2024 Q1 Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:

Hello there!

The Northwest Energy Efficiency Alliance's (NEEA) Market Research & Evaluation (MRE) team jumped headfirst into the new year by kicking off several new studies in the first quarter. These include the first Market Progress and Evaluation Report (MPER) for the Extended Motor Products Market Transformation program, a market research effort to assess consumers' use and attitudes toward connected consumer products, market research with home energy raters in the Northwest, and Residential Code Compliance Evaluations for both Montana and Oregon. This list provides a great snapshot of the all the types of research and evaluation that NEEA's MRE team scopes, manages and delivers to support NEEA's Market Transformation programs. Together, these different types of research and evaluation studies serve two outcomes: they support the continuous improvement of NEEA's Market Transformation programs, and they provide unbiased, third-party assessments of new program concepts and current programs' successes and opportunities for improvement.

We hope you find the newsletter informative, and we look forward to hearing from you. Please feel free to reach out anytime with questions or suggestions.

Wishing you a happy springtime!

~ **Amy Webb**, Sr. Manager, Market Research & Evaluation ~

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NATURAL GAS PROJECTS:

***PLANNING:** MRE projects from inception through proposal selection

***FIELDING:** MRE projects from kick-off through the completion of field work

***REPORTING:** MRE projects in the analysis/synthesis stage through report posting

At a Glance

MARKET RESEARCH & EVALUATION PROJECTS

Codes, Standards, New Construction

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DUAL FUEL (Electric & Natural Gas) PROJECTS:

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Market Progress Evaluation Report #1

Efficient Rooftop Units (RTU) | **FIELDING**

As of late 2022, NEEA's Efficient RTU program is actively promoting efficient RTUs for gas heated commercial buildings across the region. This study will be the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

1. Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
2. Assess Market Transformation progress as measured by program Market Progress Indicators.
3. Qualitatively assess program influence on observed market transformation.

NEEA contracted with Apex Analytics and NMR Group to conduct the evaluation. NEEA kicked off the Efficient RTU evaluation in June 2023. In Q1 2024, the evaluation team plans to hold focus groups with two small groups of commercial building decision makers (e.g., building owners, operators, and facilities managers); survey commercial building decision makers across the region; and interview individuals who have or have considered having an efficient RTU on their building.

The study is being conducted in close coordination with the Market Progress Evaluation for the High-Performance HVAC program, which is also being completed by Apex Analytics and NMR Group.

The evaluation will be ongoing through fall 2024, with a final report anticipated in Q4 2024.

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Market Progress Evaluation Report #1

High-Performance HVAC | **FIELDING**

As of late 2022, NEEA's High-Performance HVAC program is intervening to transform the market for very high efficiency Dedicated Outside Air Systems (DOAS) for electrically heated commercial buildings across the region. This study will be the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

1. Provide timely and actionable formative evaluation findings and recommendations to enable continuous improvement of the program.
2. Assess Market Transformation progress as measured by program Market Progress Indicators.
3. Qualitatively assess program influence on observed market transformation.

NEEA contracted with Apex Analytics and NMR Group to conduct the evaluation. NEEA kicked off the High-Performance HVAC evaluation in July 2023. In Q1 2024, the evaluation team will present findings from HVAC system designer and manufacturer representative surveys and prepare for its assessment of the program's Market Progress Indicators.

This study is being conducted in close coordination with the Market Progress Evaluation for the Efficient RTU program, which is also being completed by Apex Analytics and NMR Group.

The evaluation will be ongoing through fall 2024, with a final report anticipated in Q4 2024.

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Residential Market Share Study

High-Performance Windows | **REPORTING**

NEEA contracted with Ducker Carlisle to complete a high-performance residential window market share study on behalf of NEEA and the Center for Energy and Environment (CEE) in Q3 2024. This project is complimentary to the completed windows market characterization report which is posted to neea.org, providing a grounded estimate of window sales in the Northwest based on a national sales dataset and interviews with manufacturers and distributors (completed in Q4 2023). Ducker Carlisle estimated that close to 2.9 million windows were sold in the Northwest in 2022, with a little over half (54%) being installed in new construction residential buildings. About 3% of these sales may have been high-performance windows as defined by NEEA (with a U-Factor of 0.22 or less).

A final report is anticipated in late Q1 2024.

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Commercial Building Market Research

BetterBricks | **REPORTING**

The research objective for this market research effort is to refine and expand on NEEA's understanding of the building upgrade journey for commercial building decision makers in order to generate recommendations on how NEEA could support decision-makers and their networks. It will also inform NEEA's exploration of interventions and resources for decision-makers as they consider making energy-efficient upgrades to their buildings.

The key research question is: What is the building upgrade journey for commercial building decision makers? NEEA contracted with ETHNO to address this question through the analysis of secondary materials and by conducting interviews and site visits with commercial building decision makers across the region.

Interviews began in Q4 2023. Data collection was completed in Q1 2024, and a final report is anticipated in Q2 2024.

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Agricultural Pumps Market Research

Extended Motor Products (XMP) | **PLANNING**

In order to support ongoing program planning and opportunity assessment, NEEA intends to field a research study exploring the dynamics of the agricultural pump market across NEEA's four-state region. Study methods are likely to include secondary research accompanied by primary data collection (e.g., in-depth interviews, electronically administered surveys) to seek input and insight from professionals active in this market. The project kickoff is anticipated in Q3 2024.

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Market Progress Evaluation Report #1

Extended Motor Products (XMP) | **FIELDING**

NEEA contracted with ADM Associates, Inc., to field the inaugural XMP Market Progress Evaluation Report (MPER), which serves as the first evaluation of the program's Market Transformation efforts. The program's overarching objectives for the study are to:

1. Review the XMP Market Transformation Theory, Program Logic Model, and Market Progress Indicators (MPIs) to assess their clarity and alignment in conveying (1) the program's strategy and planned activities to overcome market barriers and drive market changes that will increase efficient clean-water pump and circulator adoption, and (2) NEEA's proposed approach for evaluating XMP market progress.
2. Conduct the first year of tracking MPIs to lay the groundwork for year-over-year evaluation, and report progress on several near-term outcomes.

A project kick-off was held in January 2024, and data collection with multiple market actor groups (including pump and circulator manufacturers' representatives, distributors, specifiers, contractors, and project owners, as well as NEEA program staff and partners) is scheduled to commence in late Q1 2024 and continue through Q3 2024. A final report is anticipated in Q4 2024.

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Fan System Market Characterization | Efficient Fans | REPORTING

NEEA contracted with DNV Energy Insights, Inc., to conduct a Market Characterization study to inform development and planning efforts for the Efficient Fans program, which is in the program development stage of NEEA's Initiative Life Cycle. The program aims to accelerate adoption of efficient fans and fan system products, including motors, drives, and controllers, by working upstream with manufacturers and highlighting efficiency metrics within their selection software. The initial program is in the commercial and industrial sectors.

The objectives for this Market Characterization study included:

1. Profiling and sizing of the regional fan system market.
2. Identifying and prioritizing market barriers.
3. Documenting market actor motivations and fan system path-to-purchase.

A project kick-off was held in February 2023, and data collection with multiple market actor groups (e.g., fan system manufacturers, manufacturers' representatives, distributors, and end users) commenced in Q2 2023 and continued through mid-Q2 2023. The study concluded in Q4 2023. A number of findings were produced regarding market dynamics, barriers, and opportunities for intervention, as well as a conservative estimate of roughly 27,000 fans sold annually in the Northwest under the program's current definition of "non-embedded."

A final report is available on neea.org.

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Key Assumptions Review

Luminaire Level Lighting Controls (LLLC) | **REPORTING**

NEEA contracted with Cadmus in late Q3 2023 to conduct a review of key assumptions underlying its benefit-cost model for its LLLC program. The research objective for this study was to revise LLLC modeling assumptions in order to refine co-created energy savings reporting for the LLLC program. Research questions included:

1. Is it appropriate for NEEA to adjust the Regional Technical Forum's (RTF) combined Controls Savings Fraction (CSF) for occupancy sensor with daylighting controls to the mathematical sum of the separate CSF values or below? If so, what values might be more appropriate?
2. Is NEEA's approach to adjusting new construction baseline CSF to reflect the code requirement of various lighting control types in various space types appropriate?
3. Is it appropriate for NEEA to adjust the baseline CSF that it nets out of retrofits?

Cadmus addressed the research objectives through the selection and review of secondary sources. Study findings recommended that NEEA continue to use the combined controls CSF value, adjust non-warehouse CSF to 28% in new construction, and adjust baseline CSF to 1.7% for retrofit non-warehouse and 8.5% for warehouse applications.

A final report is available on neea.org.

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Market Sizing for Exterior Parking Lot Applications

Luminaire Level Lighting Controls (LLLC) | **REPORTING**

NEEA's LLLC program is considering adding exterior parking lot lighting to its portfolio. This study's research objective was to attain supported estimates for the number of luminaires in parking lots, current LLLC market penetration, and the potential for market growth in exterior LLLC with NEEA intervention, in order to inform the naturally occurring baseline and projections of costs and benefits (including energy savings) over time. Research questions included:

1. What is the market size for exterior LLLC in parking lots?
2. What is the potential market size for exterior LLLC in parking lots over the next twenty years?

Cadeo reviewed secondary sources to address the research questions, and provided estimates using various methodologies that ranged from 860,000 to 3.5 million luminaires existing in outdoor parking lots today. Study findings indicate that the number of parking lot luminaires are likely to increase by 3% over the next 20 years.

Research was completed in Q4 2023, and a final report is available on neea.org.

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Condensing Gas Water Heater Qualitative Market Research

Efficient Gas Water Heaters | **PLANNING**

The Efficient Gas Water Heater program would like to better understand the purchase motivators among owners of the most efficient currently available gas storage water heaters (condensing gas water heaters) across North America. The program team recognizes this is a niche market; current estimates are that <10% of residential gas storage water heaters are made up of condensing units. However, the current hypothesis is that there is potential to utilize this market as a beachhead for early gas heat pump water heater (GHPWH) adoption by converting sales that would have been condensing gas water heaters to GHPWH. The program is interested to learn the likelihood of capturing a larger piece of this niche market. Key research objectives are under development and may include exploration of consumer path to purchase for gas condensing water heaters, any barriers they confronted in purchasing the product, and willingness to adopt the product.

Work is anticipated to begin sometime in Q2 2024 with a final report available in Q4 2024.

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Existing Water Heaters in Select Commercial Buildings Market Research

Efficient Gas Water Heaters | **PLANNING**

NEEA staff developed a Market Transformation program concept for Advanced Commercial Gas Water Heating that was added to the portfolio in Q4 2023. As the program enters the program development phase of NEEA's Initiative Life Cycle, NEEA staff are focusing on stimulating market conditions to accelerate technological advancements and generating demand for GHPWH systems by identifying which gas heat pump technology and design configuration is ideal for different building types in the Northwest. NEEA determined that a subset of commercial buildings including restaurants and lodging facilities (hotels and motels) and multifamily buildings (i.e., low rise and non-mixed use), offer the greatest savings and opportunity to launch its program efforts given their high usage of hot water.

NEEA seeks to gather insights on current water heating systems for these building types, including the purchase process, value propositions and barriers to adoption.

Work is expected to begin in Q2 2024 with a final report anticipated in Q4 2024.

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Cold Climate Demonstration Installation & Water Heater Installer Focus Group

Heat Pump Water Heaters (HPWH) | **REPORTING**

The Northwest Energy Efficiency Alliance (NEEA) contracted with ILLUME Advising in Q4 2022 to pursue two concurrent studies around water heater installers. The first was intended to focus on observational research of cold climate heat pump water heater (HPWH) installations in the Northwest to better understand the depth of previously established installation challenges, specifically in cold climate scenarios. The second study (also qualitative in nature) was geared to better understand any challenges installers and plumbers in the region might face around recommending and installing HPWHs in existing single-family homes, and their hesitation to do so. In both studies, NEEA included installers with little to no prior experience in HPWH installation across the Northwest.

Key takeaways identified opportunities to support installers in recommending HPWHs to customers. For example, findings highlight that providing more design and size options for retrofit situations may increase installer comfort and confidence in recommending HPWHs. Furthermore, observational research found that installers believe HPWHs can be installed in most homes, and that it is comparable to "installing a traditional water heater." However, the study identified opportunities to improve product options and availability to enhance the feasibility of installations. Given these discoveries, there is a valuable opportunity to engage in additional collaborations with installers to amplify their confidence in recommending HPWHs.

A final report is available on neea.org.

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Connected Consumer Products Market Research

Retail Product Portfolio (RPP) | **FIELDING**

On behalf of its RPP program, NEEA is conducting market research to assess consumers' use and attitudes toward purchasing connected consumer products. The RPP team expects to kick off the project in late Q1 2024 or early Q2 2024.

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Retailer and Manufacturer Sustainability Goal Literature Review

Retail Product Portfolio (RPP) | **REPORTING**

NEEA contracted with Apex Analytics to conduct a literature review of television and major appliance retailer and manufacturer sustainability goals. The study will publicly available information on organizations' sustainability goals as well as academic and industry articles to meet the following objectives:

- Compile information on regulatory and investor motivations that are driving organizations' sustainability efforts.
- Compile retailer and manufacturer sustainability goals and provide a summary of retailers/manufacturers sustainability goals, focus areas, and strategies.
- Assess which organizations are considered leaders or are investing heavily in sustainability/efficiency and which are investing less.
- Provide recommendations for how the ENERGY STAR® Retail Products Platform program could provide value to retailers/manufacturers pursuing sustainability goals.

This project kicked off in Q4 2023, and a final report is anticipated in Q2 2024.

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Market Progress Evaluation Report #2

Codes | **REPORTING**

NEEA contracted with ADM Associates to conduct an Market Progress Evaluation Report (MPER) for its commercial and residential codes efforts. Using information gleaned through document review, interviews with NEEA staff, market actors, and implementers/trainers for NEEA-supported trainings, and a survey with recent trainees ADM concluded that:

- NEEA is successfully influencing more robust energy codes in the Northwest and nationally.
- NEEA's training and education efforts are effectively supporting market actors, but NEEA should improve its efforts to track the use and outcomes of these activities.
- The recently revised NEEA's Codes program logic model accurately captures the team's training and education work, but that the logic model should be updated to better reflect the nuances of the team's work to influence the development and adoption of energy codes in the Northwest.

A final report is expected in late Q1 2024.

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Home Energy Raters Market Research

Codes | **FIELDING**

NEEA contracted with TRC to conduct market research with home energy raters in the Northwest to meet the following objectives: 1) Develop an estimate of the number of home energy raters currently working in the new construction market in each state in the Northwest, and 2) Provide an assessment of:

- Current raters' business practices
- Raters' perceptions of the current market for home energy ratings
- How raters' practices and perceptions differ across urban and rural areas

This project kicked off in February 2024, and a final report is anticipated in Q3 2024.

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Idaho Residential Code Compliance Evaluation

Residential Codes | **REPORTING**

NEEA contracted with Industrial Economics, Inc. (IEc) to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Idaho state code processes. Using data collected through permit review, site visits to residential new construction building sites, and interviews with market actors, this research will address the following objectives:

- Assess statewide compliance with selected code requirements among single-family homes built under IECC 2018 with Idaho amendments.
- Develop estimates of statewide energy code compliance and compliance within urban and rural jurisdictions separately.
- Provide statewide findings regarding primary space and water heating fuel and above-code elements.

This work kicked off in Q1 2023, and the final evaluation of Idaho's residential energy code is expected in Q2 2024.

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Montana Residential Code Compliance Evaluation

Residential Codes | **FIELDING**

NEEA contracted with IEc to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Montana state code processes. Using data collected through permit review, site visits to residential new construction building sites, and interviews with market actors, this research will address the following objectives:

- Assess statewide compliance with selected code requirements among single-family homes built under IECC 2018 with Montana amendments.
- Develop estimates of statewide energy code compliance and compliance within urban and rural jurisdictions separately.
- Provide statewide findings regarding primary space and water heating fuel and above-code elements using data collected on individual code requirements.

This work kicked off in Q1 2023 but paused in mid-2023 due to challenges with collecting permit data. The project re-launched in January 2024 with a new data collection plan that relies on on-site data collection. A final report is expected in Q4 2024.

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Oregon Residential Code Compliance Evaluation

Residential Codes | **FIELDING**

NEEA contracted with IEc to review assumptions underlying its estimation of energy savings resulting from NEEA's and its partners' involvement in the Oregon state code processes. This evaluation will:

- Assess statewide compliance among single-family homes built under the 2021 Oregon Residential Specialty Code (ORSC).
- Provide statewide findings regarding primary space and water heating fuel and above-code elements using data collected on individual code requirements.
- Provide an analysis of builders' choices regarding compliance pathways and efficiency level to which the home is built.

IEc will collect data from permits, site visits to residential new construction building sites, and interviews with market actors. In addition, NEEA contracted with NMR Group to collect data on inhabited homes using homeowner self-audits. These data will be provided to IEc for analysis.

This project kicked off in February 2024, and a final report is expected in Q4 2024.

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Idaho Commercial New Construction Code Compliance Evaluation

Commercial Codes | **FIELDING**

The Idaho Commercial New Construction Code Evaluation study focuses on (a) assessing the path(s) by which and degree to which code compliance is achieved with the amended 2018 International Energy Conservation Code (IECC) in newly constructed buildings, and (b) measuring the energy performance of a subset of these buildings as compared with the average energy performance of buildings constructed under previous code. The results of the study will provide direction to the development and implementation efforts of the NEEA Codes team and will provide other regional code stakeholders guidance in targeting their energy efficiency work in the commercial new construction sector.

NEEA contracted with Opinion Dynamics to undertake this study. The study design and methodology selected for this project focuses on permit data and building plans as the primary sources of construction and compliance information, with virtual or in-person site visits planned for a subsample of participating buildings in order to validate the accuracy of permit data. The project kicked off in mid-Q3 2023, with planning and sample development continuing through Q4 2023. Data collection, including interviews with site contacts, desk review of permit data, and in-person/virtual site visits, are scheduled to commence in Q1 2024 and conclude in Q3 2024. This study includes analysis of billing data; collection of this data is planned to continue through the end of Q3 2024, with analysis and report preparation to follow. A final report is anticipated in Q4 2024.

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Montana Commercial New Construction Code Compliance Evaluation

Commercial Codes | **FIELDING**

The Montana Commercial New Construction Code Evaluation study focuses on (a) assessing the path(s) by which and degree to which code compliance is achieved with the 2018 IECC in newly constructed buildings, and (b) measuring the energy performance of a subset of these buildings as compared with the average energy performance of buildings constructed under previous code. The results of the study will provide direction to the development and implementation efforts of the NEEA Codes team and will provide other regional code stakeholders guidance in targeting their energy efficiency work in the commercial new construction sector.

NEEA contracted with Michaels Energy to undertake this study. The study design and methodology selected for this project focuses on permit data and building plans as the primary sources of construction and compliance information, supplemented by telephone or virtual interviews with building owners and operators to contextualize and enrich the results of permit and plan analysis. The study also includes virtual or in-person site visits planned for a subsample of participating buildings in order to validate the accuracy of permit data. The project kicked off in mid-Q2 2022, with planning and sample development continuing through Q1 2023. Data collection, including interviews with site contacts and desk review of permit data, commenced in Q2 2023 and is scheduled to conclude in Q1 2024, while in-person/virtual site visits commenced in Q4 2023 and are scheduled to conclude in Q1 2024. This study includes analysis of billing data; collection of this data is planned to begin in mid-Q1 2024 and continue through early Q2 2024, with analysis and report preparation to follow. A final report is anticipated in Q2 2024.

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Battery Chargers Standard Evaluation

Standards | FIELDING

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the battery chargers standard. NEEA contracted with Michaels Energy to conduct a qualitative assessment of NEEA's influence on the standards processes and provide a quantitative estimate of the share of savings resulting from the standards that are the result of NEEA and other efficiency organizations' efforts. The project kicked off in September 2023 but paused in late 2023 due to a change in the U.S. Department of Energy's (U.S. DOE) timeline for publishing the final rule. Michaels Energy will re-launch the project in August 2024, at which point they will review NEEA records and publicly available documents and will conduct interviews with key stakeholders from NEEA, U.S. DOE and other organizations. A final report is anticipated Q4 2024.

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Non-Weatherized Gas Furnaces and Mobile Home Furnaces Standard Evaluation

Standards | REPORTING

NEEA's Codes and Standards team engaged in efforts to increase the stringency of the standard for non-weatherized gas furnaces and mobile home furnaces. NEEA contracted with Michaels Energy to conduct a qualitative assessment of NEEA's influence on the standards processes and provide a quantitative estimate of the share of savings resulting from the standards that are the result of NEEA and other efficiency organizations' efforts. The project kicked off in September 2023, and Michaels Energy is reviewing NEEA records and publicly available documents and conducting interviews with key stakeholders from NEEA, U.S. DOE and other organizations. A final report is anticipated in Q2 2024.

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Transition Market Progress Evaluation Report

Manufactured Homes | **REPORTING**

In the spring of 2023, the Northwest Energy Efficiency Alliance (NEEA) contracted with Apex Analytics to conduct a Transition Market Progress Evaluation Report for its Manufactured Homes Program. NEEA's program supports the adoption of manufactured homes meeting the Northwest Energy Efficient Manufactured Housing Program™ (NEEM)+ specification, developed by Northwest Energy Works. NEEM+ is a more stringent standard than the ENERGY STAR Version 2 specification, which has been in effect throughout the program's history.

The study addressed four key objectives:

- Confirm that the NEEM+ specification will remain viable without NEEA's intervention.
- Summarize initiative history in a narrative that describes the program's work and achievements from its inception to present day.
- Track select market progress indicators.
- Recommend viable approaches for conducting subsequent long-term monitoring and tracking efforts.

Report findings indicate that while NEEM+ market share is currently low, it is, in the opinion of manufacturers and retailers, still stable in the near term. Manufacturers and retailers agreed that their NEEM+ home sales were steady or had risen in the past two years. Since market forces are changing because of the new ENERGY STAR specification which takes effect in 2026, it is advised that NEEA should continue to monitor the market to ensure that NEEM+ homes remain a viable alternative on an ongoing basis.

A final report is available on neea.org.

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Energy-Efficient Technology in Cold Weather - Bridger View On-Site Research

New Construction | REPORTING | -

NEEA contracted with JG Research & Evaluation, LLC in the fall of 2021 to conduct a study of the new Bridger View housing development in Bozeman, Montana. The purpose of the study was to better understand how a cold weather climate may influence the adoption and performance of various technologies which included:

- Building envelope and insulation
- Triple pane windows
- Ductless heat pumps (DHP)
- Heat pump water heaters (HPWH)

This research took place over a period of approximately two years and covered each phase of the construction of Bridger View, which included 1) planning and design, 2) construction, and 3) homeowner lived experiences in the homes. The study concluded that decision makers (such as project consultants) were confident that the technologies would perform well in cold climates while installers expressed concern about installing HPWH and DHPs. This concern stemmed largely from unfamiliarity with the technologies. However, study findings show that Bridger View installation process appears to have positively changed these perceptions. Additionally, homeowners interviewed cited positive experiences and those who lived in the homes through a winter said they were impressed by the technology performance, such as maintaining consistent temperatures and overall lower energy bills.

A final report is available on neea.org.

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TOGETHER *We Are Transforming the Northwest*

AVISTA · Bonneville Power Administration · Cascade Natural Gas Corporation · Chelan County P.U.D. · Clark Public Utilities · EnergyTrust of Oregon · Idaho Power An IDACORP Company · NorthWestern Energy · NW Natural · Pacific Power · Portland General Electric · PSE Puget Sound Energy · Seattle City Light · Snohomish County PUD Public Utility District No. 1 · Tacoma Power Tacoma Public Utilities