2023 Q1 Market Research & Evaluation Quarterly Newsletter

WHAT'S NEW:

Hello everyone!

The Market Research and Evaluation (MRE) team is pleased to bring you this quarter's MRE newsletter. The team is looking ahead to a second quarter of lots of reports! More than half of the twenty-three studies that are currently have underway anticipate final reports to post in the next three months. These reports become key assets to the Market Transformation programs they serve, as well as to the region. NEEA's evaluation reports, such as Market Progress Evaluation and Market Characterization reports, not only assess and document progress toward expected market outcomes, but they also provide market insights to help refine the program and improve its effectiveness at transforming the market.

A few of the evaluation projects you will see described in the newsletter do not have an explicit program adaptive management use case. Examples include baseline reviews, cost-benefit model reviews, and key assumptions reviews. MRE is not tracking progress toward outcomes in these studies, and the team is not using the results to refine the program. Instead, the results of these evaluations help to refine the modeled savings for the program. They validate the model assumptions (or, as the case may be, reject them or suggest improvements) and they help to refine the accuracy of the estimated costs and benefits associated with the program's market influence. Thank you for taking some time to read over the newsletter. Please reach out with any questions or suggestions. Until next time, I hope you have a wonderful spring!

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

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DUAL FUEL (Electric & Natural Gas) PROJECTS:

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

Long-term Monitoring & Tracking

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Residential Codes: *Idaho and Montana Residential Code Evaluations*		✓	
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Market Progress Evaluation Report #1

Efficient Rooftop Units (ERTU) | **PLANNING**

As of late 2022, NEEA's ERTU program is actively engaging in the market to adopt ERTUs for gas-heated commercial buildings across the region. This Market Progress Evaluation (MPER) 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; and
3. Qualitatively assess program influence on observed market transfomation.

NEEA will conduct the ERTU MPER in close coordination with the MPER for the High-Performance HVAC Program because these programs engage with the same market actors (commercial HVAC contractors, commercial building decision makers, etc.) and have closely related target markets (existing small- to mid-sized commercial buildings with gas vs. electric heat). Coordination of the MPERs allows NEEA to reduce data collection costs and burdens placed on market actors in the region.

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

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Market Progress Evaluation Report #1

High-Performance HVAC | **PLANNING**

As of late 2022, NEEA's High-Performance HVAC program is actively intervening to transform the market for very high efficiency Dedicated Outside Air Systems (DOAS) for electrically heated commercial buildings across the region. This MPER 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; and
3. Qualitatively assess program influence on observed market transfomation.

NEEA will conduct the High-Performance HVAC MPER in close coordination with the MPER for the Efficient RTUs program. The evaluation will be ongoing through the fall of 2024, with a final report anticipated in Q4 2024.

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Naturally Occuring Baseline Review

High-Performance Windows | **FIELDING**

The residential High-Performance Windows program contracted with The Cadmus Group to launch a third-party review of the program's naturally occurring baseline forecast in Q2 2023. The research objectives for this study are to:

1. Review NEEA's overall approach for estimating the naturally occurring baseline of high-performance windows.
2. Review NEEA's approach to estimating the market average U-value of windows sold in the Northwest prior to the program's intervention.
3. Review and recommend improvements to NEEA's approach to incorporating market drivers of high-performance windows into its naturally occurring baseline. Fielded research will begin in Q2 2023.

Fielded research will begin in Q2 2023, and a final report is anticipated in Q3 2023.

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Incremental Cost Study

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

NEEA contracted with Energy Solutions to conduct the biennial incremental cost study for the LLLC program.

The research objectives for this study are to: 1) document the brands and models available for LLLC systems, 2) estimate the incremental price between non-controlled LED fixtures and LED fixtures with LLLC, 3) estimate and compare the cost of components and energy efficiency capabilities across all three levels of LLLC fixtures (smart, clever, and hybrid), and 4) gain insight into sales of exterior LLLC control systems and fixtures.

A final report is anticipated in Q2 2023.

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Key Assumptions Review

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

NEEA's LLLC program contracted with The Cadmus Group to complete a third-party review of several key assumptions underlying its energy savings model. The research objectives for this study are to: 1) review NEEA's approach for estimating hours of use and control savings fraction for LLLC, 2) explore how NEEA can quantify energy savings that fully represent the adoption of LLLC, given that fixture wattage may decrease over time, and 3) review and recommend improvements to NEEA's approach to estimating the number of LLLC fixtures being sold in the Northwest.

Fielded research completed in Q4 2022, and a final report is anticipated in early Q2 2023.

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Market Progress Evaluation Report #2

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

NEEA's LLLC program seeks to accelerate the adoption of LLLC in commercial buildings for new construction, major renovation, and retrofit projects. NEEA contracted with The Cadmus Group to conduct the second MPER and will address the following questions in this study:

1. How do the program documents clarify and align to convey the program's strategy and planned activities to overcome market barriers and drive market changes that will increase LLLC adoption?
2. To what extent has the program progressed toward achieving its short and mid-term outcomes as tracked through its market progress indicators?
3. How might NEEA program activities be affecting the broader networked lighting control (NLC) market?
4. What leads decision-makers to purchase LLLC (versus other NLC)? What features (including non-energy benefits) do they value leading up to purchase and after the product is installed?

A final report is anticipated in Q3 2023.

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Dual-Fuel and Gas Heat Pump Market Research

Natural Gas Portfolio and Strategy | **REPORTING**

NEEA contracted with Lieberman Research to conduct a market research study to gather HVAC system buyer and HVAC contractor perceptions and (when possible) feedback about four emerging HVAC technologies. Findings from the study will complement ongoing NEEA product research to assess product performance and readiness for Northwest markets. The study will help NEEA determine which, if any, of these technologies to further investigate for market transformation or other types of energy efficiency programs in the Northwest.

The study seeks to answer three main research questions for each of the technologies:

1. What are the value propositions for buyers and HVAC contractors?
2. What are the possible target markets?
3. What are the barriers to adoption?

The four technologies are residential dual-fuel heat pumps, residential gas heat pumps, commercial gas heat pumps for space and/or water heating, and commercial dual-fuel rooftop units. The Lieberman Research team is recruiting and interviewing consumers, commercial building decision makers, and HVAC contractors to address these research questions. Early findings are anticipated in early Q2 2023.

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Baseline and Key Assumptions Review

Variable Speed Heat Pumps (VSHP) | **REPORTING**

Cadmus Group will complete an independent review of NEEA's VSHP naturally occurring baseline market share forecast and key assumptions for modeling savings and other analyses. The evaluation questions for the review are:

1. Are the data and methods used to determine unit energy savings reasonable and sufficient for credible accounting of energy savings? What refinements, if any, are needed to NEEA's data sources and methods?
2. Are data sources and methods for determining the incremental first cost of the measure, and incremental operations and maintenance costs, reasonable and sufficient for credible estimates of cost effectiveness? What refinements, if any, are needed to NEEA's data sources and methods?
3. Is NEEA's naturally occurring baseline forecast a reasonable representation of market adoption without intervention by NEEA, utility programs, or its partners? What refinements, if any, are needed to NEEA's baseline forecast and what evidence supports these changes?

The completed review and final report are anticipated in early Q2 2023, after which findings will be presented to NEEA's Cost-Effectiveness Advisory Committee (CEAC).

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Fan System Market Characterization | Efficient Fans | FIELDING

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 manufactures and highlighting efficiency metrics within their selection software. The initial program focus will be in the commercial and industrial sectors.

The objectives for this Market Characterization study include:

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

A project kick-off was held in February 2023, with data collection scheduled to commence in Q2 2023 and planned to include multiple market actor groups (e.g., fan system manufacturers, manufacturers' representatives, distributors, and end users). The study is expected to conclude by the end of Q3 2023, and a final report is anticipated in Q4 2023.

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Commercial Adjustable Speed Drive Market Penetration Research

Motor-Driven Products | **REPORTING**

As part of NEEA's assessment of intervention opportunities in the market for commercial adjustable-speed drive (ASDs, hereinafter referred to simply as "drives"), NEEA contracted with Johnson Consulting Group, LLC, to conduct a market research study. The study seeks to understand the rate of market penetration for drives in the alliance's four-state region, particularly as pertaining to drives paired with commercial pumps and fans. This research will also provide insight into the decision-making processes and factors underlying market actors' choice to pair drives with commercial pumps and fans. A kickoff meeting took place in October 2022, with sample development completed in January 2023 and data collection activities running through March 2023. A a final report is anticipated in Q2 2023.

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Benefit Cost Model Review

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

In Q4 2022, NEEA contracted with Larson Energy Research to conduct a review of its Benefit Cost Model for the HPWH program. The work commenced in early 2023 and will result in a final report by early Q2 2023. The key activities include:

1. Reviewing extrapolation methodologies used to estimate manufacturer shipments
2. Assessing NEEA estimates for HPWH market share in single-family new construction
3. Reviewing and validating the modeling assumption underlying the removal of Tier 1 and Tier 2 measures for future years.

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Market Research: Challenging Installation Scenarios | Heat Pump Water Heaters (HPWH) | REPORTING

In the summer of 2020, NEEA contracted with Cadeo Group to explore water heater installer experiences with challenging installation scenarios for HPWH equipment. Findings intend to help the HPWH program develop the best approaches to help installers to overcome these difficulties, thereby enabling them to offer HPWHs to their customers as a potential replacement. Furthermore, this study supports the program's Market Transformation objectives by collecting information to inform and support NEEA's efforts in influencing an anticipated Federal water heating standard for HPWHs. Other objectives included:

1. Estimating the prevalence of these scenarios in the regional housing stock
2. Understanding the frequency with which installers encounter each scenario
3. Investigating the level of effort required to overcome challenges
4. Identifying where installers turn for information or solutions

This report complements other regional studies that have explored the prevalence of so called "challenging installations" for HPWHs in the housing stock. NEEA's recently released report, entitled "HPWH in Small Spaces Lab Testing: 'The Amazing Shrinking Room'" also adds to the body of knowledge on this topic. In addition, NEEA is currently conducting observational research of installations in cold climate locations in the Northwest to determine if there are challenges specific to cold climate regions. Plans are underway to prepare the final report summarizing the findings of this study.

A final report is anticipated in Q2 2023.

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Market Progress Evaluation Report #7

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

NEEA contracted with NMR Group to conduct the seventh Market Progress Evaluation Report (MPER) for the HPWH program. The key objectives of this effort are to:

1. Ensure the logic model accurately reflects how the current Market Transformation theory for the program is being implemented and assess the MPIs for usefulness
2. Estimate 2022 penetration of HPWHs in the region with sales broken out by key attributes
3. Evaluate the program's performance over the course of 2022 in achieving outcomes by measuring against a subset of MPIs tied to the program's highest priority barriers
4. Assess the effectiveness and impact of the "Boring but Efficient" downstream marketing campaign conducted in 2022

The kickoff occurred at the beginning of 2023 and a final report is expected in early Q3 2023.

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Installer Focus Groups | Heat Pump Water Heaters (HPWH) | FIELDING

NEEA contracted with ILLUME Advising in Q4 2022 to conduct qualitative research to better understand any challenges installers and plumbers in the region might face around recommending and installing HPWHs in existing single-family homes. A 2020 survey of HPWHs installers in the Northwest identified several factors and specific structural barriers that can complicate a HWPH retrofit, such as, but not limited to wiring constraints, small installation spaces, physical location of the unit, and proximity to condensate drain. This research provided insight as to how installers in the region might overcome these types of challenges and was specifically focused on installers that had experience with installing HPWHs. In this upcoming research, NEEA will include both active HPWH installers and those with little or no prior experience in HPWH installation across the Northwest. The key objectives of the upcoming research are to:

1. Identify the underlying reasons why installers and plumbers might be resistant to offering and installing HPWHs to customers seeking a new water heater
2. Understand the opinions and thoughts about where and why installers are not recommending and/or installing HPWHs
3. Gauge general level of resistance to code and standard changes among installers
4. Understand how installers might react to the passage of the proposed federal standard
5. Learn about what behaviors they might use to adapt to a new standard

In Q1 and Q2 2023 ILLUME Advising is recruiting for and conducting between six to eight virtual focus groups across the region with installers and plumbers that have limited experience with HPWH installation. A final report is expected in Q2 2023. Findings will inform future training efforts and help the program improve its messaging campaigns targeted to installers across the region.

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Refrigerator Baseline Update | Retail Product Portfolio (RPP) | REPORTING

ENERGY STAR® awarded a 2020-2021 Emerging Technology Award (ETA) to advanced adaptive compressors used in refrigerators and freezers and then extended the award into 2022. The number of qualifying models listed by manufacturers increased significantly in 2022. NEEA used the expanded list to re-assess the market share of qualifying products prior to the ETA and found that there was a higher proportion of qualifying products being sold in the market prior to the ETA than previously believed. As a result, NEEA contracted Apex Analytics to review the findings of the 2022 Refrigerator and Freezer Influence Assessment and Baseline Review they conducted for NEEA using the updated market share data. This project began in Q1 2023 and a final report is anticipated in Q2 2023.

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Market Progress Evaluation Report #2 | Retail Product Portfolio (RPP) | REPORTING

NEEA's RPP program provides mid-stream incentives to retailers for sales of qualifying efficient products, such as refrigerators and clothes washers, to influence retail assortment and product promotion, obtain access to sales data, and ultimately influence the ENERGY STAR specification or federal standard. NEEA contracted with TRC to conduct the second MPER for RPP to meet the following research objectives:

1. Review NEEA's updated RPP logic model and make recommendations for improvement
2. Document activities and outputs and assess progress on applicable market progress indicators (MPIs) for each product in the program's portfolio
3. Evaluate NEEA's methodology for extrapolating short-term savings to the full market

RPP MPER #2 kicked off in July 2022. A final report is expected in Q2 2023.

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Commercial Kitchen Equipment and High CRI Lamp Oregon and Washington State Standards Evaluation

Standards | **REPORTING**

NEEA's Codes and Standards team engaged in efforts to support the development of state standards in Oregon and Washington for commercial kitchen equipment (fryers and steam cookers) and high color rendering index (CRI) lamps. NEEA contracted with Michaels Energy to conduct a qualitative assessment of NEEA's influence on the standards processes in Oregon and Washington. The study intends to provide a quantitative estimate of the share of savings resulting from the standards that are the outcome of NEEA and other efficiency organizations' efforts. The project kicked off in August 2022 and a final report is anticipated in Q2 2023.

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Idaho and Montana Residential Codes Evaluation

Residential Codes | **FIELDING**

NEEA contracted with IEc to review assumptions underlying its estimation of energy savings resulting from NEEA and its partners' involvement in the Idaho and Montana state code processes. This research will involve assessing compliance with 2018 IECC with Idaho amendments and 2018 IECC with Montana amendments and addressing market research questions of interest to NEEA's Codes & Standards team. This work kicked off in Q1 2023 and final reports are anticipated in Q4 2023.

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Washington Residential Code Evaluation

Residential Codes | REPORTING

NEEA contracted with TRC to review assumptions underlying its estimation of energy savings resulting from NEEA and its partners' involvement in the Washington State Residential Energy Code (WSEC-2018) process. To understand the characteristics of homes built under WSEC-2018, TRC will conduct virtual audits with owners of single-family homes built under the code and assess data from the Residential Energy Services Network (RESNET) database for homes built under WSEC-2018. They will also collect permits for all homes included in the virtual audit and RESNET samples. TRC will conduct analyses to:

1. Estimate residential new construction compliance for single-family homes built under WSEC-2018
2. Assess NEEA's approach for estimating compliance for 2–4-unit multifamily buildings
3. Determine the compliance pathways builders are taking to meet WSEC-2018 code requirements in single-family residential buildings
4. Determine fuel selection for space and water heating in single-family residential buildings built under WSEC-2018
5. Assess how well permits represent completed homes built under WSEC-2018
6. Assess the efficacy and potential replicability of the study methodology over time and across states in the Northwest (Idaho, Montana, Oregon and Washington)

This project kicked off in June 2022, and data collection is underway. A final report is anticipated in Q2 2023.

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Market Progress Evaluation Report #2

Commercial and Residential Codes | **REPORTING**

NEEA contracted with ADM Associates to conduct a MPER for its Commercial and Residential Codes efforts. ADM will evaluate the logic and clarity of the updated Codes logic model, make recommendations for improvement and assess outcomes associated with Codes training and education activities. The project kicked off in October 2022 and a report from the first suite of study activities is expected in early Q2 2023.

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Idaho Commercial New Construction Code Evaluation

Commercial Codes | **PLANNING**

The Idaho Commercial New Construction Code Evaluation study will focus 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. The study is expected to begin in Q3 2023 and a final report is anticipated in Q4 2023.

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Montana Commercial New Construction Code Evaluation

Commercial Codes | **FIELDING**

The Montana Commercial New Construction Code Evaluation study is focused on (a) assessing the path(s) by which and degree to which code compliance is achieved with the 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 Michaels Energy to undertake this study. The study design and methodology selected for this project focuses on permit data as the primary source 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-Q2 2022, with planning and sample development continuing through late Q4 2022. Data collection, including interviews with site contacts, desk review of permit data, and in-person/virtual site visits, is scheduled to commence in Q1 2023 and conclude in Q2 2023. This study also includes analysis of billing data and collection of this data is planned to continue through late Q3 2023, with analysis and report preparation to follow. A final report is anticipated in Q1 2024.

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Ductless Heat Pump Long-Term Monitoring and Tracking, Year 2

REPORTING

This study is the second Long-Term Monitoring and Tracking (LTMT) study for DHPs. NEEA intends to conduct the study annually to monitor signs of diffusion of DHPs in NEEA's three target markets (single family homes with zonal heating, single family homes with electric forced air furnaces, and manufactured homes with electric forced air furnaces). Each year, the study will track four diffusion indicators:

1. The number of DHPs installed in single-family homes to displace/replace electric zonal heat or electric forced-air furnaces is increasing
2. The installed cost for a single-head system remains constant or decreases
3. The share of regional HVAC companies/installers offering DHPs remains constant or is increasing
4. The number of counties in the region with HVAC companies that install DHPs remains constant or is increasing

Evaluation contractor Johnson Consulting Group conducted three surveys of HVAC contractors for the study, as well as utilized secondary data from NEEA. A final report is anticipated in Q2 2023.

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TOGETHER *We Are Transforming the Northwest*

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