendation 2: NEEA should work to coordinate utility incentive efforts across the Northwest.** Many retailers serve customers across a range of utility territories, and tools like the Rebate Finder on the NEEM website could help them identify the offerings available to individual customers. NEEA should continue to provide and seek opportunities to expand these tools. It is also important for NEEA to ensure retailers are aware these tools are available.

Conclusion 3: Given the current high demand for manufactured homes, retailers and manufacturers are less likely to seek out new offerings, like NEEM+. A key benefit of offering NEEM+ homes for retailers and manufacturers is the opportunity to differentiate themselves from their competitors by demonstrating a focus on quality. Retailers and manufacturers both also described NEEM+ as a potentially

²⁰ For example, NEEA could set limited annual incentive caps for each manufacturer, a strategy that program staff reported considering.

compelling feature to home buyers, offering the potential for energy cost savings for a relatively small increase in the monthly mortgage payment. Despite these benefits, retailers and manufacturers may be unlikely to seek out information on NEEM+ in the current market conditions. Rather than seeking to attract new customers, retailers are focused on meeting existing demand.

- › **Recommendation 3: NEEA should proactively provide retailers and manufacturers with existing tools and information on NEEM+ cost savings and consider expanding those resources.** The information on the NEEM+ website addresses many of the points retailers and manufacturers raised about cost savings, including a comparison of monthly cost savings relative to the incremental increase in a homebuyer's mortgage payment from adding the NEEM+ option. NEEA could expand on this resource with a tool that would allow retailers to generate customized savings estimates for particular customers based on inputs like the climate where the home will be located, the fuels the home will use and their costs, and the customer's mortgage rate. Program staff should proactively provide retailers with these tools, rather than simply posting them for retailers to access.

Conclusion 4: Manufactured home communities' adoption of NEEM+ could significantly boost demand for qualified homes, leading to greater market acceptance, and better positioning NEEM+ for adoption as an ENERGY STAR specification. Manufactured home communities purchase homes in high volumes. Filling an order for tens or hundreds of homes for a manufactured home community would require manufacturers to develop and solidify their NEEM+ production capacity. An increase in demand for NEEM+ homes could also lead additional manufacturers to develop NEEM+ offerings in an effort to remain competitive. This increased market capacity to produce NEEM+ homes would help to justify adoption of NEEM+ as an ENERGY STAR specification.

- › **Recommendation 4: NEEA should investigate market intervention opportunities to encourage community developers to adopt NEEM+ homes.** Manufactured home communities placing large orders for NEEM+ homes could significantly increase NEEM+ production capacity and advance NEEM+ toward becoming a self-sustaining offering in the market. As a result, it would be worthwhile for NEEA to begin developing relationships with manufactured-home community developers and assess what opportunities exist to encourage them to specify NEEM+ homes.

Appendix A: Program Logic Model Review

Figure 7 shows NEEA’s current logic model for the Manufactured Homes program, as of this MPER.

Figure 7: Current Manufactured Homes Program Logic Model

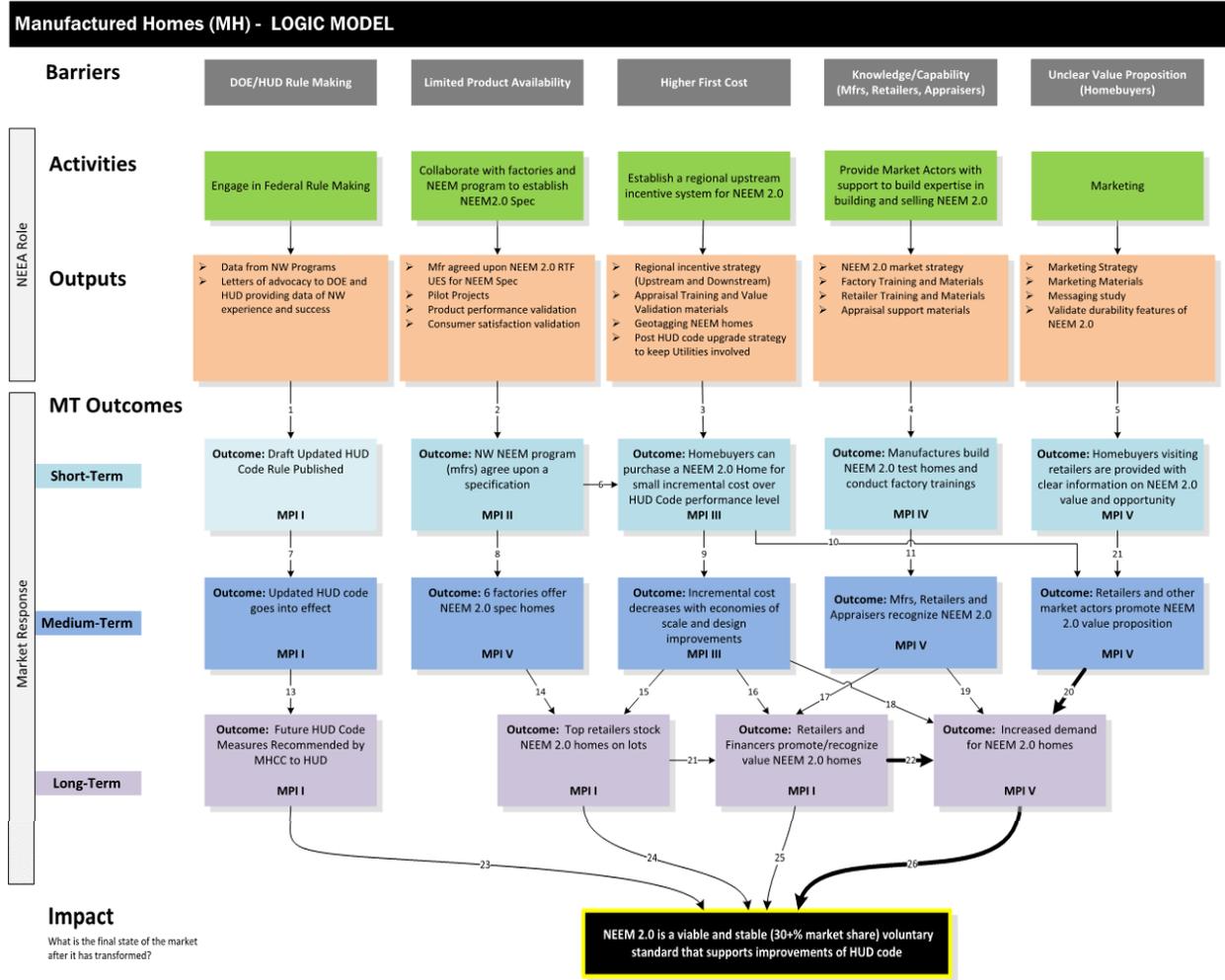


Table 10 presents detailed recommendations for ways to update the logic model to better reflect program activities and market characteristics, based on the findings from this MPER.

Table 10: Logic Model Review Recommendations

Logic Model Element	Recommendation	Rationale
Barriers		
DOE/HUD Rulemaking	Rephrase to “Outdated DOE/HUD Energy Code”.	Clarifies that the barrier is the lack of a code update.
Unclear Value Proposition (Homebuyers)	Change to “Lack of Homebuyer Understanding of NEEM+ Value Proposition”.	Findings from this MPER suggest lack of homebuyer awareness is the primary barrier. Retailers and manufacturers did not describe significant challenges with customers aware of NEEM+ not finding the offer compelling.
Activities		
Engage in Federal Rule Making	Change to “Monitor Federal Rule Making and Engage When Opportunity Arises”.	NEEA has not been directly engaged in the rulemaking in recent years, as the process has not advanced. However, NEEA has been monitoring the rulemaking process and gathering market data to support a more stringent code.
Collaborate with factories and NEEM program to establish NEEM 2.0 (NEEM+) Spec	Change to “Collaborate with industry to establish NEEM+ specification & recruit manufacturers to build NEEM+ homes”.	This activity leads to a medium-term outcome of factories offering NEEM+ homes. Recruiting manufacturers, more than developing the specification, drives that outcome. Manufacturer recruiting is also a more prominent activity now that the specification is established.
Outputs		
Market Actor Support Outputs	Add “Retailer display home incentives”.	The display home incentive is a relatively new program offering to support retailers’ ability to sell NEEM+ homes. Program staff viewed it as a promising offering and planned to continue providing it.

Logic Model Element	Recommendation	Rationale
Marketing Outputs	Add "Online advertising" and "Print advertising".	These consumer marketing activities are an important part of the program's strategy; including them in the logic model could help to increase clarity.
Short-Term Outcomes		
Homebuyers visiting retailers are provided with clear information on NEEM 2.0 value and opportunity	Add logical connection arrow from Market Actor Support Outputs to this outcome.	Retailer training and materials, provided through the market actor support activity, will directly contribute to retailers' ability to provide clear information about NEEM+.
	Combine with medium-term outcome: "Retailers and other market actors promote NEEM 2.0 value proposition".	These outcomes are somewhat redundant: retailers providing "clear information on the NEEM 2.0 value and opportunity" (short-term outcome) would, essentially, be "[promoting] NEEM 2.0 value proposition" (medium-term outcome).
N/A	Consider adding outcome: "Homebuyers recognize NEEM brand and consider energy efficiency in purchase decision".	This outcome would follow from the consumer marketing efforts (online and print campaigns) that the program has undertaken as part of its marketing activities. Existing outcomes do not capture those activities.
Medium-Term Outcomes		
N/A	Move long-term outcome "Increased demand for NEEM 2.0 homes" up to become a medium-term outcome.	This outcome would follow directly from the short-term outcome that combines the previous medium-term outcome about retailers promoting NEEM 2.0 with the short-term outcome about homebuyers receiving clear information.

Logic Model Element	Recommendation	Rationale
Long Term Outcomes		
Top retailers stock NEEM 2.0 on lots	Move up to be a short-term outcome resulting from the display home incentive, which is included in the market actor support activity.	Retailers stocking NEEM 2.0 homes is the intended direct result of the display home incentive.
Increased demand for NEEM 2.0 homes	Move up to be a medium-term outcome.	See discussion above, under medium term outcomes.

Appendix B: Detailed Baseline Review

This memo presents findings from Apex Analytics' review of NEEA's baseline assumptions for NEEM 1.1 manufactured homes. The NEEM 1.1 efficiency tier is equivalent to ENERGY STAR in the Northwest. While NEEA's Manufactured Homes program primarily targets adoption of homes meeting the higher, NEEM+ efficiency tier, NEEA staff anticipate that program activities could also drive an increase in uptake of NEEM 1.1 homes. This memo reviews NEEA's rationale for assuming program influence and the assumptions underlying NEEA's naturally occurring baseline estimates for NEEM 1.1 homes.

Rationale for Program Influence

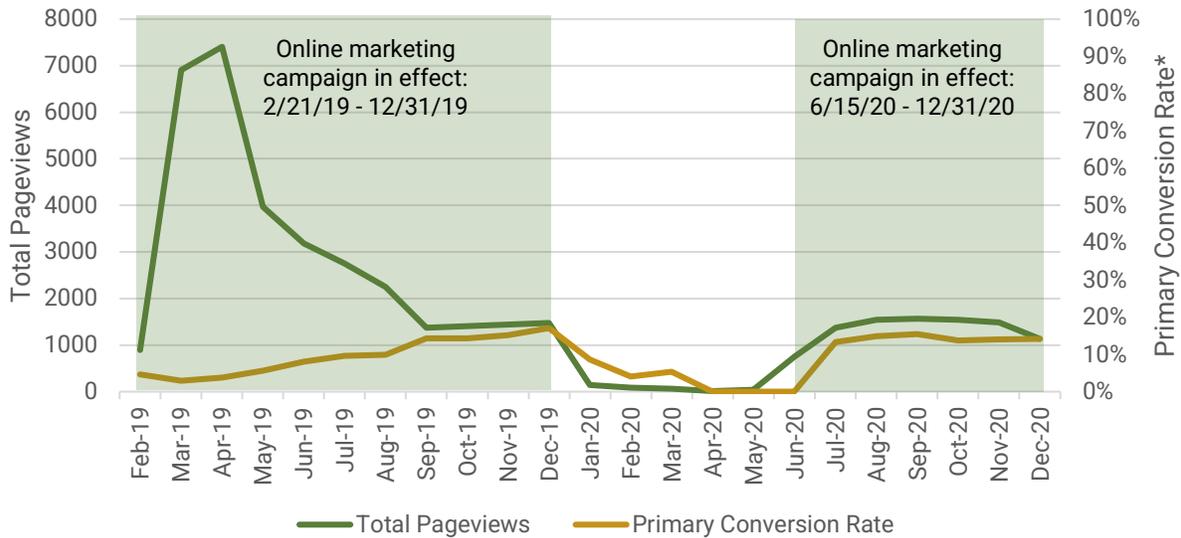
NEEA has documented three means by which the Manufactured Homes program may have influenced uptake of NEEM 1.1 manufactured homes.

NEEM Marketing Efforts

NEEA has worked with Northwest Energy Works to update and enhance branding for the NEEM program and helped Northwest Energy Works improve the user experience on the NEEM website. NEEA also provides manufactured home retailers with collateral materials promoting efficient manufactured homes and has implemented consumer-facing marketing campaigns both through advertisements in community newspapers and through a variety of online channels. NEEA staff anticipate that these activities could raise awareness of efficient manufactured homes generally, increasing sales of NEEM 1.1 homes as well as NEEM+.

The effectiveness of NEEA's online marketing campaign and the concurrent increase in NEEM 1.1 sales support this rationale. NEEA's online marketing campaign successfully increased traffic to the NEEM+ landing page, and a growing share of landing-page visitors clicked on a retailer website after visiting the landing page (Figure 8). As fewer than 10 NEEM+ homes were sold each month in 2019, most of these website visitors did not purchase a NEEM+ home. However, the website exposed each visitor to information about the benefits of manufactured homes, potentially increasing the appeal of NEEM 1.1/ENERGY STAR homes.

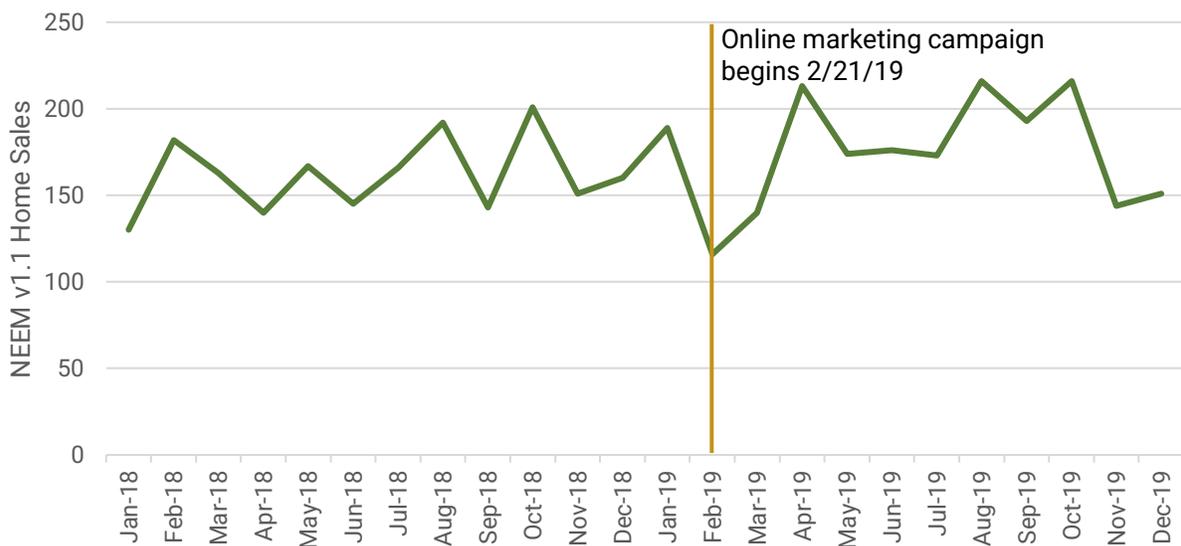
Figure 8: Online Marketing Campaign Results



*Conversion is defined as a click on a retailer URL.

While we are not able to distinguish the effects of NEEA’s marketing campaign from other market influences, sales of NEEM v1.1 homes appear to have increased during the months the marketing campaign was active in 2019, relative to the prior year (Figure 9). In particular, NEEM 1.1 sales were 25% higher in the second quarter of 2019 and 16% higher in the third quarter relative to the same periods the previous year. This year-over-year increase in sales of NEEM 1.1 homes in 2019 is also notable in that overall regional manufactured home sales fell from a peak of 4,040 in 2018 to 3,764 in 2019.

Figure 9: NEEM v1.1 Home Sales January 2018 – December 2019



Compromise Effects

NEEA staff reason that the existence of the NEEM+ brand, which NEEA promotes and helped to develop, could increase the appeal of NEEM 1.1 homes to consumers by positioning them as a mid-range option rather than a premium option. This is consistent with research in business and behavioral economics, which supports a “compromise effect” in which people are more likely to select an option when it is presented as the middle choice between two alternatives.²¹ This occurs because it is difficult for people to assess value independently; people make comparisons to the other options available to assess the value of a particular choice.²²

Code Advancement

NEEA staff note that NEEA will have an opportunity to impact a revised HUD energy efficiency code for manufactured homes by providing data and comments as part of the code adoption process. NEEA anticipates that adoption of both NEEM 1.1 and NEEM+ homes in the Northwest will demonstrate the potential for more stringent energy efficiency codes. NEEA’s current assumption is that a new code will take effect in 2024.

This assumption is reasonable, although any effect on NEEM 1.1 market share resulting from NEEA’s involvement in the HUD code update would occur after the updated code is adopted. Thus, in contrast to the two means of influence described above, this means does not impact the current market.

Naturally Occurring Baseline

The market share of NEEM 1.1 manufactured homes in 2014, the year before the initiative began, was 33%. NEEA proposes using this market share as a flat baseline representing NEEM 1.1 market share absent intervention by NEEA and its partners in calculating net market effects. Figure 10 illustrates NEEM 1.1 market share, as well as this baseline, for the years 2012 through 2020. Apex assessed two aspects of NEEA’s approach to estimating naturally occurring baseline: whether a flat baseline is appropriate as opposed to a curve that anticipates change in the naturally occurring baseline over time, and whether 33% is the appropriate value for that baseline.²³

²¹ Itamar Simonson, “Choice Based on Reasons: The Case of Attraction and Compromise Effects,” *Journal of Consumer Research* 16, no. 2 (September 1989): 158–74; Ran Kivetz, Oded Netzer, and V Srinivasan, “Alternative Models for Capturing the Compromise Effect,” *Journal of Marketing Research* 41, no. 3 (August 2004): 237–57.

²² Dan Ariely, *Predictably Irrational: The Hidden Forces That Shape Our Decisions*, First (New York: Harper Collins, 2008).

²³ NEEA engaged with Northwest Energy Works and the NEEM program prior to the start of the Manufactured Homes Program in 2016. This engagement is outside the scope of this baseline review. Thus, the estimated baseline may include increases in NEEM 1.1/ENERGY STAR market share attributable to NEEA’s prior engagement.

Figure 10: NEEM 1.1 Market Share, 2012–2020

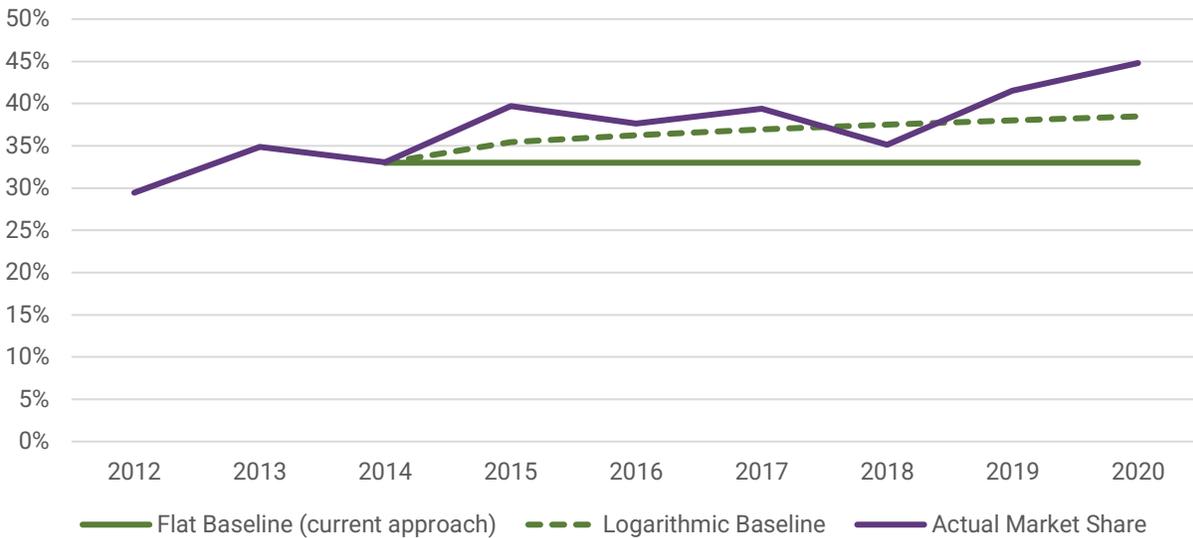


Note: Actual market share listed includes all homes that qualify for NEEM 1.1, including those that also qualify for NEEM+. NEEM+ market share was zero prior to 2018, 0.7% in 2018, 1.1% in 2019, and 3.7% in 2020.

Shape of Naturally Occurring Baseline Curve

Given the available data, Apex finds NEEA’s decision to use a flat baseline reasonable. As Figure 10 illustrates, market share generally rose in the years prior to the initiative’s launch (2012 to 2014). Apex considered a baseline approach that projects this trend into the future, using a logarithmic trendline (Figure 11). However, ENERGY STAR market share trends became more erratic between 2016 and 2018, with an overall trend of decreasing market share. The cause of this decrease is not clear. However, we have no reason to believe program activities would lead to a decrease in market share of ENERGY STAR manufactured homes. Instead, the decrease likely reflects market forces not captured by the logarithmic baseline curve.

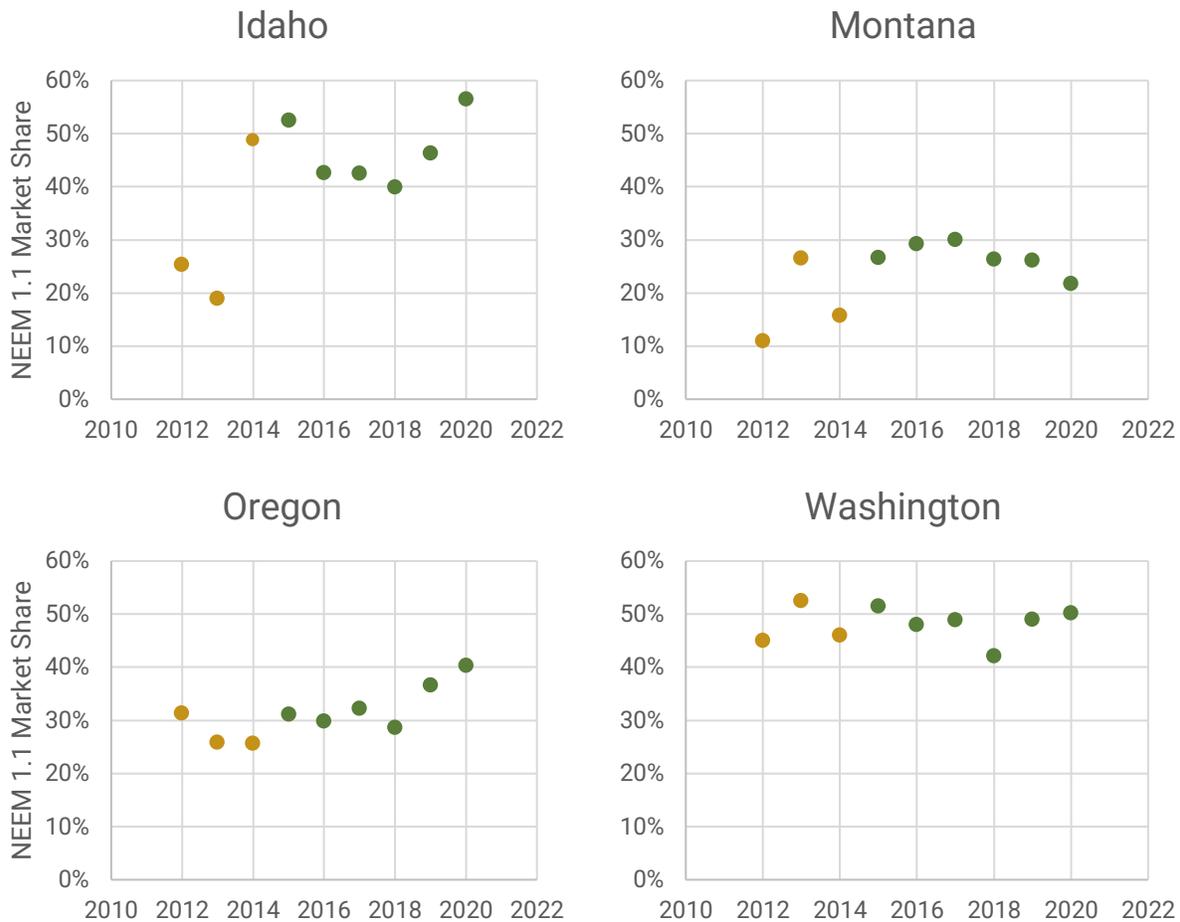
Figure 11: Baseline Market Share



Trendline equation derived from 2012-2014 data is $y=0.0377\ln(x)+0.302$, $R^2=0.5789$.

In addition, while market share in the region as a whole followed a relatively regular pattern in the 2012–2014 baseline period, that pattern does not reflect sales in any of the individual states (Figure 12). This variation within the region suggests that the 2012–2014 market share trend may not be as consistent as it appears at the regional level. Given the post-2015 market share trends and this intra-regional variation, we conclude that a logarithmic baseline curve does not provide a more accurate estimate of naturally occurring baseline than the flat baseline NEEA uses.

Figure 12: NEEM 1.1 Market Share by State, 2012–2020



Naturally Occurring Baseline Values

Apex recommends that NEEA begin claiming net market effects from NEEM 1.1 homes in 2019. This approach would be more consistent with NEEA’s logic for the program’s influence on NEEM 1.1 home sales than the current approach, which uses 2014 as the baseline year. While NEEA launched the manufactured homes program in 2015, the program’s initial focus was on recruiting manufacturers and developing their capacity to produce NEEM+ homes. The program elements NEEA anticipates would lead to increased sales of NEEM 1.1 homes became more prominent later.

NEEA anticipates that the program could increase sales of NEEM 1.1 homes as its NEEM+ focused marketing efforts build awareness of efficient manufactured homes generally. The program increased its marketing efforts when it became clear that a new HUD code for manufactured homes would not be adopted in 2016, as anticipated. Early marketing efforts focused on providing materials to retailers that they could use to help sell NEEM+ homes. The program increased its focus on reaching consumers directly in 2019 with its online marketing campaign and advertisements in community newspapers.

The more direct marketing efforts that began in 2019 are likely to have a greater effect on consumer awareness of efficient manufactured homes than the materials NEEA provided to retailers previously. The 2019 Program Assessment found that retailers gave moderate to low ratings (averaging 2.2 on a scale of one to four, with four being highly effective) to the effectiveness of the marketing materials they had at the time.²⁴ In addition, retailers may direct only homebuyers they perceive as interested in the most efficient homes to NEEM+ focused marketing materials. In contrast, as described above, NEEA's more recent consumer-focused marketing efforts increased traffic to the NEEM website and, in turn, to retailer websites and appear to be associated with an increase in NEEM 1.1 sales.

NEEA's logic that the program could increase sales of NEEM 1.1 homes by positioning them as a mid-range option between code-built homes and NEEM+ homes is also likely to have shown effects more recently. Data shared with Apex lists no sales of NEEM+ homes prior to 2018. The large majority of 2018 sales were part of the program's Auto-Upgrade promotion, in which the program paid the full incremental cost for one manufacturer to upgrade all of the NEEM 1.1 homes they had on order to NEEM+ as a way to develop their NEEM+ production capacity.

Given the lack of NEEM+ sales prior to 2018, relatively few manufactured home buyers likely considered NEEM+ homes alongside NEEM 1.1 and code-built homes when considering which home to purchase. Recent program activities are likely to increase customer consideration of NEEM+, however. Specifically, the program's incentives to retailers to purchase NEEM+ display homes have the potential to increase the likelihood that home buyers will include NEEM+ in the set of homes they consider.

The Manufactured Homes program's activities likely had a limited influence on uptake of NEEM 1.1 homes prior to 2019, when the program expanded its consumer marketing activities and sales of NEEM+ homes began to grow outside of the special Auto Upgrade promotion. As a result, Apex recommends NEEA begin claiming net market effects in 2019.

Further investigation of the market trends leading to the decline in market share between 2015 and 2018 is necessary to determine the market share NEEA should adopt as a baseline. A multi-year average, for example 2016–2018 market share, may have advantages over basing baseline market share on a single year as it would be less likely to be impacted by endogenous effects (like a single retailer closing) or data reporting issues. However, if some market forces outside the program were truly driving a decrease in market share during the baseline period, this type of multi-year average could overestimate baseline market share. Apex will explore these market trends further in data collection with market actors.

Conclusions and Recommendations

Apex draws the following conclusions and recommendations from our review of NEEA's approach to estimating baseline market share for NEEM 1.1 manufactured homes:

²⁴ Energy 350, "2019 Manufactured Homes Program Assessment" (Portland, OR: Northwest Energy Efficiency Alliance, October 23, 2019).

- › **Conclusion 1: NEEA’s rationale for program influence is reasonable.** NEEA’s consumer marketing efforts have effectively reached manufactured home buyers and provided them with information about the benefits of efficient manufactured homes. Those buyers may then be more likely to purchase a NEEM 1.1 home if they do not purchase NEEM+. In addition, economic research has found that positioning an item as a mid-range option between two alternatives—as the existence of NEEM+ does for NEEM 1.1 homes—increases sales of that item.
- › **Conclusion 2: NEEA’s decision to use a flat baseline for NEEM 1.1 homes is reasonable.** Regional market share data do not support an alternative approach to estimating changes in baseline market share over time. While regional market share data for 2012 through 2014 suggest NEEM 1.1 market share was on the trajectory of a flattening curve, data from 2015 through 2018 do not support this pattern. In addition, this trend does not hold at the state level.
- › **Conclusion 3: Beginning to claim net market effects for NEEM 1.1 homes in 2019 is more consistent with NEEA’s rationale for program influence than 2015.** According to the program’s rationale for program influence, the program likely had limited influence on NEEM 1.1 sales prior to 2019.²⁵ NEEA anticipates that its consumer marketing efforts focused on NEEM+ homes could provide a general increase in awareness of efficient manufactured homes, resulting in an increase in sales of NEEM 1.1 homes. While NEEA had undertaken some activities previously, those consumer marketing efforts increased significantly in 2019. NEEA also anticipates that introducing the NEEM+ brand to the market will position NEEM 1.1 homes as a mid-range option, rather than a premium option, which will increase their appeal. There were no sales of NEEM+ homes prior to 2018, and significant sales did not occur outside the Auto-Upgrade promotion (which targeted homes already on order) until 2019. As a result, it is unlikely that NEEM+ homes were a significant part of consumers’ decision sets prior to 2019.
 - **Recommendation:** NEEA should begin claiming net market effects for NEEM 1.1 homes in 2019. NEEA should investigate whether 2018 market share or a multi-year average of prior years’ market share is most appropriate as a baseline level.

²⁵ As noted above, this review focuses exclusively on the activities of NEEA’s Manufactured Homes program since its launch in 2016. It does not address any net market effects resulting from NEEA’s engagement with Northwest Energy Works or the NEEM program prior to 2016.

Appendix C: Data Collection Instruments

Program Sponsors

Table 11: Utility Staff Interview Research Objectives

Research Objective	Research Question	Related Interview Questions
Review the program’s logic model to assess whether it accurately represents the program’s theory of change	Are major market barriers accurately conveyed?	Q6.b
Assess program progress toward market transformation based on four key market progress indicators (MPIs)	Is the final incremental cost of NEEM+ to the homebuyer (including all incentives) less than 5% greater than the cost of comparable NW MH?	Q1
	Have manufactured homes retailers increased their sales of NEEM+ homes?	Q6
Understand the progress of NEEM+ toward market sustainability	How persistent will NEEM+ be in the market without NEEA’s support?	Q9
	What additional support, if any, is needed for the market to adopt NEEM+ in a persistent way?	Q6.c
	Would utility interventions continue if NEEA’s support ended, and would that utility support be sufficient to transform the market?	Q4, Q5, Q8, Q10

Introduction

Thank you for taking the time to speak with me today. As I said when I reached out to you, we are working with NEEA to evaluate their Manufactured Homes program. As part of that evaluation, we wanted to hear from program administrators around the Northwest that are offering downstream incentives on NEEM+ homes. I’d like to know about your program and hear your perspective on the manufactured homes market.

Do you have any questions about our research before we begin?

I will be taking notes as we talk today. Would it be OK if I also record the call? The recording will just help with my notetaking – we won’t share it with anyone and we won’t report anything in a way that would identify individual respondents.

Program Details

First, please tell me about your program offerings to support efficient manufactured homes.

Q1. What incentives, if any, do you offer for NEEM+? [Probe on customer incentives, SPIFFS for sales staff, any other incentives offered]

How long have you been offering incentives for NEEM+?

a. How much of the incremental cost of a NEEM+ home do those incentives cover? [*If respondent is not aware offhand, ask for email follow-up*]

Q2. What motivated you to offer incentives for NEEM+? [*If no incentives offered for NEEM+, ask:*] Why don't you offer incentives for NEEM+?

Q3. What other activities, if any, does your program conduct to increase NEEM+ adoption?

a. How, if at all, do you market or promote NEEM+ homes and their available incentives?

Q4. How, if at all, have your incentives or other activities to increase NEEM+ adoption changed since you began offering NEEM+ incentives?

a. What motivated those changes?

Q5. Are you planning to make any changes to your NEEM+ program offerings?

a. [*If so:*] What are they?

b. What is motivating those changes?

Q6. How much uptake have you seen of NEEM+ homes from homebuyers?

a. How does that compare to your expectations when you began offering NEEM+ incentives? [*If different:*] Why do you think that is?

b. What do you think prevents greater uptake of NEEM+ homes?

c. [*If not addressed:*] What would need to happen for the uptake of NEEM+ homes to increase?

Coordination with NEEA

Q7. How, if at all, do you coordinate with NEEA in supporting NEEM+ homes?

a. What additional opportunities do you see to coordinate with NEEA around NEEM+?

Q8. How important is NEEA's support in driving uptake of NEEM+? Why do you say that? [If needed: NEEA's support consists of upstream incentives to manufacturers, manufacturer technical support and assistance, retailer support with NEEM+ educational materials and sales resources, and a consumer marketing campaign]

- a. What elements of NEEA’s support are most important in driving uptake of NEEM+?

Q9. How do you think retailers and manufacturers would respond if NEEA no longer supported NEEM+?

Q10. How, if at all, would your program activities around NEEM+ change if NEEA was no longer active in the market? Why do you say that?

Closing

Q11. What have been your greatest surprises or lessons learned about offering incentives for NEEM+ homes? What would you do differently?

Q12. Thank you for taking the time to speak with me today. The information you have given me is helpful. Those are all the questions I had prepared. Is there anything else you think I should know as we evaluate NEEA’s manufactured homes program?

Manufacturers

Table 12 lists key details about this data collection instrument.

Table 12: Instrument Information

Characteristic	Value
Instrument Type	In-depth interview guide
Recruiting Mode	Email/phone
Data Collection Mode	Phone
Target Length	45 minutes
Target Population	Manufactured home manufacturers either producing or who have seriously considered offering NEEM+ homes
Estimated Population Size	3 manufacturers offering NEEM+ 2 manufacturers considering NEEM+
Sampling Target	Census
Incentive	\$75 electronic gift card

Table 13 lists the research objectives the manufacturer interviews will address and the interview questions that will inform those objectives.

Table 13: Research Objectives Mapped to Interview Questions

Research Objective	Research Question	Interview Questions
Review the program’s logic model to assess whether it accurately represents the program’s theory of change	Are major market barriers accurately conveyed?	Q8, Q12
Assess program progress toward market transformation based on four key MPIs	Are NW NEEM program manufacturers able to build to the NEEM+ spec?	Q7
	Is the incented incremental cost of NEEM+ less than 5% greater than the cost of comparable MH?	Q9
	Are factory trainings in NEEM+ construction held and test homes built?	Q14
	Have manufactured homes retailers increased their sales of NEEM+ homes?	Q11
Provide ongoing information and feedback to the program implementation team for adaptive management		Q14.a, Q14.b, Q18
How persistent will NEEM+ be in the market without NEEA’s support?		Q16, Q17, Q18.a
What additional support, if any, is necessary for the market to adopt NEEM+ in a persistent way? How much longer would NEEA’s intervention need to continue to achieve market transformation?		Q13, Q17.a, Q18.b, Q19

Introductory Email

Hello [NAME],

My company, Apex Analytics, is working with the Northwest Energy Efficiency Alliance, (NEEA) on a research project to improve their Manufactured Homes program. I understand your company is a [*as appropriate*: key manufacturer of NEEM+ homes/leading home manufacturer in the Northwest]. I would like to learn about your experience with NEEA’s program and your views on the manufactured homes market more broadly. Your perspective would be very helpful to inform the recommendations we give NEEA to improve their program. Please let me know when, in the next week or two, you would be available to speak for 30-45 minutes.

We understand that you are busy, and we value your time. As a result, we are offering a \$75 electronic gift-card as a thank-you for participating in this research.

I look forward to hearing from you, and I would be happy to answer any questions you have about our research.

Thank you very much,

Joe Van Clock

Survey Instrument

Introduction

Thank you for taking the time to speak with me today. As I mentioned in my email, we are working with NEEA to help improve their Manufactured Homes Program. I wanted to speak with you as part of our research to understand how the program fits into your work and hear your perspective on the manufactured homes market.

Do you have any questions before we begin?

I will be taking notes as we talk. Is it OK if I also record our conversation? The recording is just to help with my notetaking. We won't share it with anyone, and we won't report any findings in a way that would identify individual respondents.

Q1. What is your role at [COMPANY]?

- a. How long have you been in that role?
- b. Did you work in the manufactured home industry before that? [*If so:*] What did you do, and for how long? If not, then how did you transition to this industry?

Experience with NEEM+

Q2. [*NEEM+ manufacturers:*] When did [COMPANY] start offering NEEM+ homes?

Q3. [*NEEM+ manufacturers:*] How, if at all, have your NEEM+ offerings changed since you began offering NEEM+? [*If needed:*] For example, have you offered a NEEM+ option on more or different home types or floor plans? Have the non-energy related features of your NEEM+ homes changed?

- a. What led to those changes?

Q4. [*NEEM+ manufacturers:*] What plans, if any, do you have to change your NEEM+ offerings?

- a. What is driving those changes?
- b. How, if at all, do you think your NEEM+ offerings might change if an updated HUD code included energy efficiency requirements similar to the current ENERGY STAR level? Why do you say that?

Q5. [*Non-NEEM+ manufacturers:*] Has your company considered offering NEEM+ homes?

- a. [*If so:*] How far have you gone toward developing a NEEM+ product? [*If needed:* Did you discuss it with senior management? Did you gather information from materials suppliers? Did you assess changes to your production process? Etc.]

- b. Have you had any discussions with utilities in your area about incentives for NEEM+ homes?

Q6. [All:] What are the main benefits you see for [COMPANY] in offering NEEM+ homes?

- a. What elements of NEEM+ do customers find most attractive?
- b. What elements do not help to sell NEEM+ homes?

Q7. [All:] What is the most challenging part about building to NEEM+?

[If not addressed, probe on:]

- a. Obtaining the required equipment and/or materials
- b. Ensuring the staff members building your homes have the required knowledge/skills
- c. Construction processes or cost
- d. Inspection and certification

Q8. [Non-NEEM+ manufacturers:] Why did you decide not to develop a NEEM+ product offering?

Q9. [NEEM+ manufacturers:] How much more does it cost you to produce a NEEM+ home than a similar, code-built home?

- a. How much more does a NEEM+ home cost to the customer? [Probe to clarify whether "customer" is end-user or retailer]
- b. What are the main drivers increasing the cost of a NEEM+ home?

Market Trends & Barriers

Q10. [All:] What have been the most important trends in manufactured home sales (in general) over the past two years? [*Probe for both changes in sales volume and shifts in demand for specific home types or features*]

- a. What is driving those trends?
- b. Do you expect those trends to continue? Why or why not?
- c. [*If not addressed:*] How has the COVID-19 pandemic affected manufactured home sales?
- d. [*If not addressed:*] How have the recent wildfires in Oregon and Washington affected manufactured home sales?

Q11. [NEEM+ manufacturers:] What trends have you seen in sales of NEEM+ homes over the past two years?

- a. What is driving those trends?
- b. Do you expect them to continue? Why or why not?

Q12. [*NEEM+ manufacturers:*] What are the most important reasons you do not produce more NEEM+ homes?

- a. [*If not addressed:*] What are the most important reasons preventing more customers from asking for NEEM+ homes?

Q13. [*All:*] What would need to change in the market for there to be a significant increase in production of NEEM+ homes?

- a. How likely is that to happen? Why do you say that?
- b. When do you think that would happen? Why do you say that?

Experience with NEEA

Now, I'd like to shift to talk a little bit about the support NEEA provides to promote NEEM+ homes. NEEA's support includes the manufacturer incentives and the training and support you receive from Brady Peeks, as well as marketing materials and training for retailers and an online consumer-marketing campaign.

Q14. [*NEEM+ manufacturers:*] What, if anything, do you find most valuable about the training and technical support that Brady Peeks and Northwest Energy Works provide, with NEEA's support?

- a. What opportunities, if any, are there to improve that support?
- b. Are there any other types of training or technical support NEEA could provide that would help you produce or market NEEM+ homes?

Q15. [*NEEM+ manufacturers:*] How important were NEEA's incentives in your decision to begin offering NEEM+ homes? Why do you say that?

- a. How important was the information and technical support that Brady Peeks and Northwest Energy Works provided in your decision to begin offering NEEM+ homes? Why do you say that?
- b. What aspects of NEEA's support, including both incentives and technical support from Northwest Energy Works, were most important?

Q16. [*NEEM+ manufacturers:*] How important are NEEA's incentives for you to continue offering NEEM+ homes?

- a. How important is the information and technical support that Brady Peeks and Northwest Energy Works provide for you to continue offering NEEM+ homes?
- b. What aspects of NEEA's support are most important now?

Q17. [*Non-NEEM+ manufacturers:*] How, if at all, did the support NEEA offers factor into your consideration of whether to offer NEEM+ homes?

- a. What additional support, if anything, could NEEA provide that might motivate you to offer NEEM+ homes?

- Q18. [*NEEM+ manufacturers:*] I understand NEEA’s incentives decreased in 2020 from \$1,000 to \$500. How, if at all, did that change impact your NEEM+ production?
- How, if at all, would your NEEM+ production change if NEEA’s incentives were not available?
 - What would need to change in the market for you to continue producing NEEM+ homes, even without NEEA’s support?
- Q19. [*All:*] What additional opportunities, if any, do you see for NEEA to help increase production and uptake of NEEM+ homes?
- Q20. [*All:*] Those are all the questions I have prepared. Is there anything we haven’t discussed that you think would be important for me to know as we think about ways to improve NEEA’s Manufactured Homes program?

Thank you very much for taking the time to talk with me today. The information you gave me was really helpful.

Retailers

Table 14: Instrument Information

Characteristic	Value
Instrument Type	In-depth interview guide
Recruiting Mode	Email/Phone
Data Collection Mode	Phone
Target Length	30 minutes
Target Population	Manufactured home retailers
Estimated Population Size	112
Sampling Target	10 high volume retailers 10 other retailers
Incentive	\$50 electronic gift card

Table 15: Research Objectives Mapped to Interview Questions

Research Objectives	Research Questions	Corresponding Interview Questions
Review the program’s logic model to assess whether it accurately represents the program’s theory of change	Are major market barriers accurately conveyed?	Q6.b, Q8.f, Q9.b
Assess program progress toward market transformation based on four key market progress indicators	Is the incented incremental cost of NEEM+ less than 5% greater than the cost of comparable NW MH?	Q9
	Have manufactured homes retailers increased their sales of NEEM+ homes?	Q8.d
Provide ongoing information and feedback to the program implementation team for adaptive management		Q10
Review NEEM 1.1 baseline memo to verify NEEA’s influence on NEEM 1.1 market share	What caused a decline in NEEM 1.1/ENERGY STAR market share from 2015-2018?	Q3.a

Research Objectives	Research Questions	Corresponding Interview Questions
	How persistent will NEEM+ be in the market without NEEA’s support?	Q11
	What additional support, if any, is necessary for the market to adopt NEEM+ in a persistent way? How much longer would NEEA’s intervention need to continue to achieve market transformation?	Q14

Introductory Email

Hello [Name],

My company is working with the Northwest Energy Efficiency Alliance (NEEA), a regional organization that promotes energy efficiency, on a research project to improve their Manufactured Homes program, which supports the NEEM program and NEEM+ homes. Manufactured home sellers like you play a key role in advising customers about manufactured home purchases, and your perspective would be very valuable in our research. I would like to learn about any experience you have had with the NEEM program and specifically NEEM+. Please let me know when, in the next week or two, you are available to speak on the phone for about 30 minutes.

We understand that you are busy, and we value your time. As a result, we are offering a \$50 electronic gift card as a thank-you for participating in this research.

I look forward to hearing from you, and I would be happy to answer any questions you have about our research.

Thank you very much,

Joe Van Clock

Interview Guide

Introduction

Thank you for taking the time to speak with me today. As I mentioned in my email, we are working with NEEA to help improve their Manufactured Homes program. I wanted to speak with you as part of our research to hear your perspective on the manufactured homes market and understand how the program can better work with retailers.

Do you have any questions before we begin?

I will be taking notes as we talk. Is it OK if I also record our conversation? The recording is just to help with my notetaking. We won’t share it with anyone, and we won’t report any findings in a way that would identify individual respondents.

Q1. What is your role at [COMPANY]?

- a. How long have you been in that role?
- b. Did you work in the manufactured home industry before that? [*If so:*] What did you do, and for how long? [*If not:*] What led you to this industry?

Q2. To start, I’d like to hear a little bit about manufactured home sales generally. How have sales been this past couple of years?

- a. [*If not addressed:*] How has the pandemic impacted your sales?
 - b. [*If not addressed:*] How have the wildfires this fall impacted your sales?
 - c. Beyond the number of homes sold, have you seen any changes in the types of homes people are buying or the features they are requesting?
- Q3. What trends were you seeing in the market before the pandemic? [Probe on both trends in sales volume and trends in home types/features]
- a. The data we have seen seems to show a decrease in market share of ENERGY STAR homes between 2015 and 2018. Do you know what might have driven that?
- Q4. What trends do you expect to see in the next few years? [*If needed:*] Will the sales trends you saw in 2020 continue? Why or why not?
- Q5. What are the most important things people consider when they are choosing which manufactured home to buy?
- Q6. How important is energy efficiency when people are choosing which manufactured home to buy? Why do you think that is?
- a. What types of customers prioritize energy efficiency more highly than others?
 - b. Why don't more buyers prioritize energy efficiency?
- Q7. What are the most important benefits that attract customers to energy efficient homes?
- a. [*If not addressed:*] Relative to energy bill savings, how important is comfort as a benefit in selling efficient homes?
 - b. [*If not addressed:*] What about indoor air quality? How important is that as a benefit in selling efficient homes?
 - c. What other benefits of efficient homes are important to your customers?
- Q8. Are you familiar with the NEEM+ energy efficiency designation for manufactured homes? [*If needed:* NEEM+ homes are built to efficiency specifications that are more stringent than ENERGY STAR, with higher insulation levels and more efficient windows]
- a. Do you sell NEEM+ homes?
 - b. [*If do not sell NEEM+*] Why not? What, if anything, might lead you to sell NEEM+ homes?
 - c. [*If sell NEEM+*] What is appealing to customers about NEEM+ homes?
 - d. Has the number of NEEM+ homes you sell changed over the past few years? If so, how?
 - e. How, if at all, do you expect your sales of NEEM+ homes to change in the next few years? Why do you say that?

- f. What prevents you from selling more NEEM+ homes?
- Q9. *[If familiar with NEEM+]* How much more does a NEEM+ home cost than a similar, base level, home - one that just meets code requirements for energy efficiency?
- a. How much more does a NEEM+ home cost than an ENERGY STAR home?
 - b. Do customers see enough additional value in a NEEM+ home to justify that cost? Why or why not?
- Q10. *[If familiar with NEEM+:]* What support have you received from Northwest Energy Works to help you sell NEEM+ homes? *[If needed:]* For example, have you received marketing materials that highlight the benefits of NEEM+? Do you have a NEEM+ model home at your retail locations? Did you participate in the sales challenge? *(Brady can also provide a list of retailers who did participate in the sales challenge. If we talk to retailers who did, it would be good to find out if it was valuable for them).*
- a. *[If received support:]* What support did you find most valuable? Why do you say that?
 - b. *[If received support:]* What support did you find less valuable? Why?
- Q11. *[If familiar with NEEM+:]* Do you use the rebates utilities offer to homebuyers to help sell NEEM+ homes?
- a. *[If yes:]* How important are those rebates in driving customers to purchase NEEM+ homes?
 - b. *[If no:]* Why not?
- Q12. *[If involved in program:]* Would you continue to offer NEEM+ homes if support like marketing materials, rebates for display homes, and sales challenges, was no longer available? Why or why not? *[If needed, clarify that utility rebates to homebuyers would still be available.]*
- a. How, if at all, do you think your sales of NEEM+ homes would change?
- Q13. *[If not involved in program:]* What support, if any, did the Northwest Energy Works offer you?
- a. *[If not involved in program:]* Why didn't you use what the Northwest Energy Works offered?
- Q14. What would need to change in the market for NEEM+ homes to be more widely adopted?
- a. How likely is that to happen?
 - b. When do you think it would happen?
 - c. What, if anything, could NEEA do to help make those changes happen faster? How much faster do you think they would happen with that support?

Q15. What additional opportunities, if any, do you see for NEEA to increase uptake of NEEM+ homes?

Q16. Thank you for taking the time to talk with me today. Those are all the questions I had prepared. Is there anything else you think I should know about the manufactured home market or your interactions with NEEA as we consider how NEEA's manufactured homes program could improve?

Memorandum

June 23, 2021

TO: Anu Teja, Sr. MRE Scientist

FROM: Jonathon Belmont, Sr. Program Manager – Manufactured Homes Program

SUBJECT: Response to NEEA Manufactured Homes Program MPER #1

In 2020, NEEA contracted with Apex Analytics to assess NEEA’s Manufactured Homes (MH) program’s logic and progress toward specific market progress indicators, review baseline assumptions, provide general feedback to support adaptive management and program improvement, address additional research questions related to the sustainability of the NEEM+ brand in the market, and ultimately develop a Market Progress Evaluation Report (MPER) .

This memo responds to the MPER’s key conclusions and recommendations.

- Conclusion 1:** Continued program support is necessary to establish NEEM+ in the manufactured homes market.

Recommendation 1: NEEA should continue to support the manufactured homes market to the extent needed to maintain NEEM+ availability until a standard update and ENERGY STAR specification revision occur.

Staff Response: Agree. The process for updating the HUD standard and ENERGY STAR specification for manufactured homes are anticipated to begin in 2021. NEEA staff will continue activities as needed to maintain NEEM+ availability and access to data at least through 2022.
- Conclusion 2:** Utility incentives could play an important role in increasing NEEM+ uptake.

Recommendation 2: NEEA should work to support and coordinate utility incentive efforts across the Northwest.

MH Response: Agree. Utilities offering incentives to the buyer is an effective method of encouraging sales of NEEM+ homes. Staff will continue to raise retailer awareness of available incentives.
- Conclusion 3:** Given the current high demand for manufactured homes, retailers and manufacturers are less likely to seek out new offerings, like NEEM+.

Recommendation 3: NEEA should proactively provide retailers and manufacturers with existing tools and information on NEEM+ cost savings and consider expanding those resources.

MH Response: Agree. Proactively providing available tools and information on NEEM+ cost savings to retailers is a cost-effective and proven method which NEEA staff will continue. However, given the near-term objectives of influencing the specifications, the program will not pursue expanding upon these resources.
- Conclusion 4:** Manufactured home communities’ adoption of NEEM+ could significantly boost demand for qualified homes, leading to greater market acceptance, and better positioning NEEM+ for adoption as an ENERGY STAR specification.

Recommendation 4: NEEA should investigate market intervention opportunities to encourage community developers to adopt NEEM+ homes.

MH Response: While NEEA staff acknowledge that community developers could be a good target audience for NEEM+ outreach activities, NEEA does not plan to undertake this activity because utility programs and retailers are better positioned to work with buyers. Given the near-term opportunity for specification updates, the program will remain focused on current interventions and on providing technical information for the specification updates processes.