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Extended Motor Products Market Progress Evaluation Report #1

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1 Executive Summary

The Northwest Energy Efficiency Alliance (NEEA) selected ADM Associates ("ADM") to conduct the first Market Progress Evaluation Report (MPER) for the NEEA Extended Motor Products (XMP) Market Transformation Program. In consultation with the NEEA evaluation team, ADM carried out the tasks necessary for this MPER throughout 2024.

Recent technological advancements, such as the growth of smart pumps and improvements in overall pump efficiency, combined with the development of the Hydraulic Institute's (HI) Energy Rating (ER) label for pumps and new federal standards, have provided the Northwest a unique opportunity to transform the pumps market that could result in up to a 60% improvement in efficiency. Currently, there is a lack of awareness, confidence, and product performance concerns in these emerging products by key market actors. To address these market barriers and enable diffusion, the XMP program takes a multi-pronged approach that targets several areas of the sales channel directly. The program develops deep relationships with manufacturer's representatives (currently including eight firms) to raise awareness and understanding of smart pump technology and develops tools to support savings validation and to demonstrate value to owners. Agreements are formalized to provide ongoing support to those organizations, while creating a confidential process by which sales data can be shared. NEEA marketing capabilities are leveraged to help partners build awareness within targeted market segments and support innovative training and promotional approaches. The program conducts research to validate and demonstrate reliability and ease of maintenance, along with producing case studies that demonstrate the product advantages, cost-effectiveness, and reliability of smart pumps. This information is shared with manufacturer's representatives to leverage in market engagement and training opportunities, as well as supporting broader market awareness that touches market actors. The program also works with HI to improve and influence the ER label, which offers a mechanism for product differentiation for smart pumps, hence improving awareness. Close collaboration with HI, along with market actors such as manufacturers and manufacturer reps, allows NEEA to influence specifications and test procedures that result in comment letters to DOE to influence federal performance standards for pumps.

This MPER had two research objectives:

1. To review and assess:
    a. the market transformation (MT) theory behind the program,
    b. the program logic model (PLM) that graphically represents that theory,
    c. and the market progress indicators (MPIs) that NEEA has identified, corresponding to the program's various planned outcomes; and
2. To assess program progress, using the NEEA developed MPIs, via primary and secondary research activities.

Research activities included a review of program documents and data and interviews with NEEA staff, implementer staff, Program partner staff, XMP participant manufacturers' representatives, nonparticipant manufacturers' representatives, specifiers, contractors, and project owners.

In general, the ADM Team determined that the logic model captures the market barriers the program is addressing, identifies the key program activities, and lists suitable outputs and

outcomes. There are some specific edits the Team suggested, especially around developing a compelling value proposition for using the ER Label.

Participants represent most sales of pumps and circulators in the region. Reviewing participant and nonparticipant sales data revealed that participants sell more smart pumps and a greater percentage of their sales are smart pumps compared to nonparticipants. In fact, participant data shows they sell more than two times the percentage of smart pumps as nonparticipants. Study results indicate that working with NEEA has led some participants to target specific pumps for sale instead of trying to sell a wide range of pumps, allowing them to position themselves as industry experts and increasing differentiation for the pumps they emphasize.

Program data reveals that the ER rating of pumps and circulators has steadily increased over the last few years despite low awareness of the ER Label among specifiers and contractors and low use of the ER Label by manufacturers' representatives in their customer interactions. Two specifiers also reported not seeing a real value to having something like an ER Label on pumps and circulators because they prioritize other aspects of pumps and circulators like reliability, health and safety, and complying with code. Most contractors and project owners reported getting information about pump performance from nameplates on the equipment, manufacturer websites, and manufacturers' representatives.

NEEA staff are engaged with many organizations to drive federal efficiency standards. They serve on committees with ASHRAE, work with a coalition of groups to comment on changes to federal standards, and sponsor research highlighting the need for federal standards changes. For example, NEEA supported work that determined building owners were using non-clean-water pumps and circulators that were not subject to federal efficiency standards in clean-water applications. This determination led the DOE to subject those pumps and circulators to federal standards.

Conclusions and Recommendations

Conclusion #1: The logic model aligns with the theory of change underlying the XMP program's work and NEEA developed a reasonable and largely evaluable list of MPIs with one key exception: The logic model does not identify the barrier that market actors do not prioritize efficiency, and they need compelling reasons to install an efficient pump beyond efficiency. The logic model would benefit from adding a barrier about the lack of importance market actors place on efficiency despite some interest among project owners. The existing barriers imply there are efficiency benefits to smart pumps that specifiers and buyers do not understand but the logic model does not recognize that specifiers and buyers do not prioritize or even consider efficiency. Market actors are trying to solve problems such as improving the reliability or performance of a system or ensuring codes compliance when they are installing a pump. Therefore, manufacturers' representatives, specifiers, and contractors need a reason to pay attention to the ER Label and efficiency in general when working with customers.

> Recommendation #1.1: Edit the logic model per the "suggested change" column seen in Table 4-1. In doing so, pay special attention to elements related to increasing awareness of the importance of efficiency in general, the ER Label more specifically. Also pay attention to connecting those elements to the issues of concern to market actors – health, safety, reliability, code compliance, and other elements. Add elements and phrases that seek to describe market actors' relative lack of interest in energy efficiency when they are selling, specifying, and installing clean-water pumps and circulators.

Recommendation #1.2: NEEA should work with market actors to develop a value proposition for why paying attention to the ER Label specifically and efficiency more generally, is important. Emphasizing the non-energy benefits of efficient and smart pumps and circulators and tying that to the ER Label, if possible, may be one way to increase awareness and use of the ER Label and to further drive adoption of efficient and smart pumps. At the same time, emphasize that efficient and smart pumps do not mean that market actors have to compromise on the other factors of concern. They can have a safe, reliable, code compliant, and efficient pump.

Conclusion #2: XMP participants value the support the program provides, and they are engaged in the program, providing suggestions for ways to make the program even more successful for them and NEEA in the future. All participants reported high levels of satisfaction with the program. They appreciated the feedback the program provides them with and the assistance the program has provided in their marketing efforts. The suggestions for improvement they provided are actions NEEA is already undertaking or planning to undertake, such as working with technical schools and universities to educate tradespeople and other professionals about the importance and benefits of efficient pumps and circulators. The evaluation team wanted to highlight this program success but does not have a recommendation beyond continuing this work.

Conclusion #3: XMP participants differ from nonparticipants, especially in their sales of smart pumps. Efficient pump and circulator sales and smart pump sales have been trending upward among participants and participants are selling a greater number of smart pumps than nonparticipants and a greater percentage of participants' sales are smart pumps compared to nonparticipants. From 2022 through November 2024 participant sales of efficient pumps and circulators increased from 26% to 33% of all sales and smart pump sales increased from 11.5% to 16.1%. In contrast, about 6.6% of nonparticipant pump sales in the last two years were smart pumps, which is less than half the percentage of participants' smart pump sales. This suggests that program efforts are having some influence on manufacturer representatives' sales of smart pumps.

Recommendation 3.1: As indicated in conclusion #1, work with manufacturer representatives to identify and emphasize the non-energy benefits of smart pumps as one way to further increase sales of efficient pumps generally and smart pumps more specifically. Look for ways to further promote smart pumps among participants including identifying ways smart pumps can help market actors solve problems without jeopardizing their primary considerations.

Conclusion #4: Awareness of the ER Label is high among manufacturers' representatives, low among specifiers and contractors, and moderate among project owners, creating an inconsistent landscape of awareness and use of the ER Label. Awareness among manufacturers' representatives generally comes from manufacturers and NEEA. Project owners reported becoming aware of the ER Label primarily from manufacturer websites and pump dealers or representatives. Additionally, manufacturers' representatives, both participants, and nonparticipants, do not use the ER Label when assessing client needs, and none reported selling more efficient motors or controls because of the ER Label. As noted in conclusion #1, it is also unclear why these groups should pay attention to the ER Label, as they do not generally see a reason to pay attention to efficiency in general.

Recommendation 4.1: Increasing awareness and use of the ER Label among specifiers and contractors seems critical to increasing awareness and use of the ER Label across the market. Currently, one-third of project owners that are aware of the ER Label are mostly learning about the ER Label from manufacturer sources, not from the people that are

specifying and installing their pump and circulator systems. Targeting specifiers with information about the utility of the ER Label, that is how the ER Label can be used to help them in their work, will be critical to increasing market awareness in the future.

Conclusion #5: NEEA serves as a critical player in working to expand and increase federal performance standards for pumps and circulators. Through NEEA's direct interactions with DOE, serving on code review committees with efficiency partners like ACEEE and California-based utilities, and their work to develop ASHRAE code, the code referenced by DOE in federal standards, NEEA plays a notable role in the advancement of pump and circulator performance standards. For example, NEEA's research identified a blind spot in federal performance standards where end-users were using non-clean-water pumps in clean-water pump applications. DOE ultimately changed the standard to include these pumps so they would be subject to performance standards. The evaluation team wanted to highlight this program success but does not have a recommendation beyond continuing this work.

Conclusion #6: Specific market actor research is necessary to better understand the population of clean-water pump and circulator specifiers, contractors, and project owners. Despite large incentives for market actors ($100 to $500), using a variety of contact information sources (from commercial list sources like Data Axle and Dunhill, third party audience specific recruiters like Symmetric Sampling and WTWH Media (CSE Magazine), third party contacts like Trade Press Media and Building Potential, and NEEA staff) and making multiple attempts via all modes available (phone, email, and mail), the Team did not collect responses from the number of respondents they anticipated. This low response rate is consistent with the lower-than-expected response rates the evaluator saw while conducting the 2022 Energy Rating Label Awareness Study.[1] The inability to reach the anticipated populations suggests that the initial estimates of the population of each of these groups is considerably smaller than originally believed, that the messaging used did not resonate with potential respondents, that additional sources are needed to identify these populations, or some combination of all these factors is true; the populations are smaller than anticipated, the messaging did not resonate, and there is a better source of contacts. Furthermore, responses from specifiers suggest there are differences within the specifier population in terms of how much interaction they have with manufacturers' representatives. This indicates different outreach pathways may be needed to reach subsets of the specifier population.

Recommendation 6.1: Conduct focus groups or interviews with a small set of NEEA staff and implementer contacts in the engineering, contracting, and building owner spaces to better understand messaging and language about clean-water pumps and circulators that will resonate with each of these groups. Perhaps partner with Energy Trust of Oregon or utilities to conduct these focus groups or interviews at a trade ally forum or meetings. Or, work with XMP participants, and perhaps some of their contacts, to better understand the language that each of these groups may respond to when being recruited to participate in a study about clean-water pumps and circulators.

Recommendation 6.2: Conduct market research to get a better understanding of the total number of specifiers, contractors, and project owners that specify, install, and purchase clean-water pumps and circulators.

[1] Pump Energy Rating Label Awareness and Use Study. Report # E22-4450. Johnson Consulting Group, August 15, 2022

2 Introduction

The Northwest Energy Efficiency Alliance (NEEA) selected ADM Associates ("ADM") to conduct the first Market Progress Evaluation Report (MPER) for the NEEA Extended Motor Products Program (XMP). In conjunction with the NEEA evaluation team, ADM carried out the tasks necessary for this MPER throughout 2024.

Recent technological advancements, such as the growth of smart pumps and improvements in overall pump efficiency, combined with the development of the Hydraulic Institute's (HI) Energy Rating (ER) label for pumps and new federal standards, have provided the Northwest a unique opportunity to transform the pumps market that could result in up to a 60% improvement in efficiency. Currently, there is a lack of awareness, confidence, and product performance concerns in these emerging products by key market actors. To address these market barriers and enable diffusion, the XMP program takes a multi-pronged approach that targets several areas of the sales channel directly. The program develops deep relationships with manufacturer's representatives (currently including eight firms) to raise awareness and understanding of smart pump technology and develops tools to support savings validation and to demonstrate value to owners. Agreements are formalized to provide ongoing support to those organizations, while creating a confidential process by which sales data can be shared. NEEA marketing capabilities are leveraged to help partners build awareness within targeted market segments and support innovative training and promotional approaches. The program conducts research to validate and demonstrate reliability and ease of maintenance, along with producing case studies that demonstrate the product advantages, cost-effectiveness, and reliability of smart pumps. This information is shared with manufacturer's representatives to leverage in market engagement and training opportunities, as well as supporting broader market awareness that touches market actors. The program also works with HI to improve and influence the ER label, which offers a mechanism for product differentiation for smart pumps, hence improving awareness. Close collaboration with HI, along with market actors such as manufacturers and manufacturer reps, allows NEEA to influence specifications and test procedures that result in comment letters to DOE to influence federal performance standards for pumps. NEEA uses an implementer to administer the program, and this implementer joins NEEA's regular meetings with the participants, collects and analyzes participant data, and work with participants on marketing and training efforts related to efficient pumps and circulators.

NEEA estimated that the eight participating manufacturers' representatives collectively represent approximately 70% of the market share for commercial pumps and 30% of the market share for circulators in the alliance's four-state region (ID, MT, OR, and WA). While not conclusively confirming those estimates, recent research by ADM[2] was consistent with those estimates and supported NEEA's belief that XMP engages with the largest manufacturers' representatives in the market for clean water pumps and circulators for use in heating, cooling, pressure boosting, and domestic hot water in buildings. This existing evidence suggests that XMP has the potential to exert significant leverage on the commercial and industrial clean-water pump and circulator market.

This MPER had two research objectives:

1. To review and assess:
    a. the market transformation (MT) theory behind the program,

[2] *Extended Motor Products Regional Market Share Study*. Report # E22-455. ADM Associates. November 15, 2022.

   b. the program logic model (PLM) that graphically represents that theory,
   c. and the market progress indicators (MPIs) that NEEA has identified, corresponding to the program's various planned outcomes;
2. To assess program progress, using the NEEA developed MPIs, via primary and secondary research activities.

Following are the key considerations in assessing the program theory, logic, and MPIs:

- Does the MT theory and graphical representation depicted in the logic model clearly and convincingly describe how program activities will overcome market barriers to drive the desired outcomes? That is, is the logic sound? Are the expected cause-and-effect relationships clearly stated and evidence-based? Are there good reasons a given activity might not have the expected outcomes? If so, the logic may not be sound.
- Does the PLM capture the theory of change? Do the barriers, activities, outputs, and outcomes in the logic model, and the interrelationships among them, reflect what the ADM team learned from primary and secondary data sources? If not, the PLM may not capture the theory of change.
- Are the outcomes evaluable? Is it possible to establish outcome metrics that can be empirically assessed in a reliable fashion? If not, the outcomes are not evaluable.

Assessing market progress encompasses interviews and/or surveys of a range of market actor types, interviews with NEEA staff and partners, and a review of secondary source materials. Table 2-1 lists the outcomes and market progress indicators associated with each data source.

Table 2-1: Market Progress Indicators by Data Source

Logic Model Outcomes	Market Progress Indicators (MPIs)	XMP Participant Interviews and Reports	Nonparticipant Man. Reps. Interviews	Specifier Interviews	Contractors/Owners Surveys	Trade Association Documents	NEEA Staff and Documents
Sales							
I: Part. man. reps. stock and sell efficient products	• Prop. of incented efficient P&C stocked • Prop. of incented efficient P&C sold	✓					
IV: Sales of efficient and smart pumps increase	• Market share of efficient P&C • Market share of commercial smart pumps	✓	✓				
Performance							
VI: Pump product performance levels improve	• Avg. rated efficiency of P&C sold • Sales-weighted avg. efficiency of P&C sold	✓	✓				
ER Label							
II: Pump efficiency label recognized and used by distributors and specifiers	• Awareness of ER Label • Self-reported use of ER Label	✓	✓	✓			
V: Pump efficiency label recognized and used by contractors and project owners	• Contractor/owner awareness of ER Label • Contractor/owner self-reported use of use				✓		
III: No. of part. OEMs and cert. labs in ER program increases	• # participating OEMs in ER Label program • # certified labs in ER Label program					✓	
Federal Standards							
VII: DOE increases/expands fed. perf. standards for P&C	• NEEA C&S provides documentation to DOE in support of increased standards • Federal performance standards increase • NEEA role documented by ext. evaluator						✓

While assessing the progress of the XMP Program was the primary purpose of this research, as this was the first MPER, there was not an established blueprint for how to assess progress. Therefore, at the outset of this research, the ADM Team proposed methods intended to address the objectives. As the Team fielded data collection, they learned lessons about how to assess progress in the future. Thus, the conclusions and recommendations include suggestions for conducting future XMP MPERs.

The following section provides details on the approaches and methods ADM used to conduct the research and inform the report findings.

3 Methodology

This study consisted of two major research activities. The first was a review of existing documents and data provided by NEEA and through ADM's collection of other materials. The second task included primary data collection from market actors that sell, specify, purchase, and install clean-water pumps and circulators in Idaho, Montana, Oregon, and Washington. Each task is broken down into its component sections below.

3.1 Document Review

ADM received the program logic model (PLM) at the outset of this evaluation and assessed its clarity, soundness of logic, alignment with program activities, and evaluability. This task relied on ADM's review of the current PLM document and of any associated documentation such as any NEEA program planning, development, and implementation documents and websites that identify program activities, their intended outputs and outcomes, and the barriers meant to be addressed.

ADM used their discussions with NEEA staff during project initiation to confirm their understanding of logic model elements. Additionally, the ADM Team interviewed NEEA staff and partners early in the process of conducting this evaluation to ensure the ADM Team's understanding of the program and allow the Team to gather the necessary documents (see Section 3.2.1 for more information).

3.2 Interview and Survey Market Actors

The ADM Team collected data from several types of market actors working with clean-water pumps and circulators. The ADM Team interviewed manufacturers' representatives and distributors—those participating in XMP and non-participants—and equipment specifiers. The Team also surveyed contractors and project owners, encompassing building owners and facility managers that have installed or planned installation of pump and circulator systems. Interviewers and survey takers took notes during all interviews and surveys done over the phone and the ADM Team recorded and/or transcribed these calls using MS Teams with the permission of the respondent.

3.2.1 Interview NEEA Staff and Partners

The ADM Team interviewed NEEA XMP program staff and implementers to enrich their understanding of the program goals, design, management, and implementation. The ADM Team interviewed seven NEEA staff individually, three implementer staff in a group interview, one implementer in a separate interview, three Hydraulic Institute (HI) staff in a group interview, and two representatives from Washington State University's Integrated Design Lab (IDL).

Each interview lasted about one hour, and the topics included:

- Reviewing goals and objectives; confirm the NEEA Team's understanding of the logic model and progress indicators.
- Reviewing the types of project-specific support the NEEA team offers to the market such as technical and market research and awareness campaigns to understand how, to whom, and under what circumstances these types of support are delivered.
- Assessing staff, partner, and stakeholder perspectives on progress toward logic model outcomes.

- Assessing staff, partner, and stakeholder perspectives on the challenges and successes the program is experiencing.

ADM staff prepared the interview guide (Appendix B) in consultation with the NEEA Market Research and Evaluation (MRE) Scientist assigned to the XMP Program.

3.2.2 XMP Manufacturer Representative Participants

The ADM Team received the list of XMP participant contacts from NEEA and completed interviews with the eight participants between the end of June and early August 2024. These interviews covered some background questions about the participants, their awareness and use of the HI Energy Rating (ER) label, their stocking and sales practices, and trends they see in the efficiency and performance of pumps and circulators. ADM staff prepared the interview guide (Appendix C) in consultation with the NEEA MRE Scientist and other XMP Program staff.

3.2.3 Nonparticipating Manufacturers' Representatives

The ADM Team worked with a third-party vendor, Symmetric Sampling, to identify possible nonparticipating manufacturers' representatives in the region. ADM supplied Symmetric with directions about the type of firms needed for the study and ADM provided Symmetric with the lists of possible manufacturers' representatives ADM identified in the 2022 Regional Market Share Study.[3]

Symmetric worked to identify these nonparticipants from June 2024 through August 2024, ultimately recruiting five eligible respondents for the ADM team. The Symmetric team identified three other contacts, but ADM deemed them ineligible after additional vetting as they did not actually provide clean-water pump and circulator services for buildings. (For example, one potential respondent worked for an equipment rental service that rents temporary pumps for uses such as dewatering a construction site.) Eligible respondents were offered $500 gift cards as an incentive to help with this research effort.

These interviews covered some background questions about the participants, their awareness and use of the ER label, their stocking and sales practices, and trends they see in the efficiency and performance of pumps and circulators (Appendix D). ADM staff prepared the interview guide in consultation with the NEEA MRE Scientist and other XMP Program staff.

3.2.4 Specifiers

The ADM team made three separate attempts to interview specifiers. First, in June and July 2024, the team used the list of specifiers Johnson Consulting Group (JCG) identified for their work on the Energy Rating Label Awareness Study completed in 2022.[4] JCG sourced this list from Dunhill and regional engineering associations such as the American Council of Engineering Companies of Oregon, and state specific engineering organizations. The ADM team called 232 records from this list in the first half of July 2024 and ultimately identified one respondent that was actually a commissioning agent that reviewed specifiers' work. In essence, this respondent was specifier-

[3] *Extended Motor Products Regional Market Share Study*. Report # E22-455. ADM Associates. November 15, 2022.
[4] *Pump Energy Rating Label Awareness and Use Study*. Report # E22-4450. Johnson Consulting Group, August 15, 2022.

adjacent but not actually a specifier. The ADM Team chose to keep this respondent in the analysis because they had insightful comments about the market for clean-water pumps and circulators. This low response rate, one out of 232 contacts, was despite offering a $250 gift card, an amount the Team determined to be a generous incentive for about 15 minutes of respondents' time.

Following this largely unsuccessful initial recruitment effort, the ADM Team sought other sources to engage the population of interest and identified WTWH Media, the company that administers the Consulting Specifying Engineer Magazine e-newsletter and website. For a fee, this organization offers to provide up to 100 "warm leads" intended to yield 20 respondents that could address questions about the awareness and use of the ER Label. As with the first recruitment effort, WTWH offered potential respondents a $250 gift card as an incentive to assist with the research.

As of November 20, 2024, ADM experienced several problems with the 99 provided contacts. Thirty-six of the 99 contacts did not pass screening by ADM because it was determined they did not actually specify clean-water pumps or circulators. Many of these firm contacts were structural, civil, or marine engineers that reported not using clean-water pumps and circulators. The ADM team also investigated these firms' websites for any evidence that they may have a different division or business that would specify clean water pumps and circulators. In all these cases, the firms appeared to do work unrelated to this research effort such as the aforementioned engineering types. Seven records had incorrect or disconnected contact information and ADM was unable to find replacement contact information. Three of the leads had resigned or retired from their positions. Ultimately, this service only provided four respondents despite ADM making at least one email and at least two phone call attempts to the 46 remaining "warm leads." In multiple cases, the ADM Team made many more email and phone call attempts because potential respondents at these firms directed the interviewers to other people at the firm.

Finally, ADM relied on individually identified specifier contacts provided by non-XMP NEEA staff. This recruitment effort, while not representative of the larger market, yielded two eligible specifiers able to answer questions about awareness and use of the Energy Rating label. As with other specifier recruitment efforts, these respondents were offered $250 gift cards for their help.

These interviews covered some background questions about the respondents, their awareness and use of the ER label and trends they see in the efficiency and performance of pumps and circulators. As with other market actor interview guides, the Team worked with the NEEA MRE Scientist and other XMP Program staff to develop the guide (Appendix E).

3.2.5 Contractors

The ADM team surveyed 22 contractors who sell and/or install clean-water pumps or circulators of up to 50 horsepower in one of the four Northwest states. The survey covered familiarity with and use of the HI ER Label, awareness of other energy-related labels or certifications, preferred sources of information on pump energy performance, and factors considered when making pump or circulator recommendations to customers (Appendix F).

ADM used a mixed-mode survey, with both email recruitment to complete an online survey and a phone survey. The sample consisted of 1,490 Heating Ventilation and Cooling (HVAC), plumbing, or general mechanical contractors located in the four Northwest states. All records had telephone numbers, and 420 had email addresses. The distribution of the list across the four Northwest states was generally comparable to the distribution of total commercial building square footage, except

that the list included disproportionately more records from Idaho and fewer from Washington (Table 3-1).

Table 3-1: Distribution of Sample Across Four Northwest States

State	Percentage of Commercial Building SF in Northwest	Percentage of Sample	Record Included Email Address
Idaho	10%	17%	21%
Montana	10%	10%	8%
Oregon	25%	31%	35%
Washington	56%	42%	35%

Source: 2020 Commercial Building Stock Assessment.

ADM began the survey recruitment efforts by sending emails to all 420 contractors with available email addresses, inviting them to take the survey. The email explained the purpose of the research, identifying NEEA as the research sponsor and ADM as the evaluation firm conducting the research. The email noted that the survey was expected to take 10 to 12 minutes to complete and that the responses would be held in confidence. The email offered a $100 gift card for completing the survey and provided contact information for the NEEA MRE Scientist and the ADM staff member managing the project. The email included a link to the survey. ADM sent up to two reminder emails to nonrespondents.

The email recruitment produced four survey responses, but two of them did not meet the survey screening criteria (sell/install clean-water pumps/circulators up to 50 HP for commercial, industrial, or multi-family residential applications in one or more of the four Northwest states).

ADM then began phone survey recruitment with a sample of about 200 of the contractors, including the email nonrespondents. The first two weeks of calling produced a very low response rate, and so ADM included all remaining sample in the phone survey recruitment. After more than 8 weeks of calling, the phone survey resulted in contacts with 242 contractors who were willing to complete the survey. This represents a 16% response rate; however, 222 of these respondents were screened out from the survey based on the criteria identified above, resulting in a final eligible sample of 22, two from the email recruitment and 20 from the phone recruitment.

Applying the incidence of 9.1% (22 of 242) to the total sample of 1,490 contractors produces an estimate of about 135 contractors that would have met the selection criteria for this study—that is, an estimated population of 135 contractors. Applying the finite population correction factor to that population size ($\sqrt{(135-22)/(135-1)}$) produces a precision of 16% at 90% confidence in the "worst case" scenario where P = 0.5 (that is, 50% of respondents respond a certain way to a given question, which produces the greatest standard error). The precision improves as P increases or decreases – for example, it is about 13% when P = 0.2 or 0.8 and 10% when P = 0.1 or 0.9. As with other market actor interview guides, the Team worked with the NEEA MRE Scientist and other XMP Program staff to develop the guide.

3.2.6 Project Owners

The ADM team surveyed 34 individuals who owned or managed buildings in one of the four Northwest states that were at least 5,000 square feet in size and use clean-water pumps or

circulators of up to 50 horsepower. The online survey covered familiarity with and use of the HI ER Label (see Appendix G).

The ADM team used multiple methods to recruit survey respondents, beginning with an email to 1,732 Trade Press Media (TPM) subscribers in the four Northwest states. TPM is an online publisher that serves the building trades through online sources, including two online publications: *Building Operating Management* and *Facility Maintenance Decisions*. ADM contracted with TPM to send emails to subscribers with titles of "facility manager" or similar. ADM stratified the sample in proportion to the total commercial building square footage in the four Northwest states:

- 55% Washington
- 27% Oregon
- 9% Montana
- 9% Idaho

TPM sent a single email blast to 1,556 subscribers in Montana, Oregon, and Washington on July 23, 2024. The email explained the purpose of the research, identifying NEEA as the research sponsor and ADM as the evaluation firm conducting the research, noting that the survey was expected to take 10 to 12 minutes to complete and that the responses would be held in confidence. The email offered a $100 gift card for completing the survey and provided contact information for the NEEA Senior Market Research & Evaluation Scientist and the ADM staff member managing the project. The email included a link to the survey. This effort resulted in five survey responses.

On August 30, 2024, ADM followed the above with a physical recruitment letter to the same 1,556 subscribers located in Montana, Oregon, and Washington, with recruitment letters subsequently sent to 176 Idaho project owners on September 24, 2024. The letter provided the same information as the email, including a brief survey URL and a recipient-specific passcode as well as a QR code that the recipient could use to take the survey by phone. Twelve of the 1,732 letters were returned to sender resulting in a total of 1,720 delivered letters. This effort resulted in 23 survey responses.

ADM carried out a third and final recruitment effort by working with NEEA and Building Potential (formerly, the Northwest Energy Efficiency Council) to send email recruitments to Building Operator Certification (BOC) trainees in the four Northwest states. BOC is a training and certification program for building engineers and maintenance personnel, and Building Potential is the authorized provider of BOC training and certification in the Northwest. Building Potential sent email invitations to take the survey to 2,268 BOC trainees on September 25, 2024. The email was comparable to that sent by TPM. This effort resulted in 28 survey responses.

In total, the recruitment efforts produced 56 responses. Of those, 22 were screened out of the survey because they did not confirm that:

- They or their employer owned or operated any commercial, industrial, or residential buildings in Idaho, Montana, Oregon, and/or Washington of at least 5,000 square feet that use clean-water pumps or circulators of up to 50 horsepower (4 respondents); or
- They had been involved in decisions about the purchase or upgrade of clean-water pumps or circulators in any of their or their employer's buildings in the past five years (18 respondents).

The remaining 34 respondents comprised the response sample.

As with other market actor interview guides, the Team worked with the NEEA MRE Scientist and other XMP Program staff to develop the guide.

4 Findings

The ADM Team summarizes its primary findings into five subsections that align with the main research priorities. The first subsection reviews the logic model generally and then item-by-item more specifically in a table. The next four subsections examine the evaluability and progress indicators associated with the themes of each logic model outcome: Sales, Performance, ER Label, and Federal Standards.

4.1 Logic Model Review

NEEA uses logic models to describe the barriers to market adoption that its initiatives are designed to address (e.g., lack of awareness of the ER Label) the activities they conduct that address the challenges (e.g., promote the ER Label) the outputs that results from those activities (e.g., participants promote efficient pumps), and the intended outcomes (e.g., sales of efficient pumps increase). NEEA staff prepare logic models to guide their work, and they regularly revisit the logic models to ensure their work is following the model or to alter the model to reflect the market and their work more accurately.

The ADM Team reviewed the current logic model for the XMP program to assess whether:

- The model accurately captures the theory of change underlying the XMP program's work.
    - Does the PLM align with the XMP Program activities?
    - Do program resource allocations reflect the relative importance of various market barriers?
- The underlying logic is sound.
- The outcomes are evaluable.

In general, the logic model captures the barriers the program is addressing, identifies the key program activities, and lists suitable outputs and outcomes with one exception. Table 4-1 presents the ADM Team's observations of each logic model element of the XMP Program and suggested changes, if any, for that element. In general, the logic model captures the theory of how the market will change with NEEA's intervention and aligns with program activities and those activities address the key barriers to the long-term outcome of increasing the number of efficient pumps in use in the market. The one exception is the logic model does not explicitly state a key barrier to adoption of efficient and smart pumps and that is the lack of emphasis market actors place on efficiency. As will be seen in subsequent sections of this report, market actors need a reason to pay attention to efficiency and the logic model does not explicitly address this issue.

Table 4-1: Logic Model Element Review

Existing Logic Model Element	Observation	Suggested Change
Barriers		
Specifiers, buyers, and influencers lack awareness and understanding of smart pumps/circulators and have concerns about reliability, performance, down time, and ongoing maintenance costs	Program and implementer staff and program participants reported all the barriers listed here. They specified that pump and circulator customers (contractors, project owners, and specifiers) are often unaware and skeptical of new technology, and even when they are educated about smart pumps, they often do not see a significant enough benefit to change their behavior. The barriers listed here are all related to smart pumps and there is no reference here to the lack of awareness and use of the ER Label within the market.	Consider adding a barrier about overcoming the relative unimportance most market actors place on efficiency in general and the ER Label more specifically. Equating efficiency with other features of pumps that can address market actors' primary concerns like reliability, upfront cost, and ease of use– may help support some of the outcomes listed below.
Specifiers and buyers underestimate the importance of, and consequently do not prioritize, smart pumps and circulators.		
Installation contractors and facility owners prefer like-for-like replacement as it is easier and limits re-piping.		
Suppliers and buyers are reluctant to select smart pumps due to first cost and other critical factors (e.g. buying habits, staff preferences, bottom line accounting, etc.) taking priority over maximizing efficiency		
Opportunities		
Leverage HI label and DOE/RTF rule making and build awareness around the ER Label: • Standardized label • Specification, test lab and accreditation • Deemed savings and/or verifiable savings	Staff continue to work with HI, DOE, and efficiency partners nationally (e.g., CEE) to support awareness of the ER Label and to advance codes and standards to drive the development and use of more efficient pumps and circulators.	None.
Advance codes and standards through manufacturer/re/trade group engagement by building regional demand for product that meets advanced performance tier.		
Activities		

Existing Logic Model Element	Observation	Suggested Change
ACTIVITY #1: Develop strong relationships and agreements with manufacturer representative partners and provide incentives, marketing support, and market transformation bonuses.	NEEA has built strong relationships with the eight identified manufacturing representatives, meeting with them once a month and providing them with customized support based on the manufacturer reps' wants and needs. Manufacturers' representatives receive personalized training and support plans, and NEEA is trying to develop compelling case studies from some of this data.	None.
ACTIVITY #2: Support awareness and understanding of efficient pumps. • Support training and awareness campaigns for market actors. • Conduct research to validate and demonstrate reliability and ease of maintenance. • Produce case studies that demonstrate advantages, cost-effectiveness, and reliability of smart pumps. • Leverage NEEA marketing capabilities and BetterBricks to build awareness within targeted market segments (new construction/major retrofit especially). • Work with HI to develop stronger link between ER Label ratings and overall pump performance in specific design conditions.	• NEEA supports training and awareness especially among participating manufacturers' representatives. • Staff reported conducting research such as side-to-side comparisons of smart and traditional pumps that demonstrate savings and reliability and desk reviews of installation manuals that demonstrate the ease of installing smart pumps. • Staff and participants noted difficulties acquiring candidates for case studies. Challenges include convincing facility managers to spend the time necessary to document pump performance over time and convincing XMP participants to then convince facility managers to participate in a case study. • Staff reported working with trade ally networks around the PNW and attending meetings and conferences to promote the use of efficient pumps. Additionally, staff have provided information and blog posts on the BetterBricks site while also expressing an interest in doing more work with BetterBricks. • Staff reported working with HI to develop life-cycle cost calculator that demonstrates the long-term savings associated with efficient pumps.	None
ACTIVITY #3: Develop tools to support savings validation and demonstrate value of ownership. • Conduct research to validate savings and support RTF UES adoption. • Create interest in and acceptance of the Hydraulic Institute's **pump** efficiency label. • Develop a lifetime cost of ownership calculator of market actors	• NEEA conducted a research study that validates pumps' savings and demonstrates the non-energy benefits of the pumps and circulators. • Staff reported working with participants to educate them about the ER Label through training and regular meetings. Participants reported appreciating these meetings and trainings. • NEEA created a lifetime cost of ownership calculator based on research conducted in 2019.	None

Existing Logic Model Element	Observation	Suggested Change
ACTIVITY #4: Work with market actors, including manufacturer/reps and trade organizations, to influence specifications, standards, and test procedures by demonstrating that smart pumps and other highly efficient pumps have gained market acceptance	Working with information from program participants, NEEA collaborated with the Department of Energy to update federal standards for pumps. NEEA continues to collaborate with HI to influence market standards including participating in HI committees and educational initiatives promoting smart and efficient pumps. Results of market actor interviews and surveys do not indicate market acceptance of smart pumps.	Edit ACTIVITY #4 to read "Work with market actors, including manufacturer/reps and trade organizations, to influence specifications, standards, and test procedures by demonstrating that efficient and smart pumps are viable technologies."
Outputs		
OUTPUT #1: • Agreement with participating manufacturers' representatives formalized and sales data acquired • Manufacturers' representatives promote efficient pumps • Program support plan from each manufacturers' representatives and monthly check-in calls	• NEEA has agreements with eight manufacturers' representatives that represent a dominant share of pump and circulator sales in the region. • Participating and nonparticipating manufacturers' representatives reporting promoting efficient pump systems but awareness and use of the ER Label in the marketplace appears low. • All eight XMP participants have program support plans and report participating in monthly check-in calls that all reported valuing.	None
OUTPUT #2: Information and training for market actors provided. • Performance and applications of regulated efficient pumps • Using and promoting the pump efficiency label • Customer communication and collateral (ex. case studies, Power Point, etc.) created. • Strong link between ER Label and pump performance established.	• NEEA provides customized training for participants to support participants providing training to their customers and these trainings are proposed by and discussed with NEEA staff annually. • Staff may be working with participants to raise awareness and promote the pump efficiency label; however, it is unclear if this is translating to how to use the label to support efficient pump sales. • As noted above, NEEA staff and participants desire case studies that can explain the benefits of efficient pumps and circulators in various applications. However, they have struggled to find customer sites to do a case study.	Change bullet #2 to read "promoting awareness of the ER Label and how to best use that label to preferentially sell efficient pumps and circulators."
OUTPUT #3: • Lifetime cost of ownership calculator developed. • Verifiable test methods created by DOE and HI.	• HI and NEEA worked together to develop a cost of ownership calculator. • HI and NEEA worked with the DOE to push for more efficient pumps nationally. • HI created a central database of labeled pumps.	None.

Existing Logic Model Element	Observation	Suggested Change
• Central label database created by HI • Accredited process for verifiable savings developed by RTF.	• NEEA supported a study to validate energy savings assumptions used by the RTF and determined that many pumps were more efficient than baselines. This led to adjusting the criteria for ER values for pumps over 10hp.	
OUTPUT #4: Collaboration on comment letters supporting changes to specifications, standards, and test procedures.	Staff have been closely involved in commenting on all the different steps in the test procedure and the federal standard for circulators as it developed. Additionally, staff collaborated with HI staff and other efficiency advocates around the country to support ever more efficient pumps and circulators.	None
Outcomes		
OUTCOME #1: Participating manufacturers' representatives' stock and sell efficient pump products.	Participants have been increasing their sales of efficient pumps and circulators. It is unclear why "stocking" practices are important to track when sales and installations are what is most important.	Edit OUTCOME #1 to read "Participating manufacturers' representatives sell efficient pump products." Participating manufacturers' representatives' stock and sell efficient circulators and sell larger efficient pumps.
OUTCOME #2: Pump efficiency label is recognized and used by distributors and specifiers.	Staff noted that recognition and acceptance of the efficient label have been slow. Most nonparticipant manufacturer reps were unaware of the label, and participant manufacturers' representatives often do not use the ER Label in their sales tactics, noting that it is not a tool that helps them assess the best pump or circulator to meet a client's need. Instead, they use manufacturer-specific software which considers many variables to select a pump, especially in retrofit applications. The label may be more used in new construction decisions.	Is use of the label the most important outcome? If not, perhaps work with manufacturer's software to integrate desired efficiencies into it and change OUTCOME #2 to reflect that change.
OUTCOME #3: Number of participating OEMs and certified labs within the ER Label program increases.	Staff indicated that most of the major companies in the industry make ER-qualified products and smart pumps. Staff track market growth via their own data and HI's database.	None.

Existing Logic Model Element	Observation	Suggested Change
OUTCOME #4: Sales of efficient pump products, broadly, and smart pumps, specifically, increase.	According to the participants, sales trends for efficient pumps and circulators have changed over the last year, with a notable increase in the sale of pumps with drives. Participants noted that in areas with a stringent energy code like Seattle and much of Oregon, it is becoming illegal to sell non-ECM (Electronically Commutated Motor) products for new buildings. These regulations will support sales of efficient pumps generally; however, interest and sales of smart pumps has not increased at the same rate.	Elaborate on how this outcome varies from the short-term outcome "participating manufacturers' representatives' stock and sell efficient pump products."
OUTCOME #5: Pump efficiency label is recognized and used by contractors and project owners.	Staff and participants noted that the program is still relatively new; thus, they anticipated relatively low levels of awareness among contractors and project owners. Surveys of contractors and project owners confirmed that awareness was low, especially among contractors.	None.
OUTCOME #6: Pump product performance levels improve.	Program is still relatively new and therefore not fully ready to assess progress towards this outcome. However, staff and participants noted that manufacturers are beginning to offer more smart pumps and larger pumps with ECMs.	None.
OUTCOME #7: DOE increases/expands federal performance standards for pumps and circulators.	Staff indicated that this outcome is a very long-term goal. Staff continue to provide the Department of Energy feedback and recommendations for standards and codes. DOE listens to the feedback and are slowly making changes. Collaboration with HI is crucial for this long-term goal.	None.
MT Goal #1: DOE develops new and continues to increase federal performance standards for pumps and circulators.	This is ongoing, and somewhat out of NEEA's control as their focus is on the Pacific Northwest, not national standards. However, as noted in Section 4.5, NEEA does have some influence on federal standards.	Edit MT Goal to read "DOE develops new and continues to increase federal performance standards for pumps and circulators with input from NEEA.
MT Goal #2: Market uses efficient rating metrics and labels to buy and sell the most efficient pump systems.	Long-term goal. Too early to assess progress.	None.

4.2 Pump and Circulator Sales Outcomes

NEEA developed two outcomes, each with two market progress indicators (MPIs), related to sales of efficient pumps and circulators (Table 4-2).

Table 4-2: Sales Related Outcomes and MPIs

Logic Model Outcomes	Market Progress Indicators (MPIs)
I: Participating manufacturers' representatives stock and sell efficient products	• Prop. of incented efficient P&C stocked • Prop. of incented efficient P&C sold
IV: Sales of efficient and smart pumps increase	• Market share of efficient P&C • Market share of commercial smart pumps

The next sections summarize ADM's findings about how evaluable these outcomes are and provide data showing the progress the program has made toward transforming the last market for efficient clean-water pumps and circulators first two years of Market Development, as measured through the associated Market Progress Indicators.

4.2.1 Evaluability of Outcomes

Calculating the percentage of efficient pumps sold by participants is straightforward, easily achieved, and, therefore, evaluable. Program staff regularly collect data sales data from XMP participants,, including the total number of pumps and circulators each participating firm sells and how many are considered efficient per program thresholds. Additionally, the program captures sales of smart pumps. These data allow evaluators to determine what percentage of all pumps and circulators participants sell are efficient and smart.

Calculating the percentage of efficient items stocked by participants is more difficult and varied because the program does not collect stocking data and participants reported varied stocking practices. According to participants and staff, stocking practices vary considerably based on the size of the pumps, the applications, how customized the participants make their pumps, the incentives provided by manufacturers for stocking equipment, and available storage space. Three of the participants reported never stocking NEEA-incented items, instead relying on ordering equipment as needed for customer sales. Other participants noted that stocking practices are not what is important to track because it is the sales of efficient items that indicate if the market is changing.

Determining the market share of smart pumps among all pumps sold in the region is difficult, as the reticence of nonparticipants to provide detailed smart pump sales data impacts the ability to calculate market share. Program participants provide smart pump sales data via their participation in the program, however, interviews with nonparticipants resulted in imperfect estimates of smart pump sales, making determining the market share of smart pumps difficult. The survey asked respondents two questions about smart pump sales. The first asked them to estimate the percentage of their pump sales sold in the last year (Q22) were smart. One respondent reported 0%, two reported 5%, and two reported 15%. Later in the survey, respondents were asked to report the number of all pump and circulator sales they completed in the last two years and how many were smart (Q27). Four of the five provided a total count, albeit with several respondents qualifying their estimates with statements such as "Wouldn't put much stock in that answer" and only two could provide a count of smart pump sales.

Eight participants and five interviewed nonparticipant manufacturers' representatives represent the best estimate of the primary population of commercial and residential clean water pump and circulator manufacturers' representatives in the region. Combined, these manufacturer representatives sold about 67,000 pumps and circulators from 2022 to 2024 in the region. Nonparticipants represented about 6% of those sales. There may be other manufacturers' representatives serving the region, but, as noted in the Section 3, the Team did exhaustive work to look for other firms. Therefore, the Team is confident that these 13 firms constitute the primary population of pump and circulator manufacturer representatives in the region. Any remaining representatives likely serve a niche technical or regional market.

4.2.2 Market Progress Indicators and Supporting Findings

A bit over one-quarter of all pumps and circulators sold by participants received program incentives and a relatively small, but growing over time, fraction of all pump and circulator sales are smart pumps. Table 4-3 shows the percentage of all pump and circulator sales that are efficient or smart. There appears to be an upward trend in the sales of efficient pumps and smart pumps over the last few years. Participants increased the percentage of their sales of efficient units by 5% from 2022 to 2023 and 2% from 2023 to 2024. Additionally, they increased their sales of smart pumps by 3.3% from 2022 to 2023 and 1.3% from 2023 to 2024.

Table 4-3: Pumps and Circulators Sold by XMP Participants and Nonparticipants, by Year

Year	All Units			Efficient Units		Smart Pumps	
	Pumps	Circs.	Total	Efficient Units Sold	Percent	Smart Pumps Sold	Percent
Participants (*n*=8)							
2022	2,999	18,231	21,230	5,523	26.0%	344	11.5%
2023	3,042	20,570	23,620	7,237	30.6%	451	14.8%
2024[1]	2,574	15,578	18,352	6,051	33.0%	414	16.1%
Total	8,623	54,579	63,202	18,811	29.8%	1,209	14.0%
Nonparticipants (*n*=5)							
2023-24	3,885	n/a	3,885	n/a	n/a	255	6.6%
Participants and Nonparticipants (*n*=13)							
Total	12,500	n/a	67,087	n/a	n/a	1,464	11.7%

[1] 2024 data is sales from January 1 to November 15, 2024.
[2] Data not available from nonparticipants because they could not report these numbers.

Participant manufacturers' representatives work with customers as vendors and consultants. At a high level, they serve customers in two ways. The first is as a vendor, where they sell an item to a purchaser. The participants' purchasers are contractors (5 mentions), end-users (4 mentions) or wholesalers (3 mentions). The second way they serve customers is as a consultant, where they are helping an engineer (3 mentions) or end-user client (1 mention) select the appropriate pump or circulator for a given project. Often, they play the role of vendor with one market actor on a project and consultant with a different market actor on the same project.

Some manufacturers' representatives do not stock NEEA supported items; however, among those that do, most report that the XMP Program resulted in their stocking and selling more efficient pumps and circulators. Five of the eight participants reported stocking NEEA supported

items, and of those, four indicated that their participation in the program influenced their stocking practices. One respondent mentioned that the program has helped them push more efficient products and keep efficiency more front-of-mind than before participating in the program. Two other respondents stated that participation in the program and the incentives they receive has made it easier for them to justify stocking and selling efficient pumps and circulators.

Most XMP participants reported that customers are not asking for higher-efficiency pumps and there has been an uptick in sales of pumps with electronically commutated motors (ECMs). Of the eight participants, two reported that their customers have been asking for more efficient pumps and circulators, four reported that customers are not asking for efficient pumps, and two were unable to address this question. While most representatives reported few customer requests for high-efficiency pumps, the majority (5) reported that sales of pumps and circulators with ECMs have increased over the last two years, and two reported seeing an increase in pumps and circulators with advanced controls. So, customers may not be asking specifically for higher-efficiency pumps and circulators, these more efficient pump options are being sold suggesting that customers may be installing these efficient pumps and circulators for reasons other than energy efficiency.

Variable and constant speed pumps are the primary items nonparticipant manufacturers' representatives sold in the last year, and pump and circulator sales, on average, represent about half of their firms' revenue. Respondents reported mostly selling variable speed pumps, followed by constant speed pumps, and smart pumps. Only two of the five reported selling circulators, and only one of those reported selling hydronic circulators. Responses varied in terms of how much of their revenue came from pump and circulator sales, but on average, about half of firm revenue came from pumps and circulators (Table 4-4).

Table 4-4: Percentage of Pumps and Circulators Sold in the Last Year by Type by Nonparticipant Manufacturer Representative

ID	Number of Pumps and Circulators Sold in Last 2 Years	Pumps			Circulators		Perc. of Revenue from Pump and Circulator Sales
		Const.	Variable	Smart	Hydro.	Dom. Hot Water	
NR1	3,000	40%	55%	5%	n/a	100%	20 to 39%
NR2	300	10%	85%	5%	33%	67%	40 to 59%
NR3	500	25%	60%	15%	n/a	n/a	80 to 100%
NR4	Don't know	50%	35%	15%	n/a	n/a	20 to 39%
NR5	85	60%	40%	18%[1]	n/a	n/a	60 to 79%

[1] This respondent did not provide a percentage estimate about the number of smart pumps sold in the last year but later in the survey provided counts of all their pump and circulator sales and smart pump sales numbers so we could calculate the percentage.

4.3 Pump and Circulator Performance

NEEA developed one outcome, with two market progress indicators (MPIs), related to the performance of pumps and circulators (Table 4-5).

Table 4-5: Pump Performance Related Outcome and MPIs

Logic Model Outcomes	Market Progress Indicators (MPIs)
VI: Pump product performance levels improve	• Avg. rated efficiency of P&C sold • Sales-weighted avg. efficiency of P&C sold

The next sections summarize ADM's findings about how evaluable these outcomes are and provide data showing the progress the program has made toward transforming the market for efficient clean-water pumps and circulators in the first two years of Market Development, as measured through the associated Market Progress Indicators.

4.3.1 Evaluability of Outcomes

Data from XMP participants is the only reliable source of data about the rated efficiency of pumps and circulator sold in the region because nonparticipants could not provide sales data estimates. The XMP Program collects data about pump and circulator sales, but interviews with nonparticipants revealed no data about their sales of efficient pumps and circulators despite four of the five respondents reporting awareness of the ER Label. Furthermore, nonparticipants could generally not provide sales data by equipment type nor could they report on the efficiency of the pumps they sold in the last year. When asked about the percentage of each equipment type they sold that was considered efficient, only one nonparticipant could provide an answer, stating that 90% of their constant and variable speed pumps are efficient and 100% of their smart pumps are efficient. Only one of the five respondents could report sales data confidently and he estimated his firm sold 125 constant speed pumps, 300 variable speed pumps, and 75 smart pumps in the last two years.

4.3.2 Market Progress Indicators and Supporting Findings

Program data shows the average rated efficiency of pumps has been increasing over time among participants. On average, the sales of equipment among XMP participants have increased about four to five points per year since 2022 (Table 4-6).

Table 4-6: Average Rated Efficiency Score of Pump Sales from Participants

Year	Average Rated Efficiency of Pumps Sold	Sales-Weighted Average Efficiency of Pumps Sold
2022	17.46	16.23
2023	21.18	20.64
2024	23.27	25.90

Contractors rely on pump nameplates, manufacturer websites, and pump dealers for information about pump energy performance. To provide context for understanding the information on awareness of, exposure to, and use of the ER Label, discussed below, the survey asked all respondents to rate the degree to which they relied on various sources for information on pump energy performance. Respondents indicated relying most heavily on pump nameplates, followed by manufacturer websites and pump dealers or representatives (Table 4-7). Respondents appeared to rely very little on manufacturer selection software, trade associations, or the Hydraulic Institute . In fact, only one respondent (the CEO of a contracting/installation firm) indicated ever having visited the Hydraulic Institute's 's Energy Rating web page.

Table 4-7: Degree of Reliance for Information on Pump Energy Performance

Response	1-Not at all	2	3	4	5-To a great degree	Not sure
Pump name plate	18%	9%	14%	23%	36%	0%
Manufacturer websites	23%	5%	32%	9%	32%	0%
Pump dealer or representative	32%	9%	14%	14%	27%	5%
Manufacturer selection software	55%	5%	27%	0%	9%	5%
Trade association	68%	18%	14%	0%	0%	0%
Hydraulic Institute	91%	9%	0%	0%	0%	0%

Like contractors, pump owners rely on pump nameplates, manufacturer websites, and pump dealers for information about pump energy performance It is notable that the two most commonly mentioned sources of awareness of the ER Label—manufacturer websites and pump dealers or representatives—were among respondents' most relied-upon sources of information on pump energy performance (Table 4-8). The most highly relied-upon source, by a slim margin, was the pump nameplate. Like contractors, project owners relied little on manufacturer software, the Hydraulic Institute, and trade associations for pump energy performance information.

Table 4-8: Degree of Reliance for Information on Pump Energy Performance

Response	1-Not at all	2	3	4	5-To a great degree
Pump nameplate	3%	12%	15%	21%	41%
Pump dealer or representative	9%	15%	9%	24%	38%
Manufacturer websites	12%	6%	26%	26%	21%
Manufacture selection software	26%	18%	35%	3%	9%
Hydraulic Institute	32%	21%	24%	9%	3%
Trade associations	29%	29%	24%	6%	3%

4.4 Energy Rating Label

NEEA developed three outcomes with six market progress indicators (MPIs) related to NEEA's work to raise awareness and increase the use of the ER Label (Table 4-9).

Table 4-9: Energy Rating Label Related Outcomes and MPIs

Logic Model Outcomes	Market Progress Indicators (MPIs)
II: Pump efficiency label recognized and used by distributors and specifiers	• Awareness of ER Label • Self-reported use of ER Label
V: Pump efficiency label recognized and used by contractors and project owners	• Contractor/owner awareness of ER Label • Contractor/owner self-reported use of use
III: No. of part. OEMs and cert. labs in ER program increases	• # participating OEMs in ER Label program • # certified labs in ER Label program

The next sections summarize ADM's findings about how evaluable this outcome is and provide data showing the progress the program has made toward transforming the market for efficient clean-

water pumps and circulators in the first two years of Market Development, as measured through the associated Market Progress Indicators.

4.4.1 Evaluability of Outcomes

Outcomes II and V are theoretically evaluable by interviewing distributors, specifiers, and contractors; however, reaching each of these groups reliably was more challenging than expected. The ADM Team struggled to recruit respondents for all these groups and ultimately achieved fewer completed responses than anticipated for all these groups. The Team exhausted several sources, used all possible modes (phone, mail, email), and spent considerable time and money to reach far fewer respondents than anticipated. The Team used multiple sources, hired outside recruitment services, trade association sources, and offered hundreds of dollars in incentives to participate in the research and still achieved considerably lower numbers of respondents than anticipated at the outset of this research. This led the Team to hypothesize that (a) the recruitment messaging and or methodology was somehow flawed and did not resonate with prospective respondents, and/or (b) the actual population of these groups is considerably lower than originally estimated. The ADM Team provides suggestions in the conclusions and recommendations section of this report about how to address this issue in future MPERs.

Interviews and a review of certified pumps and circulators provided insights into Outcome III. The Hydraulic Institute staff and database demonstrated that most pump and circulator manufacturers list their products in the ER database and that there has been a steady increase in the number of labs able to certify products.

4.4.2 Market Progress Indicators and Supporting Findings

4.4.2.1 Manufacturer Representatives

Manufacturers' representatives, both participants and nonparticipants, are generally aware of the ER Label. Of the 13 manufacturers' representatives (eight participants and five nonparticipants) interviewed, twelve reported awareness of the ER Label. Participants awareness is expected due to their direct participation in the program, but it was less clear at the outset of this research whether nonparticipants would also be aware. Furthermore, as mentioned above, the Team is confident that these 13 firms represent the bulk of all manufacturers' representatives in the region.

Awareness of the ER Label among manufacturers' representatives came from a variety of sources. Participants reported learning of the label from manufacturers (5 mentions), NEEA (4 mentions), and customers (1 mention), while nonparticipants reported awareness via a manufacturer (2 mentions), an advertisement in a trade publication (1 mention), and via their company's sponsored training (1 mention) (Table 4-10).

The four nonparticipants that reported being aware of the ER Label reported their awareness unaided by the interviewer (that is, they did not need to see a picture of the label) and they varied in how they had seen the label used. Use of the label in their day-to-day work was minimal. The only nonparticipant reporting using the ER Label more than one-quarter of the time in assessing client needs was answering that question second-hand, specifically reporting what she thought her colleagues were doing. Nonparticipant and participant manufacturers' representatives reported their customers had limited awareness of the ER Label, with most

respondents qualifying any non-zero answer with statements such as "very few, if any" customers being aware of the label. The only exceptions were a participant that reported half to three-quarters of their customers being aware of the ER Label; this respondent was also the only one to report using the ER Label to assess client needs (Table 4-10).

Manufacturers' representatives largely do not use the ER Label to assess client needs or help convince customers to buy a more efficient motor or controls. No nonparticipant reported using the ER Label in their sales of pumps and circulators. Of the participants, most do not use or only rarely use the ER Label in assessing client needs, and almost none reported selling more efficient motors or controls because of the ER Label (Table 4-10).

Table 4-10: Awareness Source and Use of ER Label Among Nonparticipants and Participants

Resp. ID	Source of Awareness of ER Label	How has respondent seen ER Label used	Frequency using ER Label to assess client needs	Sold more energy efficient motor because of label	Sold controls because of label	Perc. of Cstmers. aware of ER Label
Nonparticipants						
NR1	Manufacturer	Label on pump box	0%	No	No	<25%
NR2	Manufacturer	Spec. in work proposal	<25%	No	No	<25%
NR4	Trade Association	Ad in trade assoc. publ.	0%	No	No	<25%
NR5[1]	Company Training	Training	25 to 50%	No	No	<50%
Participants						
XMP1	Manufacturer	Not applicable	0%	No	No	0%
XMP2	NEEA/Manuf.	Not applicable	0%	No	No	25-49%
XMP3	NEEA	Not applicable	<25%	No	No	<25%
XMP4	NEEA	Not applicable	<25%	No	No	<25%
XMP5	Manuf./Customer	Not applicable	<25%	No	No	DK[2]
XMP6	NEEA	Not applicable	50-74%	No	No	50-74%
XMP7	Manufacturer	Not applicable	<25%	No	No	0%
XMP8	Manufacturer	Not applicable	<25%	Yes	Not sure	<25%

[1] Respondent was reporting their guess for how others in the firm used the ER Label.
[2] DK = Don't know. Respondent was unable to provide an answer.

4.4.2.2 Specifiers

Specifiers were largely not aware of the ER Label, and they assumed few of their customers were aware of the ER Label. Of the seven specifier respondents, one was *aware* of the ER Label but could not recall how he became aware of it and, upon further discussion, was not sure he had ever *seen* the label. Three specifiers hypothesized that none of their customers were aware of the label, and the other four reported that a small percentage of customers might be aware.

Several specifiers did not see a compelling case for having an ER Label, as they emphasize non-energy attributes of pumps when selecting a unit. During discussions with the interviewer, two respondents volunteered that they did not see a purpose to having an ER Label. These respondents explained that they have so many other things they are considering when specifying pumps and circulators—health, safety, code compliance, reliability, and ease of maintenance—that efficiency is not a high enough priority to justify using an ER Label. One of these respondents

indicated that efficiency may be an attribute of a pump that they specify, but they specify the pump because of non-energy benefits like reliability and quiet operation. Another specifier that largely specifies domestic hot water circulators reported generally specifying the same brand and model circulator for most projects and reported having limited interactions with manufacturers' representatives.

4.4.2.3 Contractors

Two of 22 contractor respondents (9%) reported awareness of the ER Label, whereas there was much higher awareness of other energy-related labels. Respondents were asked, "Do you recall ever hearing of or seeing the ER Label for pumps or circulators?" Those who did not respond affirmatively were shown pictures of the ER Label and asked, "Having seen them here, do you recall ever seeing either of these labels?" Table 4-11 shows that 2 of the 22 respondents reported recalling the ER Label before being shown the picture (unaided recall). Showing the label (aided recall) did not prompt any further recognition, although 11 respondents (50%) changed their response from a definite "no" to "not sure." This may suggest that seeing the label stirred a vague recognition, albeit not strong enough recognition to elicit a positive response.

Table 4-11: Contractor Recognition of ER Label (*n*=22)

	Response	Count	Percent
Recall before shown picture of label	Yes	2	9%
	No	18	82%
	Not sure	2	9%
Recall after shown picture of label	Yes	2	9%
	No	7	32%
	Not sure	13	59%

By comparison, all 22 respondents were aware of the ENERGY STAR® label, half were aware of the LEED Certified designation, and about one-quarter were aware of one or more Building Performance Institute (BPI) certificates (Table 4-12).

Table 4-12: Awareness of Other Labels/Certifications (Multiple Selections Allowed) (*n*=22)

Response	Count	Percent
ENERGY STAR®	22	100%
LEED Certified	11	50%
Building Performance Institute (BPI) Certificates:	5	23%
Total Building Performance	4	18%
Building Science Principles	3	14%

The two respondents who reported awareness of the ER Label both reported having learned about it from a pump manufacturer's website, with one each also reporting manufacturer selection software and pump packaging as the source (Table 4-13,). None reported having learned about it from NEEA, a trade association, or a pump dealer or representative.

Table 4-13: Source of Information about ER Label (Multiple Selections Allowed)

Response	Count	Percent
Manufacturer website	2	100%
Manufacturer selection software	1	50%
Pump packaging	1	50%

Additional responses from those two respondents indicated differing experiences relating to their exposure to and use of the ER Label in making decisions about pumps.

- One respondent indicated greater exposure and use of the label. When asked what types of information they recalled seeing on the label, the first respondent confirmed recollection of the specific elements the survey asked about, specifically the manufacturer name, model, pump type, and horsepower (but not PEI number). That respondent reported having used information from the ER Label 26% to 50% of the time when assessing the best system for a client and more than 75% when presenting the client with options. That respondent also reported having made modifications to a pump or circulator system based on information on the ER Label.
- The second respondent recalled seeing "the characteristics on energy savings" on the label but did not confirm recollection of the specific elements the survey asked about (PEI number, manufacturer, model, horsepower, and pump type). That respondent reported having used information from the ER Label 1% to 25% of the time both when assessing the best system for a client and when presenting the client with options. That respondent also reported not having made any modifications to a pump or circulator system based on information on the ER Label.

Physical fit and price were the most important factors considered by contractors with horsepower and brand reliability close behind. This assumes that systems selected based on those factors are available for purchase in the time needed. To obtain further information on contractor decisions, the survey asked respondents to identify the important factors they consider when deciding which pump or circulator system to recommend to a client for any given application. Responses displayed an interesting pattern, with respondents varying in terms of what they considered most important than in what they considered second most important (**Error! Reference source not found.**). There was a more even distribution across responses pertaining to the most important factor versus a more varied distribution of responses when considering the second most important factor. Physical fit to the space, brand reliability and price were ranked #2 more frequently than any factor was ranked #1.

Table 4-14: Three Most Important Factors Considered When Recommending Pumps or Circulators

Response	1st	2nd	Composite[1]
Physical fit to the space	18%	27%	21%
Price	18%	23%	20%
Horsepower	18%	9%	15%
Brand reliability	9%	27%	15%
Anticipated performance	18%	0%	12%
Operating point on the pump curve	14%	9%	12%
Efficiency	5%	5%	5%

[1] This is a weighted average of the 1st and second rankings.

The above pattern makes a certain amount of sense. Physical fit to the space had a relatively high percentage of #1 and #2 rankings, which reflects its practical importance: choosing a system that would require reconfiguring the space may have significant cost and time considerations. There may be some circumstances in which this consideration is outweighed, but it seems to be a parameter that very frequently must be given priority. Similarly, price appears to be an important parameter for decision making.

4.4.2.4 Project Owners

Survey results indicate moderate familiarity with the ER Label among building owners and facility managers. Awareness comes mainly from manufacturer websites and pump dealers or representatives, which are among the most relied-upon sources of information on pump energy performance. A large majority of those who were aware of the ER Label said that a tradesperson had shown information from the label when discussing pumps and circulator systems, and somewhat more than half said that they took such information into account when making decisions about such systems.

In keeping with the methodology used in the contractor survey, project owner survey respondents were asked, "Do you recall ever hearing of or seeing the Hydraulic Institute's Energy Rating Label, or ER Label, for pumps or circulators?" Those who did not respond affirmatively were shown pictures of the ER Label and asked, "Having seen them here, do you recall ever seeing either of these labels?" Table 4-15 shows that just over one-third of respondents reported recalling the ER Label before being shown the picture (unaided recall). Showing the label (aided recall) prompted recognition for one respondent, resulting in a total of 14 respondents (41%) saying they had seen the label.

Table 4-15: Recognition of ER Label (n=34)

	Response	Count	Percent
Recall before shown picture of label	Yes	13	38%
	No	16	47%
	Not sure	5	15%
Recall after shown picture of label	Yes	14	41%
	No	15	44%
	Not sure	5	15%

The 14 respondents who reported awareness of the ER Label most commonly reported having learned about it from a pump manufacturer's website, with half also reporting a pump dealer or representative as the source (Table 4-16). Fewer reported having learned about it from NEEA, from manufacturer selection software, or from a trade association.

Table 4-16: Source of Information about ER Label (Multiple Selections Allowed) (*n*=14)

Response	Count	Percent
Manufacturer website	12	86%
Pump dealer or representative	7	50%
NEEA staff or website	3	21%

Manufacturer selection software	2	14%
Trade association	2	14%
Hydraulic institute	0	0%

Most project owners aware of the ER Label indicated more than just a passing level of awareness, with most reporting discussions about the label with other market actors and/or using the label to guide decisions. Responses from those 14 respondents provided information on their exposure to and use of the ER Label in making decisions about pumps. One finding suggests that, for most, exposure to the ER Label was not simply a matter of passing acquaintance. Specifically, more than three quarters reported that a contractor, distributor, manufacturer's representative, or other tradesperson had shown them the information on the ER Label when discussing pump or circulator systems with them. Somewhat fewer respondents reported, however, that they had actually used information from the ER Label when making decisions about pumps or circulator systems (Table 4-17).

Table 4-17: Exposure to and Use of ER Label (*n*=14)

	Response	Count	Percent
Someone showed ER Label information when talking about pump or circulator systems?	Yes	11	79%
	No	3	21%
Respondent used information from ER Label when making decisions about pump or circulator systems?	Yes	8	57%
	No	5	36%
	Not sure	1	7%

About one-quarter of project owners reported visiting the Hydraulic Institute's Energy Rating web page, another indication of having more than just a passing awareness of the label. To provide additional context for understanding the information on awareness of, exposure to, and use of the ER Label, the survey asked all respondents whether they had ever visited the Hydraulic Institute's Energy Rating web page and asked them to rate the degree to which they relied on various sources for information on pump energy performance.

About one-quarter of respondents said they had never visited the Energy Rating web page (Table 4-18). This seems consistent with, and may partly explain, the fact that none of the respondents identified the Hydraulic Institute as their source of ER Label awareness. Interestingly, however, five of the nine respondents who had visited the Energy Rating web page did report awareness of the ER Label, but indicated they learned about it from another source besides the Hydraulic Institute; specifically, all five identified manufacturer websites and one each also mentioned trade associations and NEEA.

Table 4-18: Ever Visited Hydraulic Institute's Energy Rating Web Page (*n*=34)

Response	Count	Percent
Had visited Energy Rating web page	9	26%
Had not visited Energy Rating web page	24	71%
No response	1	3%

NEEA is working with the Washington State University Integrated Design Lab (WSU IDL) to increase awareness of the ER Label and efficient pumps and circulators more generally among students. In late 2023, NEEA, Hydraulic Institute, and the WSU IDL partnered to develop a module on pumps for building science students. The idea behind this support is that as students

become aware of the ER Label and how to use it, they may eventually become market actors in the region and be prepared to use the ER Label in their work.

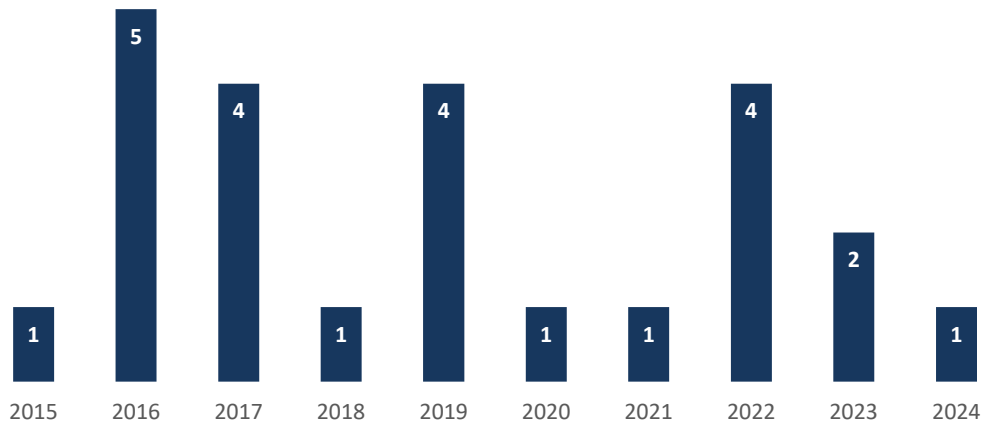
The ER Label program has seen continued growth since its launch, with most manufactures including their products in the database. As of summer 2024, the Hydraulic Institute program database included 14,907 (roughly 88%) of the approximately 17,000 eligible models available in the market. Hydraulic Institute staff noted that the remaining roughly 2,000 pumps not included in the database are mostly:

- From small manufacturers that may not have the bandwidth or incentive to get their products listed.
- New market entrants that have yet to go through the certification process.
- Models designed for niche and specific applications that may not be prioritized for inclusion in the database by manufacturers because they have such a limited market presence.
- International manufacturers with a limited market presence in the United States.
- Older models likely to be removed out of a manufacturer's portfolio, thus making the process of getting an ER Label an unnecessary cost.

Manufacturers mostly participate in the ER Label program because, according to Hydraulic Institute and program staff, it helps them differentiate their products, sell higher profit units, and prepare themselves for future energy efficiency regulations. Participation in the ER Label program by manufacturers has increased as entities like the Department of Energy (DOE) have referenced the ER Label. These manufacturers are trying to prepare their products for compliance with future DOE energy efficiency regulations. Staff noted that manufacturers want to be able to point to the ER Label to separate their products from others to sell their product to customers interested in energy savings and environmental impact.

There are 24 certified labs in the Hydraulic Institute database, and they have approved between one and five labs per year since 2015 (Figure 4-1**).** Most of these labs (19 of 24) entered the program while the XMP Program was in its pilot phase—that is, before it entered the Market Development phase of NEEA's Initiative Lifecycle in May 2022. According to staff, many of the major manufacturers have had their labs certified in the program. Staff indicated they are targeting a few additional labs for inclusion in the program, mostly international firms that are looking to expand their work in the US. Most Hydraulic Institute -certified labs review end-suction frame-mounted pumps (20), end-suction close-coupled pumps (20), in-line pumps (18) and radially split multi-stage pumps (15). Fewer firms approve submersible turbine pumps (9) and vertical turbine pumps (1).

Figure 4-1: Number of Labs Certified in the Hydraulic Institute's Pump Test Laboratory Approval Program by Year



4.5 Federal Standards

NEEA developed one outcome with three market progress indicators (MPIs) related to NEEA's work with federal standards (Table 4-19).

Table 4-19: Federal Standards Related Outcome and MPIs

Logic Model Outcomes	Market Progress Indicators (MPIs)
VII: DOE increases/expands fed. perf. standards for P&C	• NEEA C&S provides documentation to DOE in support of increased standards • Federal performance standards increase • NEEA role documented by ext. evaluator

The next sections summarize ADM's findings about how evaluable this outcome is and provide data showing the progress the program has made toward transforming the market for efficient clean-water pumps and circulators in the first two years of Market Development, as measured through the associated Market Progress Indicators.

4.5.1 Evaluability of Outcomes

This outcome is evaluable, and the ADM Team assessed the outcome and MPIs using staff interviews and example documents staff shared. Specifically, staff shared examples of making federal standards more efficient, their work with other groups to push for more efficient standards, and documents that exhibit this work. The section below provides more details about NEEA's work in increase standards.

4.5.2 Market Progress Indicators and Supporting Findings

The main way NEEA staff support increased pump and circulator performance standards is through their work with a coalition of efficiency partners. NEEA staff work with various

efficiency partners to comment upon DOE standards, develop new standards, and deliver succinct and data-driven recommendations to DOE. Efficiency partners include the Northwest Power and Conservation Council, ASHRAE, ACEEE committees, California utilities, and the Hydraulic Institute, among others. According to staff, working with a coalition of agencies and providing comments to DOE in a coordinated way increases the likelihood of successfully influencing standards at a national level. This coalition will work together to craft a combined response to DOE recommending new standards or defending existing standards.

Staff noted several examples of ways the federal performance standards increased or will likely increase, including evidence of NEEA's influence on those changes.

- **Expand scope of pumps subject to code**: NEEA helped remove loopholes in federal standards that allowed end-users to select non-clean-water pumps that were not subject to efficiency standards for clean-water applications. Staff noted that previously, the DOE did not think certain pumps were used for clean-water applications. However, using XMP program data, NEEA staff were able to show DOE that there was a notable share of the market using non-clean-water pumps for clean-water purposes. DOE subsequently adjusted the standards to include these pumps, thus subjecting these pumps to clean-water pump efficiency standards.
- **Advocate for circulators having ECMs**: In part due to NEEA's collaborative advocacy, upcoming standards will require circulators to have ECMs which, according to staff, will result in circulators becoming notably more efficient.
- **Advocate for all pumps to have an ER Label**: Staff reported that the ER Labeling initiative is currently voluntary, but they expect through their work with the Hydraulic Institute, ER Labels will become mandatory in coming years, meaning pumps will have to meet a minimum efficiency standard to be sold.
- **Influence ASHRAE, which in turn influences the DOE**: NEEA staff sit on committees for ASHRAE and help ASHRAE develop codes and standards that serve as benchmarks for energy efficiency in buildings. This work, in turn, influences DOE standards because of the link between DOE and ASHRAE standards.[5] Additionally, NEEA staff made presentations to local ASHRAE chapters to educate them about the ER Labels and efficient pumps in general.[6]

4.6 Feedback from XMP Participants

While not a key part of this MPER, the ADM Team did ask XMP participants about anything the program could do to make their experience with the program better. The ADM Team heard exclusively positive comments about their experience working with NEEA and implementer staff, specifying aspects they appreciate about their participation in XMP.

Participants reported valuing regular meetings with NEEA and implementer staff. Respondents appreciated the information exchange and support they received, with one participant reporting "The engagement level from NEEA is 10 times higher than anyone else we deal with."

NEEA has helped focus sales participant efforts. XMP participants reported NEEA has helped focus their sales participant efforts in a way they have not done before. One respondent elaborated

[5] Federal Building Energy Efficiency Rules and Requirements. U.S. Department of Energy. Accessed November 20, 2024

[6] *Smart Pumping Design: Efficient Pump Systems in the Northwest Market*. Presented by NEEA staff to ASHRAE - Oregon, October 2021.

that working with NEEA has led them to target specific pumps for sale instead of trying to sell a wide range of pumps. This new approach means they are able to position themselves as an industry expert for the pumps they emphasize instead of being less knowledgeable about a wide range of items, and this shift has led to a more satisfied salesforce.

Participants suggested NEEA should consider undertaking or continue to undertake the following efforts to increase sales of efficient pumps and circulators.

- Continue and expand training sessions about the benefits of energy-efficient pumps for business development teams and specifiers.
- Partner with tech schools and universities to educate future industry professionals about the importance and benefits of energy efficient pumps.
- Collaborate with manufacturers and industry associations to promote the ER Label more effectively through advertisements and industry events.
- Continue and expand incentives for early adopters to encourage the transition to more efficient pumps.
- Continue to support cases studies that emphasize the long-term cost savings and efficiency benefits of energy-efficient pumps to counteract the focus on first costs.
- Provide grants or offer other support for manufacturers to support innovations in developing more energy efficient pumps.

5 Conclusion and Recommendations

This research had two primary objectives: 1) Review and assess the XMP Program market transformation theory, corresponding logic model, and MPIs. 2) Assess program progress using the existing MPIs. Additionally, as this was the first MPER, there was not an established blueprint for how to assess progress. Through the activities of this research, the Team gathered insights, described below, that may help evaluators assess progress for future MPERs.

Conclusion #1: The logic model aligns with the theory of change underlying the XMP program's work and NEEA developed a reasonable and largely evaluable list of MPIs with one key exception: The logic model does not identify the barrier that market actors do not prioritize efficiency, and they need compelling reasons to install an efficient pump beyond efficiency. The logic model would benefit from adding a barrier about the lack of importance market actors place on efficiency despite some interest among project owners. The existing barriers imply there are efficiency benefits to smart pumps that specifiers and buyers do not understand but there is not a recognition in the logic model that specifiers and buyers do not often prioritize or even consider efficiency. Several XMP participants reported that before their involvement with NEEA, they did not prioritize efficiency in their consultations with customers. Manufacturers' representatives reported not using the ER Label to assess client needs. Contractors and specifiers, groups with low awareness of the ER Label, emphasize space, price, health, safety, and code compliance. Two specifiers reported that the ER Label would have limited utility to them because their focus was on health, safety, reliability, and meeting codes, not efficiency. Yet, project owners expressed some interest in energy efficiency of pumps and circulators and had relatively high awareness of the ER Label compared to contractors and specifiers. Ultimately, market actors are trying to solve problems such as improving the reliability or performance of a system or ensuring codes compliance when they are installing a pump. Therefore, manufacturers' representatives, specifiers, and contractors need a reason to pay attention to the ER Label and efficiency in general when working with customers.

> Recommendation #1.1: Edit the logic model per the suggested change column seen in Table 4-1 paying special attention to elements related to increasing awareness of the importance of efficiency in general, the ER Label more specifically, and connecting those elements to the issues of concern to market actors – health, safety, reliability, code compliance, and other elements. Add elements and phrases that seek to describe market actors' relative disinterest in energy efficiency when they are selling, specifying, and installing clean-water pumps and circulators.
>
> Recommendation #1.2: NEEA should work with market actors to develop a value proposition for why paying attention to the ER Label specifically and efficiency more generally, is important. Emphasizing the non-energy benefits of efficient and smart pumps and circulators and tying that to the ER Label, if possible, may be one way to increase awareness and use of the ER Label and to further drive adoption of efficient and smart pumps.

Conclusion #2: XMP participants value the support the program provides, and they are engaged in the program, providing suggestions for ways to make the program even more successful for them and NEEA in the future. All participants reported high levels of satisfaction with the program. They appreciated the feedback the program provides them with and the

assistance the program has provided in their marketing efforts. The suggestions for improvement they provided are actions NEEA is already undertaking or planning to undertake, such as working with technical schools and universities to educate tradespeople and other professionals about the importance and benefits of efficient pumps and circulators.

Conclusion #3: Efficient pump and circulator sales and smart pump sales have been trending upward among participants and participants are selling a greater number of smart pumps than nonparticipants and a greater percentage of participants' sales are smart pumps compared to nonparticipants. From 2022 through November 2024 participant sales of efficient pumps and circulators ranged from 26% to 33% of all sales and smart pump sales ranged from 11.5% to 16.1%. In contrast, about 6.6% of nonparticipant pump sales were smart pumps, which is less than half the percentage of participants' smart pump sales. This suggests that program efforts are having some influence on manufacturer representatives' sales of smart pumps.

> Recommendation 3.1: Continue to work with participant manufacturers' representatives to emphasize efficient pumps and circulators in their sales. As indicated in conclusion #1, working with manufacturer representatives to identify and emphasize the non-energy benefits of smart pumps may be one way to further increase sales of efficient pumps generally and smart pumps more specifically.

Conclusion #4: Awareness of the ER Label is high among manufacturers' representatives, low among specifiers and contractors, and moderate among project owners, creating an inconsistent landscape of awareness and use of the ER Label. Awareness among manufacturers' representatives generally comes from manufacturers and NEEA. Project owners reported becoming aware of the ER Label primarily from manufacturer websites and pump dealers or representatives. Additionally, manufacturers' representatives, both participants, and nonparticipants, do not use the ER Label when assessing client needs, and none reported selling more efficient motors or controls because of the ER Label. As noted in conclusion #1, it is also unclear why these groups should pay attention to the ER Label, as they do not generally see a reason to pay attention to efficiency in general.

> Recommendation 4.1: Increasing awareness and use of the ER Label among specifiers and contractors seems critical to increasing awareness and use of the ER Label across the market. Currently, the one-third of project owners that are aware of the ER Label are mostly learning about the ER Label from manufacturer sources, not from the people that are specifying and installing their pump and circulator systems. Targeting specifiers with information about the utility of the ER Label will be critical to increasing market awareness in the future.

Conclusion #5: NEEA serves as a critical player in working to expand and increase federal performance standards for pumps and circulators. Through NEEA's direct interactions with DOE, serving on code review committees with efficiency partners like ACEEE and California-based utilities, and their work to develop ASHRAE code, the code referenced by DOE in federal standards, NEEA plays a notable role in the advancement of pump and circulator performance standards. For example, NEEA's research identified a blind spot in federal performance standards where end-users were using non-clean-water pumps in clean-water pump applications. DOE ultimately changed the standard to include these pumps so they would be subject to performance standards. By continuing to work with efficiency partners, especially ASHRAE, to influence efficiency codes that ultimately influence federal performance standards NEEA can do things like identify loopholes in the

standards that NEEA can share with DOE to inform their decision making about federal performance standards.

Conclusion #6: Specific market actor research is necessary to better understand the population of clean-water pump and circulator specifiers, contractors, and project owners. Despite large incentives for market actors ($100 to $500), using a variety of contact information sources (from commercial list sources like Data Axle and Dunhill, third party audience specific recruiters like Symmetric Sampling and WTWH Media (CSE Magazine), third party contacts like Trade Press Media and Building Potential, and NEEA staff) and making multiple attempts via all modes available (phone, email, and mail), the Team did not collect responses from the number of respondents they anticipated. This low response rate is consistent with the lower-than-expected response rates the evaluator saw while conducting the 2022 Energy Rating Label Awareness Study.[7] The inability to reach the anticipated populations suggests that the initial estimates of the population of each of these groups is considerably smaller than originally believed, that the messaging used did not resonate with potential respondents, that additional sources are needed to identify these populations, or some combination of all these factors is true; the populations are smaller than anticipated, the messaging did not resonate, and there is a better source of contacts. Furthermore, responses from specifiers suggest there are differences within the specifier population in terms of how much interaction they have with manufacturers' representatives. This indicates different outreach pathways may be needed to reach subsets of the specifier population.

> Recommendation 6.1: Conduct focus groups or interviews with a small set of NEEA staff and implementer contacts in the engineering, contracting, and building owner spaces to better understand messaging and language about clean-water pumps and circulators that will resonate with each of these groups. Perhaps partner with Energy Trust of Oregon or utilities to conduct these focus groups or interviews at a trade ally forum or meetings. Or work with XMP participants, and perhaps some of their contacts, to better understand the language that each of these groups may respond to when being recruited to participate in a study about clean-water pumps and circulators.
>
> Recommendation 6.2: Conduct market research to get a better understanding of the total number of specifiers, contractors, and project owners that specify, install, and purchase clean-water pumps and circulators.

[7] Pump Energy Rating Label Awareness and Use Study. Report # E22-4450. Johnson Consulting Group, August 15, 2022

Appendix A – Survey and Interview Respondent Characteristics

This section summarizes key characteristics of the market actor respondents the ADM Team interviewed or surveyed.

Participant Manufacturers' representatives

Participant manufacturers' representatives serve Idaho, Montana, Oregon, and Washington, the four states of the Pacific Northwest that NEEA covers. Respondents representing these firms were generally executive officers of the company and had been working with the program for at least four years. As the data and information these participants provide is confidential, this report does not share more specific information about these participants.

Nonparticipant Manufacturers' representatives

Most nonparticipant manufacturer representative respondents were located in Washington, serve most of the region, have senior positions at their firm and have been in their role for five or more years. Only one respondent reported not serving the entire region, but even those that serve the entire region reported their sales were concentrated in Oregon and Washington (Append. Table 1).

Append. Table 1: Nonparticipant Manufacturer Representative Characteristics

ID	Role	Time in Position (yrs.)	Items Sold	Firm Headquarters Location	States served			
					ID	MT	OR	WA
NR1	President/Sales Mgr.	4	Pumps and circ.	ID	✓	✓	✓	✓
NR2	President/Sales Mgr.	15	Pumps and circ.	OR	✓	✓	✓	✓
NR3	General Manager	10	Pumps	WA	✓	✓	✓	✓
NR4	President	16	Pumps and circ.	WA	✓	✓	✓	✓
NR5	Senior Buyer	5	Pumps	WA	✓		✓	✓

Specifiers

Specifier respondents were typically, but not always engineers, located in the Pacific Northwest and served all states in the region (Append. Table 2).

Append. Table 2: Specifier Respondent Characteristics

ID	Source	Role	Firm Headquarters Location	States served			
				WA	OR	ID	MT
Spec1	2022 Study	President & Tech.	WA	✓	✓	✓	
Spec2	CSE	Engineering. Mgr.	ID	✓	✓	✓	✓
Spec3	CSE	Sr. Mech. Engineer	MT	✓	✓	✓	✓
Spec4	CSE	Sr. Engineering Mgr.	WA	✓	✓	✓	
Spec5	NEEA	Mechanical Engineer	MN	✓	✓	✓	✓
Spec6	NEEA	Mechanical Engineer	WA	✓	✓	✓	✓
Spec 7	CSE	Mechanical Engineer	CA		✓		

Contractors

The 21 contractor respondents varied in terms of employment status (Append. Table 3). Somewhat less than half were employees of a company providing contracting or installation services, while about one-third were independent operators, and nearly one-fifth reported being the owner or CEO of a company providing contracting or installation services. One reported being a wholesaler. More than three-quarters said they sold or installed pumps and somewhat more than half said they handled circulators. They varied widely in the length of time they had sold or installed pumps and circulators, but somewhat more than half reported more than 20 years of experience doing so.

Append. Table 3: Contractor Respondent Characteristics

	Response	Count	Percent
Respondent's employment status	Employee of contracting/installation company	9	41%
	Independent operator (self-employed)	7	32%
	Owner of contracting/installation company	4	18%
	Other[1]	2	9%
Equipment types handled	Pumps	18	82%
	Circulators	13	59%
Respondent's years of experience selling and/or installing pumps/circulators	One or less	1	5%
	Two to five	3	14%
	Six to 10	1	5%
	11 to 20	4	18%
	More than 20	13	59%
Services provided	Assess client needs and make recommendations	18	82%
	Install equipment that others have identified	11	50%
	Other	3	14%

[1]One wholesaler, one CEO of contracting/installation company.

The above table also shows that a large majority reported that their services include assessing client needs relating to pump and circulator systems and making recommendations, while about half said they install equipment that others specify. Three of those who said they assess needs and recommend equipment also indicated other services, one each reporting they (a) design and build custom systems, (b) specify *and* install equipment, or (c) repair and service equipment.

Respondents largely were self-employed or represented firms of 10 or fewer individuals and had installed 50 or fewer pumps or circulators in the target size range within the past 12 months, although larger firms with more sales were represented in the responses (
Append. Table 4).

Append. Table 4: Company Characteristics / Sales History

	Response	Count	Percent
Number of employees in company	Five or fewer (includes independent operator)	13	59%
	Six to 10	3	14%
	11 to 50	3	14%
	More than 50	1	5%
	Other[1]	2	9%
Total units ≤50 HP sold in past 12 months	10 or fewer	7	32%
	11 to 50	12	55%
	51 to 100	1	5%
	101 to 200	0	0%
	201 to 500	2	9%

[1]Respondents who reported "other" employment status were not asked the number of employees.

Respondents' sales represented all four Northwest states. Append. Table 5 shows the percentage of sales in each state, across all respondents and by the state where the respondents were located. The percentages in each row indicate the percentage of sales that occurred in the state identified for that row. As this shows, respondents' sales were largely concentrated in the state where their business was located: 98% of the Idaho and Montana respondents' sales were in Idaho and Montana, respectively; 85% of the Oregon respondents' sales were in Oregon; and 93% of the Washington respondents' sales were in Washington.

Append. Table 5: Share of Respondents' Pump and Circulator Sales, by State

State of Sales	All Respondents	Respondent Business Location			
		Idaho[1]	Montana[1]	Oregon	Washington[1]
Idaho	20%	98%	3%	1%	4%
Montana	10%	3%	98%	0%	1%
Oregon	28%	0%	0%	85%	1%
Washington	43%	0%	0%	14%	93%

[1]Percentages of sales by state do not sum to 100% because of rounding.

The fact that respondents' sales were largely located within the states where their business location was located meant that the overall distribution of sales across states closely reflected the distribution of respondents (

Append. Table 6). As this table shows, Idaho respondents and sales were somewhat overrepresented, and Washington respondents and sales were somewhat underrepresented, relative to the distribution of commercial real estate in the target size range by state. Weighting responses based on the distribution of commercial building square footage did not affect results

substantively and would not have changed conclusions. Therefore, only unweighted survey responses are reported below.

Append. Table 6: Distribution of Respondents and of Pump/Circulator Sales by State, Compared to Distribution of Commercial Real Estate (of at Least 5,000 Square Feet) by State

	Business Location	Percent of Sales	Percent of Commercial Real Estate
Idaho	19%	20%	10%
Montana	10%	10%	10%
Oregon	33%	28%	25%
Washington	43%	44%	55%

Respondents' sales were largely in the residential market segment, with about three-quarters of sales, on average, in that segment (Append. Table 7). After residential, commercial was the most commonly reported sector. A minority of respondents reported sales in the industrial and agricultural segments.

Append. Table 7: Share of Pump/Circulator Sales by Market Segment

	0%	1% to 20%	21% to 40%	41% to 60%	61% to 80%	81% to 99%	100%	Mean
Residential	14%	0%	0%	14%	18%	32%	23%	77%
Commercial	32%	50%	9%	5%	0%	0%	5%	15%
Industrial	82%	0%	9%	0%	0%	0%	9%	12%
Agricultural	95%	5%	0%	0%	0%	0%	0%	<1%

Project Owners

Of the 34 respondents, all but one indicated they were *not* the building owner. Those 33 respondents were nearly equally split between someone who has primary responsibility for equipment purchase and/or maintenance decisions and someone who contributes to those decisions (Append. Table 8). Respondents varied widely in terms of how much personal experience they had making decisions about clean-water pumps: just over one-third reported five or fewer years, while one-quarter reported more than 20 years.

Append. Table 8: Respondent Characteristics

	Response	Count	Percent
Respondent role	Owner	1	3%
	Non-owner, primary equipment responsibility	17	50%
	Non-owner, contributes to equipment decisions	16	47%
Number of years with equipment decision-making responsibility	Two to five	13	38%
	Six to 10	6	18%
	11 to 20	5	15%
	More than 20	9	26%
	Not sure	1	3%

The respondents' businesses or organizations generally owned or managed multiple buildings in the four Northwest states, often with relatively large square footage: two-thirds of reported at least six buildings, with one in five reporting more than 50 buildings; three-quarters reported that these buildings totaled more than 100,000 square feet, with half reporting more than 500,000 square feet (Append. Table 9). When asked to select the organization type(s) that best represented theirs, three-quarters of respondents identified real estate management and somewhat over half identified education. No more than two respondents identified any other specific type.

Append. Table 9: Company/Organization Characteristics

	Response	Count	Percent
Number of buildings owned or managed in Northwest	One	2	6%
	Two to five	7	21%
	Six to 10	6	18%
	11 to 50	10	29%
	More than 50	7	21%
	Not sure	2	6%
Total square footage of buildings owned or managed in Northwest	5,000 to 25,000	4	12%
	25,001 to 50,000	2	6%
	50,001 to 100,000	1	3%
	100,001 to 500,000	8	24%
	More than 500,000	18	53%
	Not sure	1	3%
Company/organization type (multiple selections allowed)	Real estate management	16	76%
	Education	12	57%
	Retail food	2	10%
	Food service	2	10%
	Healthcare office/clinic	2	10%
	Professional services	2	10%
	Government	2	10%
	Retail (nonfood)	1	5%
	Wholesale, distribution, or warehousing	1	5%
	Hospital	1	5%
	Health-related residential	1	5%
	Bank	1	5%
	Other, unspecified	3	14%
Northwest states represented by buildings owned or managed (multiple selections allowed)	Idaho	2	6%
	Montana	5	15%
	Oregon	19	56%
	Washington	19	56%

As shown in the above table, respondents reported owning or managing buildings in all four Northwest states. Idaho was somewhat underrepresented, with two respondents (4%) reporting buildings in Idaho. By contrast, Idaho represents about 10% of the total commercial building square footage in the Northwest. Weighting responses based on the distribution of commercial building square footage did not affect results substantively and would not have changed conclusions. Therefore, only unweighted survey responses are reported.

Appendix B – Staff and Implementer Instrument

Introduction Script

Hello,

My name is [INTERVIEWER NAME] with ADM Associates and I am working on the first market progress evaluation report (MPER #1) for NEEA's XMP Program. To conduct that research, we need to understand the XMP Program and learn about the successes and challenges the program faces. This will help us understand how the program activities align with the market transformation theory, and the logic model. Speaking with you and other staff associated with the program will be critical to helping us achieve that understanding.

For the purposes of this MPER, we are most interested in you program work since the XMP Program moved into Market Development on May 26, 2022. However, we acknowledge that NEEA was actively working on pumps and circulators prior to that date so please share anything from that earlier time that would be relevant to our understanding of the program.

I anticipate this interview will last about 60 minutes. I'll start with some introduction/background questions and then get into questions about how the program works, program activities, and how you see the activities aligning with the outputs and desired outcomes of the program.

This is really designed to be a conversation so please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. The recording is confidential. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes

I also understand that each member of the XMP team has a unique role and perspective on the program's efforts; if you don't feel that your role gives you visibility of some of these activities, just let me know and I will move on to the next question.

Background and Roles

The next few questions are about your role and your colleagues' roles with the XMP Program. To start with...

[ASK ALL]

Q1. Please describe your role on NEEA's XMP Program Team and your primary activities working with the program.

[ASK ALL]
Q2. Who within NEEA are the key people you work with on the XMP Program and what are their roles?

[ASK ALL]
Q3. Who outside of NEEA are the key people you work with on the XMP Program and what are their roles?

[ASK ALL]
Q4. What barriers or challenges in the pump and circulator market is the XMP Program working to address?

[ASK IF NOT DIRECTLY INVOLVED IN XMP PROGRAM]
Q5. Are there plans to change the scope of the program, and if so how would it change? For example, do you plan to recruit other market actors into the program, develop a new outreach and/or intervention strategy, etc.?

[ASK IF NOT DIRECTLY INVOLVED IN XMP PROGRAM]
Q6. Are you aware of any current discussions to shift or expand the scope of the program, and if so, what changes have been discussed?

Understanding Program Activities

The next few questions are about the program activities listed at the top of the logic model. Based on our review of the XMP Logic Model (9/12/23) there are four key activities the program engages in. [STATE IF FAMILIAR WITH DIRECT ACTIVITIES] I'd like to go through each of those four activities and discuss how NEEA conducts these activities and ask for examples, where possible. Also, please direct me to any documents or resources that may help my understanding of program activities. [FOR THOSE NOT FAMILIAR WITH DIRECT ACTIVITIES: I'd like to go through each of these four activities and discuss your perspectives on how they are each intended to contribute to sustained market transformation.]

[ASK ALL]
Q7. The first activity is to "**develop strong relationships and agreements with manufacturers' representatives and provide incentives, marketing support, and market transformation bonuses**." [STATE IF FAMILIAR WITH DIRECT ACTIVITIES] Please summarize how you and the NEEA team have done this since moving into Market Development. [FOR THOSE NOT FAMILIAR WITH DIRECT ACTIVITIES] Please share your thoughts on this activity's contributions to the XMP program's market transformation theory?]

[PROBES]
1. How are you developing/ have you developed relationships?
2. How are you providing incentives/bonuses and what are those incentives/bonuses based on?
3. How do you offer marketing support and can you provide any examples of that support?

[ASK ALL]

Q8. The second activity is to "**support awareness and understanding of efficient pumps**." [IF FAMILIAR WITH DIRECT ACTIVITIES] Please summarize how you and the NEEA team have done this since moving into Market Development. [FOR THOSE NOT FAMILIAR WITH DIRECT ACTIVITIES: Please share your thoughts on this activity's contributions to the XMP program's market transformation theory?]

[PROBES]

1. How are you supporting training for increasing awareness and understanding of efficient pumps?
2. How are you supporting research and case studies about efficient pumps and can you share examples (or direct us to those if you have already shared on NEEAnet)?
3. How do you work with other NEEA efforts to support adoption of efficient pumps?
4. How do you work with other entities (like HI) to support adoption of efficient pumps and can you provide examples?

[ASK ALL]

Q9. The third activity is to "**develop tools to support savings validation and demonstrate value of ownership**." Please summarize how you and the NEEA team have done this since moving into Market Development. [

[PROBES]

1. How do you support research aimed at validating savings and what examples can you provide?
2. How do you support the use and acceptance of the Hydraulic Institute's (HI) Energy Rating (ER) label?
3. How do you support the development and use of a lifetime cost of use calculator for pumps?

[ASK ALL]

Q10. The fourth activity is to "**work with market actors to influence specifications, standards, and test procedures to demonstrate market acceptance**." [IF FAMILIAR WITH DIRECT ACTIVITIES] Please summarize how you and the NEEA team have done this since moving into Market Development. [FOR THOSE NOT FAMILIAR WITH DIRECT ACTIVITIES: Please share your thoughts on this activity's contributions to the XMP program's market transformation theory?]

Logic Model Outcomes and Progress

I would now like to switch our conversation to focus on the desired outcomes, listed at the bottom of the logic model, that result from the program activities we just reviewed. I want to make sure I understand the desired outcomes and that I understand examples of the activities and outputs associated with each of these outcomes.

Outcome #1: Participating manufacturers' representatives' stock and sell efficient pump products.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]

Q11. I'd like to focus the next part of our discussion on **Outcome #1: Participating manufacturers' representatives' stock and sell efficient pump products**." Can you

provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]
Q12. Since the program moved into Market Development on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]
Q13. What challenges does the program face now when trying to achieve this outcome?

Outcome #2: Pump efficiency is label recognized and used by distributors and specifiers.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]
Q14. I'd like to focus the next part of our discussion on **Outcome #2: Pump efficiency is label recognized and used by distributors and specifiers."** Can you provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]
Q15. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]
Q16. What challenges does the program face now when trying to achieve this outcome?

Outcome #3: Numbers of participating OEMs and certified labs within the ER Label program increases.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]
Q17. I'd like to focus the next part of our discussion on **Outcome #3: Numbers of participating OEMs and certified labs within the ER Label program increases."** Can you provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]
Q18. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]
Q19. What challenges does the program face now when trying to achieve this outcome?

Outcome #4: Sales of efficient pump products, broadly, and smart pumps, specifically increase.

For the next few questions and outcomes, we recognize that the outcomes we are asking about may be several years off and that there may not be much activity yet and therefore not much opportunity to have experienced any specific successes or challenges. Please let us know if that is the case.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]

Q20. I'd like to focus the next part of our discussion on **Outcome #4: Sales of efficient pump products, broadly, and smart pumps, specifically increase.** Can you provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]

Q21. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]

Q22. What challenges does the program face now when trying to achieve this outcome?

Outcome #5: Pump efficiency label is recognized and used by contractors and project owners.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]

Q23. I'd like to focus the next part of our discussion on **Outcome #5: Pump efficiency label is recognized and used by contractors and project owners.** Can you provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]

Q24. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]

Q25. What challenges does the program face now when trying to achieve this outcome?

Outcome #6: Pump product performance levels improve.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]

Q26. I'd like to focus the next part of our discussion on **Outcome #5: Pump product performance levels improve.** Can you provide examples of your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]

Q27. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]

Q28. What challenges does the program face now when trying to achieve this outcome?

Outcome #7: DOE increases/expands federal performance standards for pumps and circulators.

[ASK IF FAMILIAR WITH DIRECT ACTIVITIES]]

Q29. I'd like to focus the next part of our discussion on **Outcome #7: DOE increases/expands federal performance standards for pumps and circulators.** Can you provide examples of

your activities or outputs that are driving toward that outcome? If so, what are those activities?

[ASK ALL]
Q30. Since the program went from a pilot to a full-fledged program on May 26, 2022, what successes has the program experienced in working towards this outcome?

[ASK ALL]
Q31. What challenges does the program face now when trying to achieve this outcome?

Conclusion

[ASK ALL]
Q32. Are there any program activities you or your colleagues are conducting that we have not covered today? If so, what are those activities and how do they support the desired outcomes and overall market transformation theory of the program?

[ASK ALL]
Q33. Finally, what would you most like to learn from this evaluation effort that would help you in your role?

Those are all the questions I have. Thanks for your time.

Appendix C – Participant Instrument

Introduction to Interview Script

Hello [NAME],

As I mentioned in our previous interactions, my name is [INTERVIEWER NAME] with ADM Associates and I am working on the first market progress evaluation report (MPER #1) for NEEA's XMP Program. I understand that you are participating in this program and that you work regularly with NEEA and the XMP Team, including Warren Fish.

During this interview, I would like to speak with you about the progress the NEEA program is making in achieving its goals. Specifically, I would like to speak with you about your stocking and sales practices of efficient pumps and circulators, smart pumps, and all other clean water pumps and circulators used in commercial buildings. Additionally, I would like to learn more about the awareness and use of the Energy Rating label on pumps and circulators. The interview would start with some introduction/background questions.

This is really designed to be a conversation so please don't hesitate to ask questions or clarify things as we go through the questions.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. That recording, like all aspects of your participation in this program would be confidential; however, if you prefer not to be recorded, that is ok too. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes

I also understand that you may not be able to address some of my questions. If that is the case, please just let me know and I will move on to the next question.

Background

To start with, I'd like to get some background information about you and your firm.

[ASK ALL]
Q34. Please tell me your title and describe your role with your firm?

[ASK ALL]
Q35. How long have you personally been working with NEEA on the XMP program?

[ASK ALL]
Q36. Who do you mostly interact with regarding your participation in the NEEA program?

Energy Rating Label

I would now like to discuss the Hydraulic Institute's Energy Rating label.

[ASK ALL]
Q37. How did you become aware of the Energy Rating label? [PROBES: Trade association, manufacturer, training, NEEA, etc.]

[ASK ALL]
Q38. How often, if at all, do you use the Energy Rating Label when assessing what pump or circulator system best suits a client's needs?

1. Never
2. Up to one quarter of the time
3. More than one quarter of the time and up to one half of the time
4. More than one half of the time and up to three quarters of the time
5. More than three quarters of the time
6. Not sure

[ASK ALL]
Q39. Have you ever sold a more efficient motor along with a pump for a project because you consulted the Energy Rating Label? [INTERVIEWER: Capture any comments that provide insights into how respondents characterize "more efficient."]

1. No
2. Yes
3. Not sure

[ASK ALL]
Q40. Have you ever sold controls along with a pump for a project because you consulted the Energy Rating Label?

1. No
2. Yes
3. Not sure

[ASK ALL]
Q41. What percentage of your customers that come to you needing pumps and/or circulators would you estimate are aware of the Hydraulic Institute's Energy Rating label?

1. 0%
2. 1 to 24%
3. 25 to 49%
4. 50 to 74%
5. 75 to 99%
6. 100%

[ASK ALL]
Q42. What other pump or circulator ratings or certifications, if any, do your customers ask about? For example, are there other efficiency ratings, safety certifications, something else, that customers ask about?

[ASK ALL]
Q43. Through the XMP Program, NEEA is hoping to increase the recognition of the Hydraulic Institute's Energy Rating label among specifiers. In addition to or in lieu of what they are already doing through your Program Support Plan (e.g., performance bonuses, per-unit incentives, and data stipends), what could NEEA do, if anything, to support your company in increasing awareness of the Energy Rating label? What changes, if any, would you make to how NEEA is working to build awareness of the Energy Rating label?

Sales

The next few questions are about your stocking and sales practices.

[ASK ALL]
Q44. Do you typically stock the pumps and circulators that receive support from NEEA? Or, are these items something that you typically order for a customer?

[ASK ALL]
Q45. Who are the typical customers of the pumps and circulators that are supported by NEEA? [PROBE: Are they building owners, specifiers, contractors, or a combination of these? What proportion of your customers fall into each category?]

[ASK ALL]
Q46. How, if at all, have your stocking practices of efficient pumps and circulators (those supported by NEEA) changed since you began participating in the XMP program?

[ASK ALL]
Q47. Have you been stocking or selling larger higher horsepower pumps or circulators since participating in the program?

[ASK ALL]
Q48. Have you been selling efficient pumps or circulators with higher horsepower since participating in the program? [In other words, are customers asking for higher horsepower efficient pumps or circulators more now than they were when you began participating in the program?]

[ASK ALL]
Q49. How, if at all, have sales trends for efficient pumps and circulators changed over the last year? How, if at all, have these trends varied by type (constant, variable, smart, hydronic, and DHW)

[ASK ALL]
Q50. Through the XMP Program, NEEA is hoping to increase the stocking and selling of efficient pumps and circulators by firms like yours. In addition to or in lieu of what they are already

doing through your Program Support Plan (e.g., performance bonuses, per-unit incentives, and data stipends), what could NEEA do to support your company in selling efficient pumps and circulators? What changes, if any, would you make to how NEEA is working to increase the stocking and selling of efficient pumps and circulators?

Pump Performance

I would now like to discuss how, if at all, the efficiency performance of pumps and circulators has changed over time and get your perspectives about how you see the performance changing, if at all.

[ASK ALL]
Q51. What trends, if any, have you seen in pump product performance levels?

[ASK ALL]
Q52. How have these trends varied, if at all, by type of pump or circulator?

1. Constant speed pump
2. Variable speed pump
3. Smart pump
4. Hydronic heating circulators
5. Domestic hot water circulators

[ASK ALL]
Q53. What is driving those trends?

[ASK ALL]
Q54. Through the XMP Program, NEEA is hoping to see pump and circulator performance improve over time. In addition to or in lieu of what they are already doing through your Program Support Plan (e.g., performance bonuses, per-unit incentives, and data stipends), what could NEEA do, if anything, to support your company in improving pump performance? What changes, if any, would you make to how NEEA is working to encourage improved pump and circulator performance?

Conclusion

I have just a couple remaining questions before concluding this conversation. Thanks for sharing information with me so far.

[ASK ALL]
Q55. What, if anything, could NEEA do to improve your experience with participating in the XMP program?

Those are all the questions I have. Thanks for your time.

Appendix D – Nonparticipant Instrument

Introduction

Hello [NAME],

My name is [INTERVIEWER NAME]. [SCHEDULER NAME] spoke with you on [SCHEDULER DATE] and scheduled this time for us to talk about the market for clean water pumps and circulators in the Pacific Northwest. As [SCHEDULER NAME] mentioned, this will take about 15 to 20 minutes and we will send you a $500 gift card as our thanks. Is this still a good time to talk?"

During this interview, I would like to speak with you about your stocking and sales practices of efficient pumps and circulators, smart pumps, and all other clean water pumps and circulators used in commercial buildings. Additionally, I would like to learn more about your awareness and possible use of the efficiency designations or ratings on pumps and circulators.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. That recording, like all aspects of your participation in this program would be confidential; however, if you prefer not to be recorded, that is ok too. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes

I also understand that you may not be able to address some of my questions. If that is the case, please just let me know and I will move on to the next question.

Screening

To start with, I'd like to get some background information about you and your firm.

[ASK ALL]
Q1. How would you describe your firm? Are you a…

[MULTIPLE RESPONSE]

1. Manufacturer representative that represents various non-competing product lines.
2. Distributor that sells a variety of brands of similar equipment.
3. Engineering or design firm that specifies equipment for commercial projects.
4. Consultant that specifies equipment for commercial projects
5. Contractor that recommends and installs equipment for commercial projects.
6. Other, please specify: _____

[ASK ALL]
Q2. Does your firm sell or distribute any of the following?

[MULTIPLE RESPONSE]

1. Clean water pumps

2. Circulators
3. None of the above [THANK AND TERMINATE]

[ASK ALL]
Q3. What sectors does your company sell in?

[MULTIPLE RESPONSE]

1. Commercial
2. Multifamily residential [HOLD IF more than 50% of their work]
3. Industrial
4. Residential [TERMINATE IF 100% of work]
5. Other, please specify: _____ [THANK AND TERMINATE]

[ASK ALL]
Q4. What state(s) does your firm sell or distribute clean water pumps and/or circulators market in the Northwest?

[MULTIPLE RESPONSE]

1. Washington
2. Oregon
3. Idaho
4. Montana
5. None of the above [THANK AND TERMINATE]

Background and Firmographics

My next few questions are about your firm and specifically your firm's work in the region served by NEEA. Including Idaho, Montana, Oregon, and Washington.

[ASK ALL]
Q5. Please tell me your title and describe your role with your firm?

[ASK ALL]
Q6. Where is your organization headquartered?

[ASK ALL]
Q7. What states/regions do you cover? [PROBE: How, if at all, do your services differ by state/region?]

[ASK ALL]
Q8. Please tell me whether your firm sells or specifies each of the following types of equipment:

[MULTIPLE RESPONSE]

1. Constant speed pumps
2. Variable speed pumps
3. Smart pumps (a pump with integrated controls and motors)
4. Hydronic heating circulators
5. Domestic hot water circulators

[ASK ALL]
Q9. Who are your typical customers? Are they…

[MULTIPLE RESPONSE]

1. Building owners or managers.
2. Contractors.
3. Engineers or designers that specify equipment.
4. Other, please specify: _____

[ASK ALL]
Q10. What types of buildings are you primarily serving with your sales and support of clean water pumps and circulators?

1. Offices
2. Multifamily
3. Retail
4. Warehouse
5. Manufacturing facilities
6. Other, please specify:

[ASK IF Q1 =1 or Q1]
Q11. What manufacturer(s) do you represent or sell for each of the following product types?

1. [ASK IF Q8 = 1] Constant speed pumps
2. [ASK IF Q8= 2] Variable speed pumps
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)
4. [ASK IF Q8 = 4] Hydronic heating circulators
5. [ASK IF Q8 = 5] Domestic hot water circulators

Energy Rating Label

I would now like to discuss the Hydraulic Institute's Energy Rating label.

[ASK ALL]

Q12. Do you recall ever hearing of or seeing the Hydraulic Institute's Energy Rating label, for C&I pump and circulator systems?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure

[DISPLAY IF Q12 = 2 OR 3]

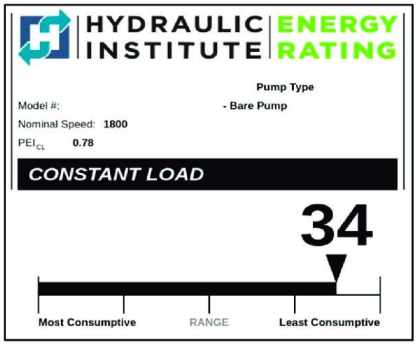
Q13. NEEA worked with the HI to develop an Energy Rating label that includes at-a-glance information for a given pump model regarding energy usage and cost to operate on a scale from least to most energy-efficient. Do you recall ever hearing of or seeing this Energy Rating label?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure

[DISPLAY IF Q13 = 2 OR 3]

Q14. Have you ever heard of or seen the HI's Energy Rating label for pump and circulator systems (INTERVIEWER WILL SHARE SCREEN AND SHOW PICTURES OF LABELS)?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure



[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q15. How did you become aware of the Energy Rating label? [PROBES: Trade association, manufacturer, training, NEEA, etc.]

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q16. How, if at all, have you seen the Energy Rating label used? [PROBES: Was it used on an advertisement for a product, called out in a work proposal, something else?]

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q17. How often, if at all, do you use the Energy Rating label when assessing what pump or circulator system best suits a client's needs?

1. Never
2. Up to one quarter of the time
3. More than one quarter of the time and up to one half of the time
4. More than one half of the time and up to three quarters of the time
5. More than three quarters of the time
6. Not sure

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q18. Have you ever sold a more efficient motor along with a pump for a project because you consulted the Energy Rating label?

1. Yes
2. No
3. Not sure

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q19. Have you ever sold controls along with a pump for a project because you consulted the Energy Rating label?

1. Yes
2. No
3. Not sure

[ASK IF Q19 = 2, No]

Q20. What features or characteristics, if any, do you emphasize when selling controls?

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q21. What percentage of your customers that come to you needing pumps and/or circulators would you estimate are aware of the Hydraulic Institute's Energy Rating label?

1. 0%
2. 1 to 24%
3. 25 to 49%
4. 50 to 74%

5. 75 to 99%
6. 100%

Sales

The next few questions are about your sales of efficient pumps and circulators compared to non-efficient pumps and circulators.

[ASK IF Q1 =1 OR Q1 =2]
Q22. What percentage of the pumps you sold in the last year were?

1. [ASK IF Q8 = 1] Constant speed pumps
2. [ASK IF Q8 = 2] Variable speed pumps
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)

[ASK IF Q1 =1 OR Q1 =2]
Q23. What percentage of the circulators you sold in the last year were?

1. [ASK IF Q8 = 4] Hydronic heating circulators
2. [ASK IF Q8 = 5] Domestic hot water circulators

[ASK IF Q1 =1 OR Q1 =2 AND Q12=1 OR Q13 =1 OR Q14=1]
Q24. For each of the following equipment types your firm sold in the last year, what percentage would you classify as efficient (that is, having an Energy Rating score greater than 1). So, starting with…

1. [ASK IF Q8 = 1] Constant speed pumps
2. [ASK IF Q8 = 2] Variable speed pumps
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)
4. [ASK IF Q8 = 4] Hydronic heating circulators
5. [ASK IF Q8 = 5] Domestic hot water circulators

[ASK IF Q1 =1 OR Q1 =2]
Q25. What percentage of all your revenue do your pump and circulator sales represent?

1. 1 to 19%
2. 20 to 39%
3. 40 to 59%
4. 60 to 79%
5. 80 to 100%

[ASK IF Q1 =1 OR Q1 =2
Q26. How, if at all, have sales trends for efficient pumps and circulators changed over the last year? How, if at all, have these trends varied by type (constant, variable, smart, hydronic, and DHW) cost, or performance?

Pump Performance

I would now like to discuss the efficiency performance of pumps and circulators.

[ASK IF Q1 =1 OR Q1 =2]

Q27. For each of the following equipment types, please tell me how many you sold by make and model over the last two years.

1. [ASK IF Q8 = 1] Constant speed pumps
2. [ASK IF Q8 = 2] Variable speed pumps
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)
4. [ASK IF Q8 = 4] Hydronic heating circulators
5. [ASK IF Q8 = 5] Domestic hot water circulators

[ASK IF Q1 =1 OR Q1 =2 (MR OR DIST) AND ASK IF Q12=1 OR Q13 =1 OR Q14=1 (AWARE OF ER)]

Q28. For the manufacturers of pumps and circulators you sell, over the last two years, what is the average rated efficiency of each product type?

Product type	Manufacturer #1 from Q11	Manufacturer #2 from Q11	Manufacturer #3 from Q11
1. [ASK IF Q8 = 1] Constant speed pumps			
2. [ASK IF Q8 = 2] Variable speed pumps			
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)			
4. [ASK IF Q8 = 4] Hydronic heating circulators			
5. [ASK IF Q8 = 5] Domestic hot water circulators			

[ASK IF Q1 =1 OR Q1]

Q29. What trends, if any, have you seen in pump product performance over the last year?

[ASK IF Q1 =1 OR Q1]

Q30. How have these trends varied, if at all, by type of pump or circulator?

1. [ASK IF Q8 = 1] Constant speed pumps
2. [ASK IF Q8 = 2] Variable speed pumps
3. [ASK IF Q8 = 3] Smart pumps (a pump with integrated controls and motors)
4. [ASK IF Q8 = 4] Hydronic heating circulators
5. [ASK IF Q8 = 5] Domestic hot water circulators

[ASK IF Q1 =1 OR Q1]

Q31. In your assessment, what is driving those trends?

Conclusion

[ASK ALL]

Q32. Those are all the questions I have for you. As noted at the beginning of this call, as a thank you for your time, we are providing a [$500 for nonpart MR/dist. or $250 for specifiers] incentive for helping us today. Please provide me with your email address and we will send that e-gift card to you in the next week or two.

1. _____@_____.com

Those are all the questions I have. Thanks for your time.

Appendix E – Specifier Instrument

Introduction

Hello [NAME],

My name is [INTERVIEWER NAME] and I spoke with you recently and scheduled this time for us to talk about the market for clean water pumps and circulators in the Pacific Northwest. As I mentioned, this will take about 15 to 20 minutes and we will send you a $250 gift card as our thanks. Is this still a good time to talk?

During this interview, I would like to speak with you about your awareness and possible use of the efficiency designations on pumps and circulators.

I will be taking notes throughout the call, but I would also like to record our conversation to make sure I capture what you are telling me accurately. That recording, like all aspects of your participation in this program would be confidential; however, if you prefer not to be recorded, that is ok too. Is it ok that I record the call?

1. [IF YES] Start recording
2. [IF NO] Take notes

I also understand that you may not be able to address some of my questions. If that is the case, please just let me know and I will move on to the next question.

Screening

[ASK ALL]

Q1. To start with, I'd like to get some background information about you and your firm. Is your firm involved in the commercial clean water pumps and/or circulators market in the Northwest?

[MULTIPLE RESPONSE FOR "NO" RESPONSES]

1. Yes- Continue (EXCLUSIVE]
2. No, we do not serve the PNW [THANK AND TERMINATE]
3. No, we do not represent clean-water pump or circulator manufacturers or distribute these products for sale [THANK AND TERMINATE]

[ASK ALL]

Q2. How would you describe your firm? Are you a…

[MULTIPLE RESPONSE]

1. Manufacturer representative that represents various non-competing product lines.
2. Distributor that sells a variety of brands of similar equipment.
3. Engineering or design firm that specifies equipment for commercial projects.
4. Consultant that specifies equipment for commercial projects
5. Contractor that recommends and installs equipment for commercial projects.
6. Other, please specify: _____

Background and Firmographics

My next few questions are about your firm and specifically your firm's work in the region served by NEEA. Including Idaho, Montana, Oregon, and Washington.

[ASK ALL]
Q3. Please tell me your title and describe your role with your firm?

.

[ASK ALL]
Q4. Where is your organization headquartered?

[ASK ALL]
Q5. What states/regions do you cover? [PROBE: How, if at all, do your services differ by state/region?]

[ASK ALL]
Q6. Please tell me whether your firm sells or specifies each of the following types of equipment:

[MULTIPLE RESPONSE]

1. Constant speed pumps
2. Variable speed pumps
3. Smart pumps (a pump with integrated controls and motors)
4. Hydronic heating circulators
5. Domestic hot water circulators

[ASK ALL]
Q7. Who are your typical customers? Are they…

[MULTIPLE RESPONSE]

1. Building owners or managers.
2. Contractors.
3. Engineers or designers that specify equipment.
4. Other, please specify: _____

[ASK ALL]

Q8. What types of buildings are you primarily serving with your sales and support of clean water pumps and circulators?

1. Offices
2. Multifamily
3. Retail
4. Warehouse
5. Manufacturing facilities
6. Other, please specify:

[ASK IF Q1 =1 or Q1]

Q9. What manufacturer(s) do you represent or sell for each of the following product types?

1. [ASK IF Q6 = 1] Constant speed pumps
2. [ASK IF Q6 = 1] Variable speed pumps
3. [ASK IF Q6 = 3] Smart pumps (a pump with integrated controls and motors)
4. [ASK IF Q6 = 4] Hydronic heating circulators
5. [ASK IF Q6 = 5] Domestic hot water circulators

Energy Rating Label

I would now like to discuss the Hydraulic Institute's Energy Rating label.

[ASK ALL]

Q10. Do you recall ever hearing of or seeing the Hydraulic Institute's Energy Rating label, for C&I pump and circulator systems?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure

[DISPLAY IF Q12 = Q12.2 OR Q12.3]

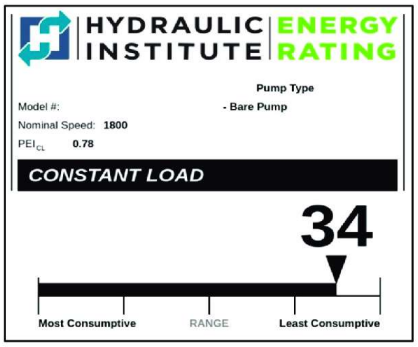
Q11. NEEA worked with the Hydraulic Institute to develop an Energy Rating label that includes at-a-glance information for a given pump model regarding energy usage and cost to operate on a scale from least to most energy-efficient. Do you recall ever hearing of or seeing this Energy Rating label?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure

[DISPLAY IF Q13 = Q13.2 OR Q13.3]

Q12. Have you ever heard of or seen the Hydraulic Institute's Energy Rating label for pump and circulator systems (INTERVIEWER WILL SHARE SCREEN AND SHOW PICTURES OF LABELS)?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen eithER Label
3. Not sure



[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q13. How did you become aware of the Energy Rating label? [PROBES: Trade association, manufacturer, training, NEEA, etc.]

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q14. How, if at all, have you seen the Energy Rating label used? [PROBES: Was it used on an advertisement for a product, called out in a work proposal, something else?]

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q15. How often, if at all, do you use the Energy Rating label when assessing what pump or circulator system best suits a client's needs?

1. Never
2. Up to one quarter of the time
3. More than one quarter of the time and up to one half of the time
4. More than one half of the time and up to three quarters of the time
5. More than three quarters of the time
6. Not sure

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q16. Have you ever sold a more efficient motor along with a pump for a project <u>because you consulted the Energy Rating label</u>?

1. Yes
2. No
3. Not sure

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q17. Have you ever sold controls along with a pump for a project <u>because you consulted the Energy Rating label</u>?

1. Yes
2. No
3. Not sure

[ASK IF Q19 = 2, No]

Q18. What features or characteristics, if any, do you emphasize when selling controls?

[ASK IF Q12=1 OR Q13 =1 OR Q14=1]

Q19. What percentage of your customers that come to you needing pumps and/or circulators would you estimate are aware of the Hydraulic Institute's Energy Rating label?

1. 0%
2. 1 to 24%
3. 25 to 49%
4. 50 to 74%
5. 75 to 99%
6. 100%

Conclusion

[ASK ALL]

Q20. Those are all the questions I have for you. As noted at the beginning of this call, as a thank you for your time, we are providing a $250 gift card for helping us today. Please provide me with your email address and we will send that e-gift card to you in the next week or two.

1. ____

Those are all the questions I have. Thanks for your time.

Appendix F – Contractor Instrument

Screening

First, a few questions about you and your business. Some of these are to confirm that you do the type of work that our questions are about.

Note that this survey uses "circulators" to refer to pumps that circulate liquids in a closed circuit. These typically are smaller pumps, which vary from 1/40th to 5 HP.

[ASK ALL]

Q1. Do you sell and/or install clean water pumps and/or circulators that are up to 50 HP for commercial, industrial, or residential applications?

1. Yes
2. No
3. Not sure

[DISPLAY IF Q1 = 2 OR 3]

Q2. Do you work as a specifier for projects that include clean water pumps and/or circulators that are up to 50 HP for commercial, industrial, or residential applications?

1. Yes
2. No
3. Not sure

Screening: Specifier

[DISPLAY IF Q2 = 1]

Q3. This survey is for contractors who sell and/or install clean water pumps and/or circulators. However, we also will be interviewing specifiers about their experience as a specifier for pump and/or circulator equipment over the next few weeks. May we contact you for that interview?

1. Yes
2. No

[DISPLAY IF Q3 = 1 AND EITHER EMAIL = NULL OR PHONE = NULL, THEN TERMINATE]

Q4. That is great. We do not have the following contact information for you in our files. Please provide it here:

1. [DISPLAY IF EMAIL = NULL] Email address: [OPEN-END]
2. [DISPLAY IF PHONE = NULL] Phone number: [PHONE#]

Q5. What is the best time to reach you by phone? [OPEN-END]

Thanks again. We will contact you within the next two weeks.

Screening: Screened Out 1

[DISPLAY IF Q2 = 2 OR 3, THEN TERMINATE]
Our questions are for contractors who sell and/or install clean water pumps and/or circulators for commercial, industrial, or residential applications. We appreciate your willingness to help but we won't need any more of your time today. Thanks much!

Screening: Screened Out 2

[DISPLAY IF Q3 = 2, THEN TERMINATE]
We understand. We appreciate your willingness to help with the current survey and don't need any more of your time today. Thanks much!

[DISPLAY IF Q1 =1]
Q6. Do you sell and/or install those equipment types in Idaho, Montana, Oregon, **and/or** Washington?

1. Yes
2. No
3. Not sure

Screening: Screened Out 3

[DISPLAY IF Q6 = 2 OR 3, THEN TERMINATE]
Our questions are for contractors who sell and/or install clean water pumps and/or circulators in Idaho, Montana, Oregon, or Washington. We appreciate your willingness to help and don't need any more of your time today. Thanks much!

[DISPLAY IF Q6 =1]
Q7. Which of the following types of services do you provide relating to pumps and/or circulators? Please select all that apply. [MULTISELECT]

1. Assess client needs and make recommendations
2. Install equipment that others have identified
3. Other – please specify: [OE]

[DISPLAY IF Q6 =1]
Q8. Which of those equipment types (pumps or circulators) do you sell and/or install? Please select all that apply. [MULTISELECT]

1. Pumps
2. Circulators

[FROM HERE ON, "ASK ALL" MEANS "ASK ALL WHO WERE NOT TERMINATED FROM Q1 OR Q6."]

Background

[ASK ALL]
Q9. Which of the following best describes you?

1. Independent operator
2. Owner of company that employs contractors/installers
3. Employee of company that employs contractors/installers

4. Other – please specify: [OE]

[DISPLAY IF Q9 = 2 OR 3]

Q10. How many employees does your company have, excluding administrative staff but including yourself?

1. 5 or fewer
2. 6 to 10
3. 11 to 50
4. More than 50
5. Not sure

[ASK ALL]

Q11. How many years have you, personally, been selling and/or installing clean water pumps and/or circulators?

1. 1 or fewer
2. 2 to 5
3. 6 to 10
4. 11 to 20
5. More than 20
6. Not sure

[ASK ALL]

Q12. Thinking about your sales of all types of clean water pumps and circulators, about how many total units up to 50 HP did you sell and/or install in Idaho, Montana, Oregon, and Washington in the past 12 months?

1. 10 or fewer
2. 11 to 50
3. 51 to 100
4. 101 to 200
5. 201 to 500
6. More than 500
7. Not sure

[ASK ALL]

Q13. About what share of your sales of clean water pumps and/or circulators in Idaho, Montana, Oregon, or Washington are in each of the following market sectors?

[MATRIX – OPTIONS FOR EACH ITEM ARE:
○ NONE
○ UP TO 25%
○ 26% TO 50%
○ 51% TO 75%
○ 76% TO 100%
○ NOT SURE
DON'T ENFORCE ADDITION TO 100%; IF NEEDED, WE WILL ADJUST RESPONSES, KEEPING RELATIVE LEVELS AS INDICATED.]

1. Commercial
2. Industrial

3. Residential
4. Other – please specify: [OE]

[ASK ALL]

Q14. Thinking about **your total sales of clean water pumps and/or circulators**, about what share are in each of the following four states?

[MATRIX – OPTIONS FOR EACH ITEM ARE:
NONE
○ UP TO 25%
○ 26% TO 50%
○ 51% TO 75%
○ 76% TO 100%
○ NOT SURE
DON'T ENFORCE ADDITION TO 100%; IF NEEDED, WE WILL ADJUST RESPONSES, KEEPING RELATIVE LEVELS AS INDICATED.]

1. Idaho
2. Montana
3. Oregon
4. Washington

Awareness of ER Label

[ASK ALL]

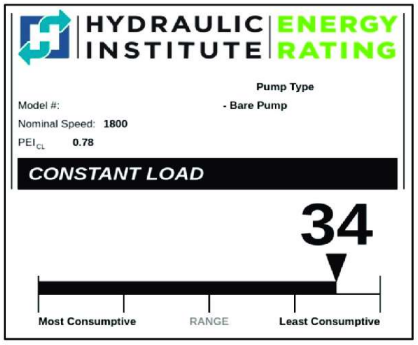
Q15. Do you recall ever hearing of or seeing the Hydraulic Institute's Energy Rating Label, or "ER" Label for pumps and/or circulators?

1. Yes
2. No
3. Not sure

[DISPLAY IF Q12 = Q12.2 OR Q12.3]

Q16. Below is a picture of the ER Labels. Having seen them here, do you recall ever seeing either of these labels?

1. Yes, I have heard of or seen one or both labels
2. No, I have never heard of or seen either Label
3. Not sure



[DISPLAY IF Q12 = 1 OR Q16 = 1]

Q17. Where did you hear about or see the label? Please select all that apply. [MULTISELECT]

1. Pump dealer or representative
2. Manufacturer websites
3. Manufacturer selection software
4. Trade association
5. Hydraulic Institute (pumps.org)
6. NEEA staff or website
7. BetterBricks.com
8. Other – please specify: [OE]

[DISPLAY IF Q12 = 1 OR Q16 = 1]

Q18. Which of the following things do you recall being on the label? Please select all that apply. [MULTISELECT]

1. PEI number
2. Manufacturer
3. Model
4. Horsepower (HP)
5. Pump type
6. Other – please specify: [OE]

[DISPLAY IF Q18 = 1]

Q19. How valuable to you was having the PEI number on the label? Please answer on a scale from 1 (not at all valuable) to 5 (extremely valuable). [INSERT SCALE, WITH 98=NOT SURE]

Use of ER Label and Calculator [DISPLAY BLOCK IF Q12 = 1 OR Q16 = 1]

[ASK ALL SHOWN THIS BLOCK]

Q20. How often, if at all, do you use the Energy Rating Label when assessing what pump or circulator system best suits a client's needs?

1. Never
2. Up to 25% of the time
3. More than 25%, up to 50% of the time

4. More than 50%, up to 75% of the time
5. More than 75% of the time
6. Not sure

[ASK ALL SHOWN THIS BLOCK]

Q21. How often, if at all, do you use the Energy Rating Label when presenting options for pump or circulator systems to clients?

1. Never
2. Up to 25% of the time
3. More than 25%, up to 50% of the time
4. More than 50%, up to 75% of the time
5. More than 75% of the time
6. Not sure

[ASK ALL SHOWN THIS BLOCK]

Q22. Have you ever made modifications to a pump or circulator, such as adding a more efficient motor or adding controls, based on information provided on the Energy Rating Label?

1. No
2. Yes
3. Not sure

Other Pump Efficiency Information Sources

[ASK ALL]

Q23. Have you ever visited the Hydraulic Institute's "Energy Rating" web page at https://www.pumps.org/what-we-do/energy-rating/?

1. Yes
2. No
3. Not sure

[ASK ALL]

Q24. To what degree do you rely on each of the following sources of information on pump energy performance? Please answer on a scale from 1 (not at all) to 5 (to a great degree). [INSERT SCALE, WITH 98=NOT SURE]

1. Pump dealer or representative
2. Manufacturer websites
3. Manufacturer selection software
4. Trade associations
5. Pump name plate
6. Hydraulic institute
7. Other – please specify: [OE]

[DISPLAY IF Q24 = 4]

Q25. What trade associations do you rely on?

1. [OPEN ENDED]

Other

[ASK ALL]

Q26. Please rank the top three factors in terms of their importance when deciding which pump or circulator to recommend for a given application.

1. Operating point on the pump curve
2. Size (HP)
3. Efficiency
4. Brand reliability
5. Availability
6. Physical fit to the space
7. Price
8. Anticipated performance

[ASK ALL]

Q27. Which of the following labels or certifications are you aware of? Please select all that apply or select "none of the above." [MULTISELECT, EXCEPT "NONE OF THE ABOVE"]

1. Building Performance Institute Building Science Principles certificate
2. Building Performance Institute Total Building Performance certificate
3. LEED Certified (including Silver, Gold, or Platinum)
4. ENERGY STAR®
5. x-None of the above

Those are all the questions we have for you today. Thank you for your time!

Appendix G – Project Owner Instrument

Screening

First, a few questions about you and your business. Some of these are to confirm that our questions are relevant to you.

[ASK ALL]
Q1. Do you or your employer own or operate any commercial, industrial, or residential buildings in Idaho, Montana, Oregon, **and/or** Washington that are at least 5,000 square feet and use clean water pumps or circulators of up to 50 horsepower?

1. Yes
2. No
3. Not sure

[DISPLAY IF Q1 = 1]
Q2. In the past five years, have you been involved in any decisions about the purchase or upgrade of clean-water pumps or circulators in any of your or your employer's buildings?

1. Yes
2. No
3. Not sure

Screening: Terminate Message 1

[DISPLAY IF Q1 = 2 OR 3, THEN TERMINATE]
Our questions are for individuals who have buildings in Idaho, Montana, Oregon, or Washington that are at least 5,000 square feet and use clean water pumps or circulators of up to 50 horsepower. We appreciate your willingness to help and don't need any more of your time today. Thanks much!

Screening: Terminate Message 2

[DISPLAY IFQ2 = 2 OR 3 THEN TERMINATE]
Our questions are for individuals who have had some involvement in the purchase or upgrade of clean-water pumps or circulators. We appreciate your willingness to help and don't need any more of your time today. Thanks much!

FROM HERE ON, "ASK ALL" MEANS "ASK ALL WHO WERE NOT TERMINATED FROM Q1 OR Q2."

Background

[ASK ALL]
Q3. Which of the following best describes your role relating to the buildings mentioned above?

1. Owner
2. Non-owner, person with primary responsibility for equipment purchase and/or maintenance.

3. Non-owner, person who contributes to decisions about equipment purchase and/or maintenance.
4. Other – please specify: [OE]

[ASK ALL]

Q4. How many buildings do you or your employer own or operate in Idaho, Montana, Oregon, or Washington that are at least 5,000 square feet and use clean water pumps or circulators of up to 50 horsepower?

1. One
2. 2 to 5
3. 6 to 10
4. 11 to 50
5. More than 50
6. Not sure

[ASK ALL]

Q5. And what is the total square footage of those buildings?

1. 5,000 to 25,000
2. 25,001 to 50,000
3. 50,001 to 100,000
4. 100,001 to 500,000
5. More than 500,000
6. Not sure

[ASK ALL]

Q6. How many years have you, personally, had any role in making decisions about buying, installing, upgrading, and/or maintaining clean water pumps and/or circulators?

1. 1 or fewer
2. 2 to 5
3. 6 to 10
4. 11 to 20
5. More than 20
6. Not sure

[ASK ALL]

Q7. Which of the following best describes your company or organization? Please select all that apply. [MULTISELECT]

1. Manufacturing or industrial
2. Agricultural
3. Retail sales (nonfood)
4. Retail food sales
5. Food service (e.g., restaurant)
6. Wholesale, distribution, or warehousing
7. Hospital
8. Healthcare office (e.g., physician/dental) or clinic
9. Health-related residential (e.g., long-term/assisted care)
10. Professional services (e.g., law firm, engineering firm, accountant)
11. Bank

12. Real estate management
13. Multifamily housing
14. Other – please specify: [OE]

[ASK ALL]

Q8. And in which of the following states do you or your employer have buildings? Please select all that apply. [MULTISELECT]

1. Idaho
2. Montana
3. Oregon
4. Washington

Awareness of ER Label

[ASK ALL]

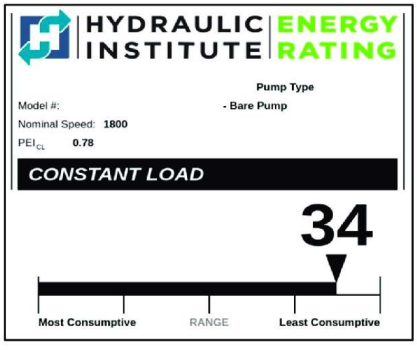
Q9. Do you recall ever hearing of or seeing the Hydraulic Institute's Energy Rating Label, or "ER" Label, for pumps or circulators?

1. Yes
2. No
3. Not sure

[DISPLAY IF Q12 = Q12.2 OR Q12.3]

Q10. Below is a picture of the ER Labels. Having seen them here, do you recall ever seeing either of these labels?

1. Yes
2. No
3. Not sure



[DISPLAY IF Q12 = 1 ORQ14 = 1]

Q11. Where did you hear about or see the label? Please select all that apply. [MULTISELECT]

1. Pump dealer or representative

2. Manufacturer websites
3. Manufacturer selection software
4. Trade association
5. Hydraulic institute (pumps.org)
6. NEEA staff or website
7. BetterBricks.com
8. Other – please specify: [OE]

Use of ER Label [DISPLAY BLOCK IF Q12 = 1 OR Q14 = 1]

[ASK ALL SHOWN THIS BLOCK]

Q12. Has anyone, such as a contractor, distributor, or manufacturer's representative, shown you the information on the Energy Rating Label when talking about pump or circulator systems?

1. Yes
2. No
3. Not sure

[ASK ALL SHOWN THIS BLOCK]

Q13. Have you used any information from the Energy Rating Label in making decisions about buying, installing, or upgrading pump or circulator systems?

1. Yes
2. No
3. Not sure

Other Pump Efficiency Information Sources

[ASK ALL]

Q14. Have you ever visited the Hydraulic Institute's "Energy Rating" web page at https://www.pumps.org/what-we-do/energy-rating/?

1. Yes
2. No
3. Not sure

[ASK ALL]

Q15. To what degree do you rely on each of the following sources of information on pump energy performance? Please answer on a scale from 1 (not at all) to 5 (to a great degree). [INSERT SCALE, WITH 98=NOT SURE]

1. Pump dealer or representative
2. Manufacturer websites
3. Manufacturer selection software
4. Trade associations
5. Pump name plate
6. Hydraulic institute
7. Other – please specify: [OE]

[DISPLAY IF Q15Q24 = 4]

Q16. What trade associations do you rely on?

1. [OPEN ENDED]

Those are all the questions we have for you today. Thank you for your time.

HI