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# Pump Energy Rating Label Awareness and Use Study

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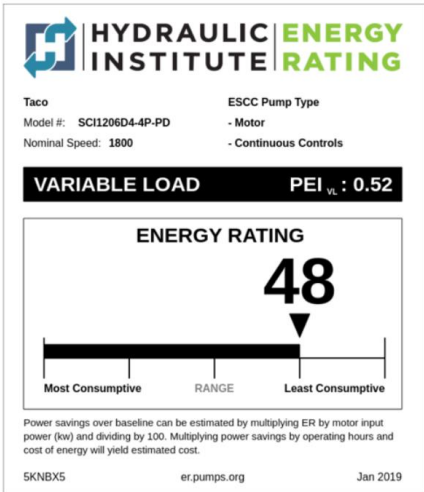
# Executive Summary

The Northwest Energy Efficiency Alliance (NEEA) created the Extended Motors Products (XMP) program to accelerate the adoption of energy-efficient pumps and circulators sold in the Commercial and Industrial (C&I) markets in the Northwest, specifically Idaho (ID), Montana (MT), Oregon (OR), and Washington (WA). The program aims to achieve this objective through a number of activities, including promotion of the Hydraulic Institute's energy rating (HI ER) label for pumps.[1] Promotion of the HI ER label is intended to raise market awareness of efficient pumps and pump systems and enable product differentiation among market actors in the Northwest.

The HI ER label (see Figure E-1) illustrates quantifiable energy savings available from switching from standard to high-efficiency pumps. Like many other labeling programs, the higher the ER, the higher the savings from the pump.

**Figure E- 1: The HI's Pump Rating Label**




**Source:** [HI Pump Rating Example]

Through engagement with pump specifiers, installers, and commissioning agents, this study explored the following research objectives:

- ***Research Objective #1 (RO1)****:* Assess the role of efficiency in the pump selection process.
- ***Research Objective #2 (RO2):*** Assess current levels and patterns of awareness and use of the HI ER label.
- ***Research Objective #3 (RO3):*** Identify opportunities to promote the HI ER label.

The Johnson Consulting Group team conducted structured interviews across all three respondent groups noted above. Participant samples were drawn from various sources, including contacts from previous NEEA research, lists of licensed professionals in each market segment (i.e., specifying engineers, contractors, and commissioning agents), and Internet searches of firms located across NEEA's four-state region. Multiple attempts were made to reach these professionals over a six-week recruitment period, which resulted in 27 completed structured interviews.

## *Study Conclusions and Recommendations*

Analyzing the 27 market actor interviews led to the following conclusions and recommendations, summarized by each research objective. Given the sample size of the overall respondent groups, the qualitative and quantitative findings should be viewed as directional rather than statistically significant.

[1] https://www.pumps.org/EnergyEfficiency/Energy_Rating.aspx

***RO1****:* Assess the role of efficiency in the pump selection process.

***Conclusions:***

- ***Energy efficiency is not a key driver in the pump selection decision for any of three market actor groups.*** In general, the market actors included in this study indicated that the most important criterion for selecting a pump is ensuring it is "best suited for the application." Specifically, these respondents described this as meaning that the pump will operate flawlessly in the desired design conditions. Exploring this finding further revealed that the energy efficiency rating received an average rating of 3.43 on a five-point scale, making it the fourth most important factor out of the eight selection factors assessed. In contrast, "*best suited for the application*" received the highest average rating of 4.73 on a five-point scale.

  ***The HI ER Label will not likely influence pump decision-makers unless primary selection criteria are met first.*** The most important criteria for pump selection identified by study participants focus on suitability, horsepower, and the pump's overall location (or performance) on the pump's operating curve. However, several participants expressed openness to including energy efficiency in their decision-making processes once these first-order selection criteria had been satisfied. Most respondents indicated that the HI ER label would influence their decision (52%). In comparison, 48% said it would not, suggesting that the ER label could ***support*** a pump selection decision, but the information provided by the label is unlikely to be the sole criterion.

***Recommendation:***

- ***The XMP program should work with the Hydraulic Institute to develop a stronger link between energy efficiency ratings and overall pump performance in specific design conditions.*** Rather than emphasizing dollar savings, the label should emphasize the superior operating performance characteristics of pumps with a high ER rating compared to the standard pump. Overall, the ER label should be linked more directly to the message that "HI ER-labeled" pumps may be a way to determine if the pump is *"best suited to the specific application."*

***RO2:*** Assess current levels and patterns of awareness and use of the HI ER label.

***Conclusions:***

- ***Overall awareness of the HI ER Label was low across all market actor groups.*** Specifically, only two respondents had seen the HI ER Label prior to the interview, resulting in an "Unaided Awareness" rate of 7%. Three additional respondents recalled seeing the HI ER Label once it was shown to them, resulting in an "Aided Awareness" rate of 11%.
- ***The XMP Initiative targets the correct market actors, with a focus on specifying engineers and manufacturer's representatives.*** These market actors were also the original targets identified by the HI in developing user profiles, as described more fully in Figure 3 below. Of note, specifying engineers and installation contractors reported slightly higher awareness of the HI ER Label compared to commissioning agents, which is consistent with the HI ER users' profiles research described in greater detail in Section 2.1.

***Recommendation***

- ***The XMP program should focus its outreach activities on raising awareness of the HI ER Label among two critical groups: specifying engineers and manufacturers' representatives.*** Educating contractors/installers and commissioning agents may lead to greater awareness about the HI ER Label across the market in general. However, without concurrent awareness-building among specifiers and manufacturers' representatives, such outreach will likely not directly influence the pump selection decision-making process.

***RO3:*** Identify opportunities to promote the HI ER Label.

***Conclusions***

- ***The current HI ER Label does not provide sufficient context to be considered useful or trustworthy in the absence of preexisting knowledge of the label***. While respondents generally expressed interest in the label, the absence of contextual information prevented them from considering it a particularly valuable resource when making a pump selection decision. Specifically, the label does not include the reference point or additional design conditions that provide sufficient credibility to these pump system experts.
- ***Although the HI ER Label reminded respondents of other energy labels, the format confused first-time observers***. The participants generally did not understand how the energy rating was calculated or how the numbers tied back to energy efficiency.

***Recommendations:***

- ***The XMP program should work with Hydraulic Institute Staff to identify ways to modify the label to ensure clarity, relevance, and trustworthiness for pump purchase decision-makers.*** The HI staff has expressed interest in leveraging the findings from this study to improve the HI ER's label awareness levels. Going forward, the XMP and HI Staff should work together to incorporate the following modifications to the HI label in their outreach efforts to target key pump purchase decision-makers, as identified in Figure 3:
    - Show the ER label calculation method (i.e., "the math")
    - Clarify the inputs used to derive the calculations, including capacity, RPMs, and HP
    - Identify the range of values used to rank the ER-pump against its peers, such as a dollar savings or annual operating costs under specific operating conditions
- ***The XMP program should explore ways to integrate and promote the HI ER Label at the beginning of the pump selection process, specifically during the pre-design phase,*** through its ongoing outreach to manufacturers' representatives***.*** Most respondents believed that the label could provide valuable information when the pump systems are initially designed, rather than waiting until the pump submittal phase in a new construction or retrofit project.

# 1. Introduction

The Northwest Energy Efficiency Alliance (NEEA) is committed to promoting energy-efficient pump systems through its XMP Pumps and Circulators Program (XMP Program). A critical component of this midstream program[2] was to develop an easy-to-understand Energy Rating (ER) label to identify energy-efficient pumps systems. NEEA worked with the Hydraulic Institute (HI) to create this label and promote it in the Commercial and Industrial (C&I) Heating, Ventilation and Air Conditioning (HVAC) and plumbing markets.

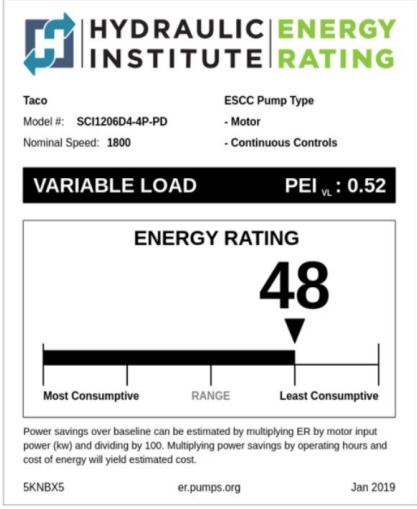
The goal of this study is to understand how pump specifiers (i.e., specifiers, designers, and engineers), installers (contractors and installers), and commissioning agents (i.e., Testing, Adjusting and Balancing Engineers (TAB)) make pump selection decisions, value energy efficiency, and gauge overall awareness of the ER pump label.

## *Program Description*

Through the XMP program, the NEEA Team works to accelerate the adoption of energy-efficient commercial and industrial (C&I) pumps and circulators sold in the Northwest. NEEA is currently partnering with eight manufacturers' representative firms to encourage stocking, promotion, and sales of energy-efficient pumps and circulators. The XMP Program develops customized incentives for each participant to support sales practices that prioritize qualifying highly efficient equipment.

***The Energy Rating Label***

**Figure 1: The HI's Pump Rating Label**




Source: HI Pump Rating Example

A key component of the XMP program involves a collaboration with the Hydraulic Institute (HI) to develop an Energy Rating (ER) label that provides an at-a-glance efficiency score for qualifying pumps.[3] Promotion of the HI ER label is intended to raise market awareness of efficient pumps and pump systems and enable product differentiation among manufacturers in the Northwest. The HI ER label illustrates quantifiable energy savings achievable by switching from standard to high-efficiency pumps, with energy savings calculated over the baseline established by the U.S. Department of Energy according to HI Performance Test Standards.[4] Similar to other labeling programs, the higher the ER, the higher the savings from the pump. Figure 1 illustrates the HI ER Label for pumps.

[2] Programs that pay incentives to distributors or retailers who sell directly to end-users. https://www.esource.com/429191fwdt/what-measures-are-moving-stream <<Accessed 5-15-22>>

[3] The HI developed a separate label for ER circulators; however, the present study focused primarily on pumps.

[4] https://pumps.org/EnergyEfficiency/Energy_Rating.aspx <<Accessed 10-28-2021>>

# 2. Methodology and Approach

This section summarizes the overall approach used to address the three research objectives for this study.

The best way to assess any market intervention's overall effectiveness is to objectively measure it. Based on knowledge of pump market dynamics and the findings from the recently published *Market Test Assessment Report* of the XMP program[5], this study employed structured interviews as the primary data collection method. It included respondents from three market actor groups:

1. C&I Specifiers (specifiers, designers, engineers)
2. C&I Installers (contractors/installers)
3. C&I Commissioners (commissioning consultants,[6] Testing, Adjusting and Balancing [TAB] engineers)[7]

For each of these market actor groups, this study explored the following objectives:

- ***Research Objective #1 (RO1)****:* Assess the role of efficiency in the pump selection process.
- ***Research Objective #2 (RO2):*** Assess current levels and patterns of awareness and use of the HI ER label.
- ***Research Objective #3 (RO3):*** Identify opportunities to promote the HI ER label.

## *Sampling Methodology*

The Johnson Consulting Group team identified a total of 627 potential respondents from the following sources:

- A list of respondents who had previously been contacted or identified in NEEA's Commercial Fan Study focusing on specifying engineers (*n* = 166)
- A list of HVAC contractors located in NEEA's four-state region purchased from Data Axel (*n* = 232)
- A list of Commissioning Agents compiled by Johnson Consulting Group based on state licensing authorities for each state (*n* = 131)
- Internet searches of specifying engineering firms, commercial HVAC contractors and TAB consultants across the four-state NEEA region (*n* = 70)
- Additional lists of contacts made available through the XMP program (*n* = 28)

The original sampling plan included a target of 60 interviews (for a 9.5% completion rate) distributed proportionally across the four states and three market actor groups represented in the study, as illustrated in Table 1.

[5] https://neea.org/resources/extended-motor-products-pump-and-circulator-manufacturers-representative-pilot-market-test-assessment

[6] https://www.cfms.ca/blog/the-importance-of-hiring-a-commissioning-consultant-during-early-design-stage/

[7] https://www.csemag.com/articles/special-report-test-and-balance-in-buildings/

**Table 1: Proposed Sampling Plan by State and Market Actor Group**

| State | C&I Specifiers | C&I Contractors | C&I Commissioning Agents | Total |
|---|---|---|---|---|
| **Oregon** | 5 | 14 | 5 | 24 |
| **Washington** | 6 | 10 | 6 | 22 |
| **Idaho** | 2 | 4 | 2 | 8 |
| **Montana** | 2 | 2 | 2 | 6 |
| **Total** | **15** | **30** | **15** | **60** |

Data collection efforts ran from February 14 through March 23, 2022. The team used a variety of strategies to contact and recruit market actors identified during sample generation, which included multiple emails to respondents and up to five attempts to contact via telephone follow-ups, cold-calling businesses providing specifying, contractor, or commissioning services in the commercial pumps market, and accommodating respondent schedules to conduct impromptu interviews using real-time emails and texts. Of note, many potential respondents identified in the Internet searches were subsequently determined to be ineligible to participate in the study, as they did not sell commercial equipment, did not work with commercial pumps, or declined our request. Overall, recruitment from these groups proved challenging, with the final participating sample including a total of 27 in-depth interviews completed (see Table 2 for interview distribution).

**Table 2: Actual Number of Completes by State and Market Actor Group**

| State | C&I Specifiers | C&I Contractors | C&I Commissioning Agents | Total |
|---|---|---|---|---|
| **Oregon** | 3 | 1 | 3 | **7** |
| **Washington** | 2 | 4 | 5 | **11** |
| **Idaho** | 2 | 2 | 2 | **6** |
| **Montana** | 1 | 1 | 1 | **3** |
| **Total** | **8** | **8** | **11** | **27** |

Overall, this market research study reflected a response rate of 4.3%. Reflections and key findings from the recruitment process, including barriers identified and considerations for future similar studies, are as follows:

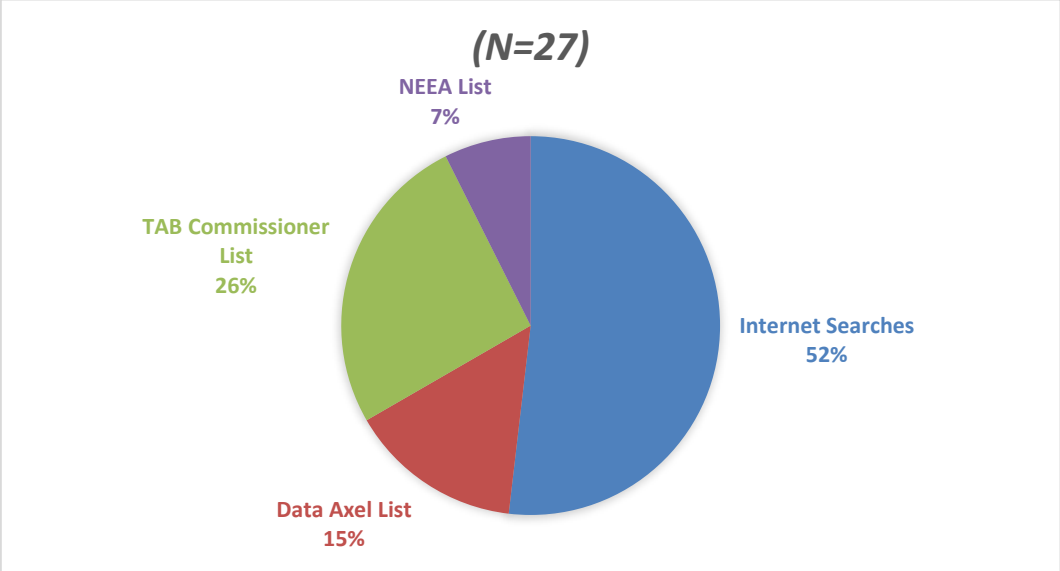
- Lists of **specifying engineers** were initially developed by researching and identifying engineering firms throughout the four-state region using online sources, such as state engineering boards and trade organizations. Initial outreach to those companies revealed that few, if any, specified pumps for these systems, instead typically outsourcing this task to a mechanical design company or using the manufacturer's representative to select the pump.
- The firms identified and contacted through Internet searches ($n$ = 31) yielded a very high completion rate of 26%. Of the remaining sample, most did not respond to messages left by

telephone or email (*n* = 18) or explained they did not have time to participate in this structured interview (*n* = 3), while two companies were no longer in service.

- The sample lists from Data Axel contained a large percentage of HVAC contractors who did not install commercial pumps (*n* = 116). Of those contractors who did appear to install commercial pumps, several were unresponsive to multiple recruitment requests made via email and telephone messages (*n* = 80), while others refused or declined the interview request (*n* = 10) or had inaccurate or out-of-date contact information on file (*n* = 20). The overall completion rate for the Data Axel list was 2% (*n* = 4).
- The TAB Commissioning List was used for each state until the adjusted quota was reached. This sample source was the most successful way to reach Commissioning Agents, with a completion rate of 6.8%.
- Internet searches for the contractors and Commissioning Agents were conducted each weekday throughout March. Overall, the Internet search and recruitment process yielded a completion rate of 20%.
- The NEEA list provided relatively few non-duplicative contact names (i.e., contacts not already identified through sampling techniques outlined above). Of the 28 contacts included in this list, two participants were interviewed, yielding a completion rate of 7.1%

Figure 2 illustrates the breakdown of in-depth interview respondents by the data source.

**Figure 2: Data Source of Respondents**




The Johnson Consulting Group team developed an interview guide for these respondents, covering a range of topics intended to address the study's research objectives besides providing relevant firm characteristics, such as size, location, and the number of employees[8] (see Table 3 for a list of topics addressed by interview guide items). While a single structured interview guide was developed for the study, the questions were

[8] This type of information is also described as "firmographics."

modified slightly depending upon each respondent's specific market actor group. Appendix A provides a copy of the structured interview guide that illustrates these group-by-group modifications.

**Table 3: Topics Covered in the In-Depth Interview Guides**

| Research Topics |
|---|
| Respondent Recruitment and Qualifying Questions |
| “Firmographic” Questions |
| Role in Pump Selection Process |
| Awareness of the Energy Efficiency Label |
| Label Understanding |
| Promotion Opportunities |

The Johnson Consulting Group team scheduled interviews with respondents and then sent each respondent a meeting invitation, including a link for GoToMeeting, the online communication platform used for this study. The structured interview instrument was designed using best practices for conducting "unaided” and “aided” awareness structured interviews. Measuring unaided and aided awareness incorporates the following steps: Awareness, Interest, Desire, and Action (AIDA).

- **Measuring Unaided Awareness**: To measure “unaided awareness” the structured interview included **an *open-ended question*** in which the HI ER Label was not mentioned specifically. Respondents were first asked about their familiarity with energy rating labels in general before focusing on the HI ER Label for pumps specifically. Researchers then asked participants if they had seen the HI ER Label and, if so, where. Respondents were also asked to describe the ER label; those respondents who could successfully identify the HI ER Label without seeing it or hearing it explicitly described were classified as having “unaided awareness."
- **Measuring Aided Awareness:** For respondents who did not fall within the “unaided awareness” group, researchers next described the HI ER Label to determine if a verbal description elicited recall of the label. If the respondent did not recall the ER label following verbal description, researchers provided a visual depiction of the HI ER Label for pumps (see Figure 1) using GoToMeeting’s screen-sharing functionality. Once respondents viewed the HI ER Label, researchers asked additional questions to determine whether they had previously encountered the label and, if so, where. Respondents who indicated at this point that they had previously seen the label were classified as “aided awareness”; the awareness levels were further delineated to distinguish between recall following a verbal description (“aided awareness 1”) and recall following the visual depiction of the HI ER Label (“aided awareness 2”). Lastly, those respondents who indicated that they had not previously encountered the HI ER Label after both verbal and visual aid were classified for the purposes of this study as “unaware.”

Once the awareness level was established, the respondents provided detailed feedback about their impressions of the label. These responses are summarized in the structured interview findings (see Section 3).

## 2.1 Findings from Literature Review and Contextual Research

The Johnson Consulting Group team completed a literature review to inform the development of the in-depth interview guides employed in this study, with this literature review being the source of the "best practices" noted above regarding the measurement of "Unaided" and "Aided" Awareness levels using an online structured interview approach.

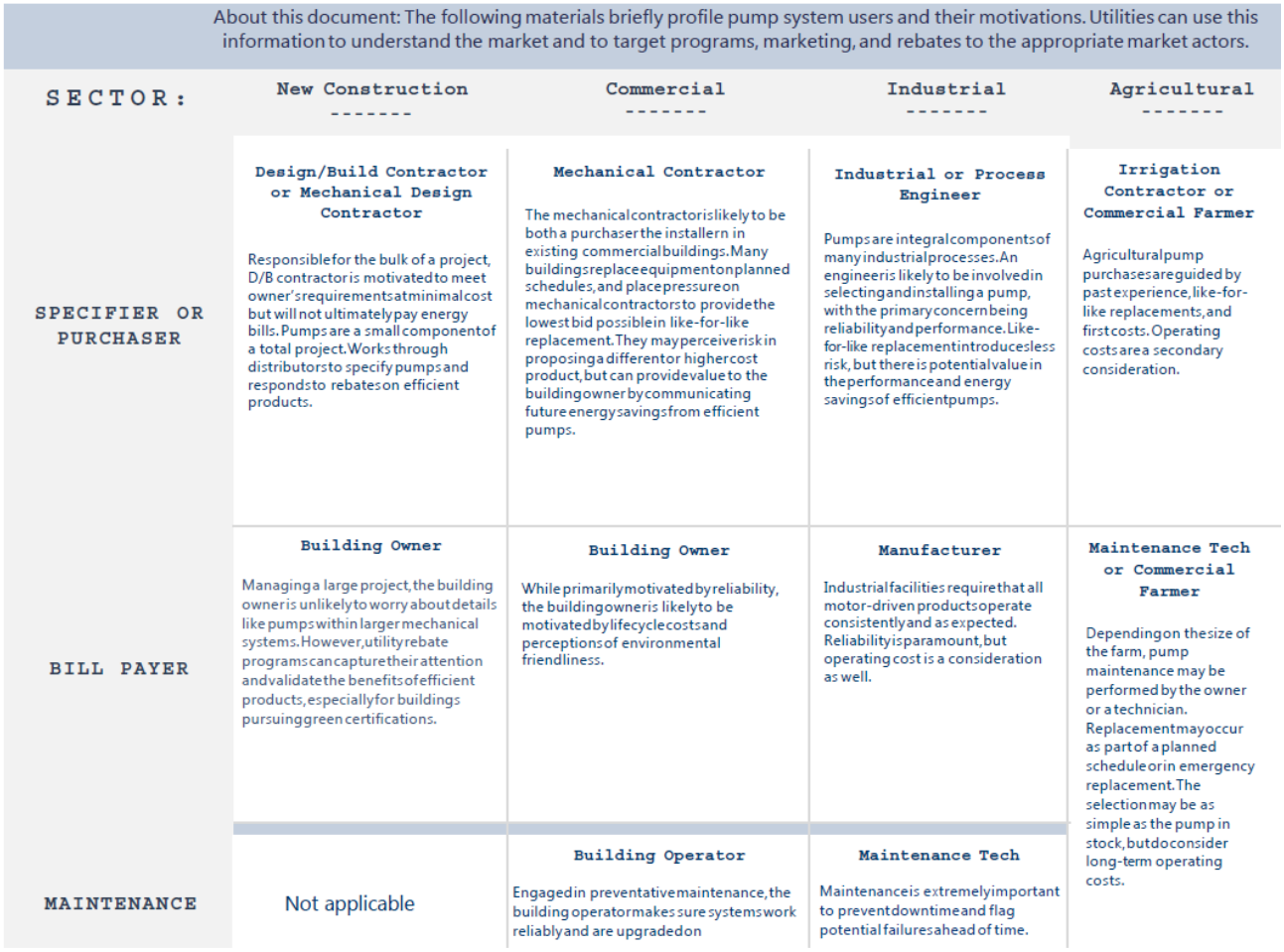
The Johnson Consulting Group team also reviewed the initial promotional materials developed by NEEA and its contractors to promote the HI ER label throughout the Northwest. These materials included the following:

- **2021 NEEA – HI Pump Efficiency Energy Rating Marketing and Promotion Project Plan** described the promotional activities to support the launch of the HI ER Rating. From Jan 1, 2021–December 31, 2021, NEEA worked with the HI and Finn Partners to guide and contribute to the overall effort. The Scope of Work focused on promoting energy-efficient pumps by promoting the HI Energy Rating Label, smart pumps, and related technological advancements. (2021 NEEA – HI Pump Efficiency Energy Rating Marketing and Promotion Project Plan)
- **2020 Finn Partners- HI ER Awareness Campaign Master Plan, August,** provides a detailed schedule of the promotional activities planned during the ER launch period.
- **2020 NEEA: Press releases and other materials announcing the launch of the HI ER Label**
  - https://www.utilitydive.com/press-release/20200728-hi-launches-resources-to-help-utilities-build-pump-focused-incentive-progra-1/. Of note, 41 publications picked up and promoted the press release between March 26-July 29, 2020
- **2020 – Hydraulic Institute User Profiles** developed by the HI Institute to identify target audiences for the HI ER label awareness campaign (www.pumps.org)
- ***2022 NEEA: NEEA Pumps and Circulators Market Test Assessment*** report was published in January. This report documents the progress and activities completed during the first two years of the XMP Initiative.
- **Johnson Consulting Group – 2021.** *Best Practices for Conducting Unaided and Aided Awareness Structured interviews, NEEA XMP Pump Label Awareness Study Work Plan,* December 21, 2021. The work plan describes the approach used to measure and analyze awareness levels among the interview participants.

## 2.2 Key Findings

To better understand the concept and intent of the ER Label, the Johnson Consulting Group team reached out directly to the HI staff for additional insights. As part of this information exchange, HI staff shared the user profiles developed to identify critical decision-makers in the pump selection process. As Figure 3 shows, HI focused on reaching out to pump specifiers or purchasers directly in the commercial sector as the best way to influence pump selection decisions. This insight was valuable in identifying likely respondents for the market actor interviews.

**Figure 3: Pump User Profiles**




Source: HI Pump System Profiles, www.pumps.org

The Market Test Assessment of the XMP program suggested that the HI ER Label was not yet well known within the commercial pumps market. Specifically, this report documented the following:

- ***The HI ER label does not carry the same cachet as other labeling programs,*** as it is still relatively new in the market, and its value has not been determined. The literature review revealed that labeling programs are a good way to promote energy-efficient equipment but are most successful if the following conditions are met:
  - Energy efficiency or cost savings is a key factor in decision-making
  - The labels are part of a larger effort to promote a system approach rather than a component approach
  - The label for C&I products is part of a purchasing specification[9]

The Johnson Consulting Group team used these findings as a springboard to ask several follow-up questions about the HI ER Label, including its similarity and credibility relative to other energy labels used to promote energy-efficient equipment. The structured interviews also asked respondents to rank the importance of

[9] Johnson Consulting Group, 2022. "*NEEA Pumps and Circulators Market Assessment,"* p. 6.

energy efficiency levels to further gauge the role that energy efficiency plays in the pump selection decision. Lastly, the structured interview guide directly assessed whether the development of a purchasing specification would be a useful way to increase the HI ER Label's awareness and/or credibility among critical decision-makers.

To supplement these background materials, the Johnson Consulting Group team also conducted an in-depth informational interview with a staff member from HI. The key findings from this interview provided additional context regarding the development and purpose of the HI ER Label for pumps.

## *2.3 Summary of Interview with HI Staff*

As articulated by the HI staff member who participated in an informational interview, the HI ER Label was developed with manufacturers' input to create a "level playing field" and increase the adoption of efficient pumping technology while concurrently leveraging the work that was being done in the regulations that included HI support and participation. Note that all direct (italicized) quotes below were provided by the participating HI staff member.

- The label was developed in a collaborative process with input from key stakeholders, including manufacturers, manufacturers' representatives, representatives from the energy industry, and HI staff.
- The label's goal was to "*develop a uniform playing field"* providing a system to identify all the qualified pumps in a database that could be used in the market. All labeled pumps must undergo an independent third-party testing procedure.
- The ER label was developed to help utilities incentivize energy efficiency by creating a database of energy-efficient pumps. The label was not intended to be used by end-user customers. Rather, the "*majority of people who know about the [label] are the manufacturers who are making the pumps and the representatives and distributors who are benefiting from mid-stream incentives."*
- For a mid-stream program, the strategy is that you "*need to have energy-efficient pumps stocked with the label on it, the salesforce needs to be educated on it, and the salesforce needs an incentive to sell it.*"

  *"The label is important in submittal documents, purchasing documents. Items like that… And it presents well in that fashion."*

- The label was designed to mimic other energy ratings, such as the FTC label.

  *"The FTC Energy Guide is the kind of model that would be understandable to people."*

  *"The number just represents the percent power savings very simply. It's the percent power savings over a minimally compliant pump. So, we intended for the number to be very easy to understand and then easy to use in the calculation.*

  *"Pre-design phase is the intended selection point for the HI ER Label, as that is when the pump system requirements are determined at that pre-design phase, once you got those pre-design numbers (i.e., flow rate, pressure, etc.) …. That's where you go when you start looking for pumps, and that's when you need the label."*

To summarize, HI developed the ER label to differentiate energy-efficient commercial pumps in the market during ***the pump selection process***. The label uses the same format as other labels developed to promote

energy-efficient equipment. However, this label was not designed for a mass-market end-user audience; rather, the label awareness activities targeted specifying engineers and manufacturers' representatives. This study expanded upon and complemented those initial HI targets to include pump installation contractors and commissioning agents.

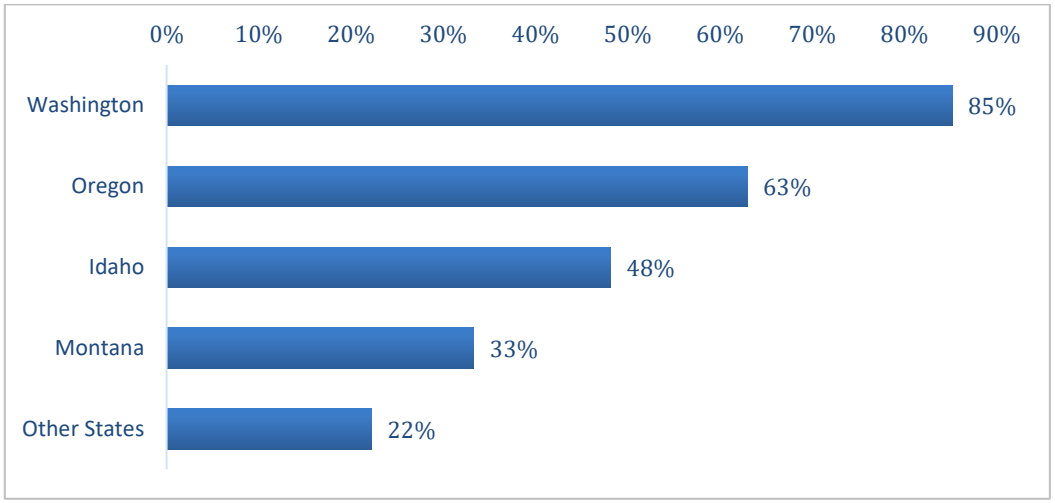
# 3 Structured Interview Findings

This section summarizes the findings from the structured interviews with the 27 market actors recruited through the methods outlined in Section 2, Methodology and Approach.

## *3.1 Respondent "Firmographics"*

First, the respondents provided some background information about their work with commercial pumps in the four-state NEEA region. Of note, all the respondents worked in at least one state where NEEA operates but most worked in multiple locations (see Figure 4). A few respondents worked for companies with multiple locations in other states, including North and South Dakota, Texas, and Wyoming.

**Figure 4: Locations Where Respondents Provide Services***




*Multiple response question, so totals will not add up to 100%. *N* = 27.

These structured interview participants worked for well-established businesses (years in business *M* = 36.64, range of 3 to 100 years) whose work with commercial pumps accounted for 55% of their work, on average.

## *3.2 Research Objective Findings*

### 3.2.1 Research Objective #1: Assess the role that efficiency plays in the pump selection process

**Respondent role in pump selection/installation/commissioning process:** All 27 respondents answered this question, of which 20 (74%) were directly involved in reviewing or recommending commercial pumps for their customers. Of note, among the 20 respondents, all eight specifying engineers (100%), six contractors (75%), and eight commissioning agents (72.7%) reported being directly involved in the pump selection process.

The remaining seven respondents did not directly participate in the process but were involved in pump operations at some point within the pump selection or installation decision. Their roles included providing

general guidance regarding pump selection as a part of the overall installation or commissioning process rather than directly influencing the decision.

Of note, contractors are not as involved in the selection process as the specifying engineer usually makes this decision. As one contractor observed, "Usually pumps aren't big decisions" because the pumps are simply components of a larger system.

The following comments illustrate how these respondents participate in the pump selection process:

- *"Providing guidance and input on the design requirements"* (Specifying Engineer)
- *"Review the submittals from the suppliers to make sure pump is sized properly for the projected demand"* (Commissioning Agent)
- *"Involved if there is a problem…. The design engineer selects the pumps. I only recommend pumps if there is a problem."* (Contractor/Installer)

**Other Factors Affecting the Pump Selection Process.**

The structured interview guide then asked the respondents to provide an "open-ended" response to this question: "What is the most important factor that you consider when deciding to install/commission a commercial pump?" The most frequent category of unprompted response was "best suited for the application" (although this specific wording may or may not have been used by a given respondent). Next, we asked the respondents to rate the importance of the following factors in the pump selection process. This set of questions specifically included the phrase "best suited for the application." For each respondent who mentioned this factor, we then asked them to define what they meant when saying that the pump was "best suited for the application." Table 4 summarizes the definitions the participants provided in either the initial open-ended response or when asked directly about this factor in the follow-up questions.

**Table 4: "Best Suited for the Application" Comments**

| Other Factors Affecting the Pump Selection Process | | |
|---|---|---|
| **Market Actor** | **Number Mentioning "Best Suited for the Application"** | **Additional Verbatim Comments** |
| **Specifying Engineer** | *n* = 9 | *"best suited for the application/is suitable for the application"*<br>*"right fit for the system"*<br>*"good application for what it will be used for"*<br>*"ability to meet the design conditions"*<br>*"familiarity with the pump"* |
| **Contractor** | *n* = 2 | "*best suited for the application*"<br>"*application dynamics, head/flow power available* " |
| **Commissioning Agent** | *n* = 3 | *"can provide the capacity that it needs."*<br>*"durability and how well hold up over time*."<br>*"understanding the system and how it will work over the long-term."* |

While all specifiers selected "best suited for the application" as the most important factor in their pump selection process, some respondents from other market actor groups also mentioned additional factors as important to decisions regarding pump selection; these open-ended responses are as follows, summarized by market actor group.

**Contractors:**

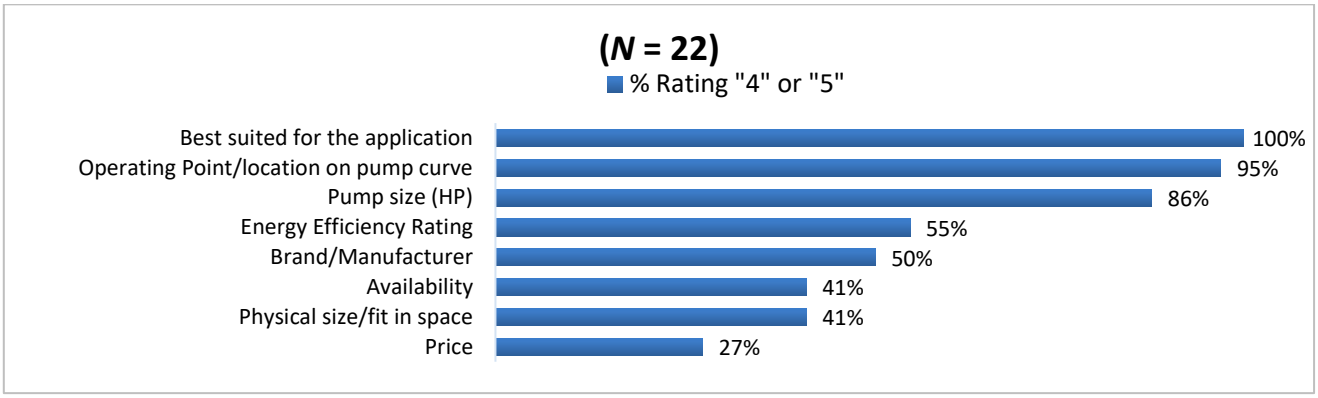
- "*Sometimes efficiency is important but not always. Some people are very stuck on energy efficiency*"
- *"Lead-times/availability"*
- *"Pricing and name-brand reliability"*
- *"Power is relatively cheap, so it is not a large discussion about motor efficiency, only replacement and installation costs"*

**Commissioning Agents**:

- *"Operating curve is pretty important"*
- "*(I) view pump sizing for buildings as a long-term project. (I) don't want to build a building and not consider additions… (I) want to design pumps large enough to handle additions and consider redundancy"*

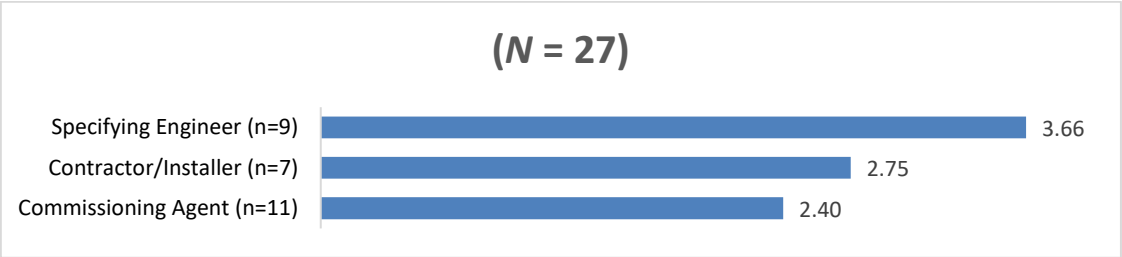
Following their open-ended identification of the most important factor in pump selection, respondents were asked to rate the importance of eight factors in the pump decision process using a scale of "1 (Not at all important)" to "5 {Very Important)" (see Figure 5). These eight factors were identified in collaboration with the XMP program team as potentially relevant based on prior research and programmatic experience. As illustrated in Figure 5, the most important factor was "*best suited for the application*," with all the respondents awarding it an importance rating of "4" or "5" (in keeping with prior open-ended responses). The Operating Point/location on the pump curve also ranked as important in the pump selection decision, as did the pump size in horsepower. Energy efficiency was identified by respondents as being of secondary importance, roughly commensurate with the brand or manufacturer of the pump, indicating that efficiency may play a role in pump selection but is likely not a primary driver in such decisions.

**Figure 5: Ranking of the "Most Important" Factors in the Pump Specifying/Installing/Commissioning Decision**




**Importance of Energy Efficiency in Pump Decision > 5HP:** The respondents used the same scale to rate the importance of energy efficiency in the selection process for pumps ***above 5 HP***. In keeping with the initial findings, the average rating overall was 3.0 on a scale of "1" to "5," suggesting that energy efficiency potentially holds some relevance and importance for large pump selection but is, again, not a critical factor for such pumps. Figure 6 summarizes these quantitative results by market actor.

**Figure 6: Average Importance Ratings of Energy Efficiency in the Pump Decision for Pumps > 5HP**




**Feedback Regarding Circulators:** Twenty-one of these respondents also indicated that they specify, install, or commission circulators; while the present study focused primarily upon pumps, researchers sought these respondents' perspectives on similarities and differences in criteria and the importance of energy efficiency for circulator selection. Overwhelmingly these respondents indicated that their selection decision criteria for pumps are very similar to those used for pumps. A few respondents noted that the selection decision for circulators was not as critical as it was for pumps; as one specifying engineer explained, "A circulator is just a small pump."

One commissioning agent observed that circulators "tend to fail more often and they are more of a sensitive product," which could indicate that the circulator's installation and energy efficiency usage are of increased importance in selecting the right equipment.

**Pump Metrics and Information Sources**: Following their assessment of selection criteria, respondents provided open-ended responses regarding the types of performance metrics they use in the pump decision-making process. As illustrated in Table 5, only the "*Best Efficiency Point"* was mentioned by more than one-third (37%) of the respondents (with the preponderance of these positive responses provided by specifiers),

suggesting that the other efficiency metrics outlined in the interview are not well-known, not perceived as critical to the pump selection process, or both. Of note given its integration into the HI ER label, none of the respondents mentioned the Pump Efficiency Index (PEI) as a metric they use to make pump selection decisions.

**Table 5: Summary of Efficiency Metrics Mentioned by Market Actors**

| Efficiency Metric* | Market Actor | | | Total | % Mentioning (*N* = 27) |
|---|---|---|---|---|---|
| | Specifying Engineers (*n* = 9) | Contractors/Installers (*n* = 7) | Commissioning Agents (*n* = 11) | | |
| Best Efficiency Point | 8 | 1 | 1 | 10 | 37% |
| Other | 4 | 0 | 4 | 8 | 15% |
| Motor Efficiency | 2 | 1 | | 3 | 11% |
| Duty Point Efficiency | 2 | 1 | 0 | 3 | 11% |
| Hydraulic Efficiency | 1 | 0 | 1 | 2 | 7% |
| HI ER Rating | 0 | 1 | 1 | 2 | 7% |
| None of the Above | 0 | 3 | 3 | 6 | 22% |
| **Total** | 17 | 7 | 10 | 34 | NA |

*Multiple response questions; percentages do not total 100%

Next, the respondents identified additional sources of information they used to find out about specific pump performance. Not surprisingly, the most frequently mentioned sources included the pump dealer/representative (48%) and the manufacturer's website (33%) (see Table 6). These findings reinforce the vital role played by pump dealers and representatives in providing critical information to other market actors during the pump selection process.

**Table 6: Sources of Pump Information**

| Source | # Mentioning (*n* = 21) | Percent Mentioning * |
|---|---|---|
| Pump dealer/representative | 10 | 48% |
| Manufacturer's Website | 7 | 33% |
| Other (Specify)* | 6 | 29% |
| Manufacturer's Selection Software | 4 | 19% |
| ASHRAE | 2 | 10% |
| Pump software package | 1 | 5% |
| Trade associations | 1 | 5% |
| NEMA | 1 | 5% |
| Name Plate | 1 | 5% |
| Pump database | 0 | 0% |
| Hydraulic Institute | 0 | 0% |

### 3.2.2 Research Objective #2: Assess current levels and patterns of awareness and use of the HI ER label.

To assess patterns of awareness and use of energy labels in general, respondents were initially asked to name any energy labels with which they were familiar. More than one-quarter (27%) could not recall any specific energy labels, while 45% mentioned the "ENERGY STAR" label without prompting. A few respondents mentioned other labels, such as the LEED certifications, but none specifically mentioned the HI ER label, as illustrated in Table 7.

**Table 7: Types of Energy Labels Mentioned by Respondents**

| Response | # Mentioning (*n* = 27)* | % Mentioned* |
|---|---|---|
| Energy Star Labels | 10 | 45% |
| Other (Specify) | 7 | 32% |
| LEED Gold/Platinum | 2 | 9% |
| Consumer Guide Labels (Yellow ones for home appliances) | 1 | 5% |
| HI's ER Label | 0 | 0% |
| BPI Metric | 0 | 0% |
| None/Not Aware | *6* | 27% |

*Multiple response questions; percentages do not total 100%

As described in Section 2: Methodology and Approach, the structured interview was designed to measure four levels of awareness among respondents:

- *"Unaided Awareness*" of the HI ER Label –recognition of the label without prompting
- "*Aided Awareness 1"* of the HI ER Label –recognition of the label following verbal description by the researcher
- *"Aided Awareness 2*" of the HI ER Label –recognition of the label following visual presentation by the researcher
- *"Unaware"* of the HI ER Label –no recognition of the label after the verbal description and visual presentation by the researcher

Note that none of the respondents recalled the label as it was described (i.e., "Aided Awareness 1"); therefore, this category was excluded from the in-depth analysis.

**Unaided Awareness**

First, respondents were asked if they *had ever seen* the HI ER Label for pumps. Two respondents, a specifying engineer, and an installer, recalled seeing this label, indicating an Unaided Awareness Rate of 7%. The specifying engineer indicated that he had seen the label on a cut sheet, while the installer stated that he may have seen it "in the field."

**Aided Awareness**

Next, all respondents who had not claimed unaided awareness (*n* = 25) were provided a verbal description of the label by the researcher; as noted above, no respondents indicated aided awareness at this point. Respondents were then shown a picture of the actual label on an MS PowerPoint slide. Three respondents then recalled seeing this label in the following locations:

- *"A remote show by (a manufacturer) at a 'lunch and learn'"* (Specifying Engineer).
- *"Possibly from a manufacturer's representative or at an ASHRAE technical conference"* (Specifying Engineer).
- *"Probably on the paperwork. Pumps have lots of labels"* (Commissioning Agent).

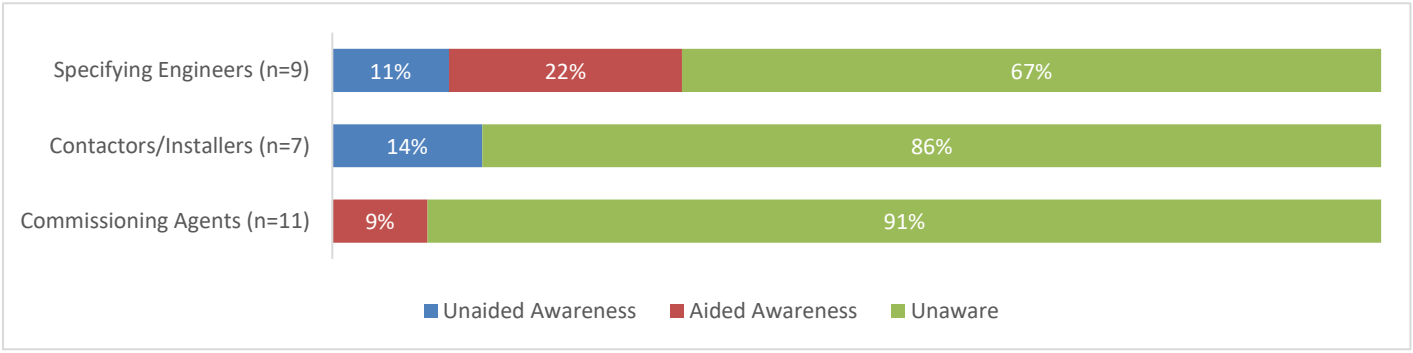
However, as outlined in Table 8, most (81%) of the respondents had never seen the HI ER Label before the interview.

**Table 8: Summary of Awareness Levels (N=27)**

| Awareness Level | Total | % |
|---|---|---|
| Unaided Awareness | 2 | 7% |
| Aided Awareness | 3 | 11% |
| Unaware | 22 | 81% |
| **Total** | 27 | 100% |

While awareness of the HI ER Label was generally low, levels of awareness differed across market actor groups (see Figure 7). Specifically, contractors/installers had the highest levels of "unaided awareness" (14%) compared to the specifying engineers (11%) and commissioning agents (0%). In comparison, specifying engineers had a higher level of "aided awareness" (22%) than the other market actor groups. While inconclusive, these findings suggest that specifying engineers are most familiar with the HI ER label compared to other market actor groups.

**Figure 7: Comparison of Awareness Levels Across Market Actors**




## Respondent Feedback Regarding HI ER Label

All the respondents answered a series of open-ended questions designed to capture their overall impressions of the label (both positive and negative), describe what information the label is conveying, and offer suggested improvements.

**Praise for the HI ER Label:** Several respondents liked the specific components of the HI ER Label, including the inclusion of the PEI number, the layout, and the overall visibility. Two respondents believed the label would help provide valuable information regarding the pump's broad performance capabilities, and several

appreciated the label's "clean layout" and "straightforward approach." The following selected comments illustrate the general impressions of the ER label across market actor groups:

> *"(It is) attention-grabbing"* (Specifying Engineer)
>
> "*I like the fact (that the label) clearly identifies pumps, TACO pump…I can immediately tell what I have"* (Contractor/Installer)
>
> *"It looks very helpful to have something so simple"* (Commissioning Agent)

Three respondents said the HI ER Label resembled other energy rating labels, such as ENERGY STAR and water heater labels. This theme is not necessarily positive or negative, but merits consideration as any future adjustments are planned.

**Critiques of the HI ER Label:** As intended, in addition to the positive comments noted above, researchers elicited feedback from respondents that suggested areas to improve the HI ER Label and support more robust integration into the pump selection process. Notably, 13 respondents said the HI ER label did not provide information that could be immediately understood, trusted, or used.

- The label was difficult to understand without additional information or context regarding the information on the label (11 respondents)
- Labels can be biased or meaningless (2 respondents)

One specifying engineer explained that while energy ratings may appear valuable, they are not often well-understood, leading to his belief that "*"Rating systems make people feel good but don't necessarily do a whole lot."* Therefore, the rating system must be well-defined so that users understand the parameters of this label

**Comments regarding missing context:** Three market actors wanted to understand how the numbers were developed, including the calculations used to arrive at the ER presented on the label. Several others wanted the label to provide comparisons to critical reference points such as the pump's location on the operating curve or the dollars per year savings in energy costs. The following verbatim comments from respondents are representative of these themes.

> "*It is difficult without background information to understand what everything means."* *(*Specifying Engineer)
>
> "*…I don't know what this represents. (I) wouldn't necessarily put lots of faith in this*." (Contractor/Installer)
>
> *"I need a reference point of what is it compared to. I need the explanatory slide for building owners…it is always good to have more data for an owner to decide what they want to put into the building."* (Commissioning Agent)

**Comments Regarding Label Format:** Several respondents stated that the label format was unclear. One respondent also suggested using bigger and bolder font type on the label to make it easier to read. In contrast, other respondents indicated that a lack of clarity regarding the HI ER Label diminishes its overall usefulness.

"*It might be a good label to [inform] lay people of how efficient a pump or maybe a third-party energy standard. For engineers, it doesn't help. It doesn't tell me anything about how the pump operates at various capacities (i.e., on the curve) – …(I) don't know where on the curve that rating applies.* (Specifying Engineer)

"*First off, I would think, the least and most- on left- to right reading— is reversed… the bar graph looks confusing to me."* (Contractor/Installer)

*"On the least consumptive, is a lower number better? If you go to the left, is (the pump) more consumptive than a 48?* (Commissioning Agent)

**Pump Information on the HI ER Label:** Respondents also provided their assessment of what the label told them about this specific pump. Several indicated that the label describes the pump, including the manufacturer, speed, model number, HP, and type. As a specifying engineer explained, this information helps calculate a "reference relative to energy efficiency," as a specifying engineer explained.

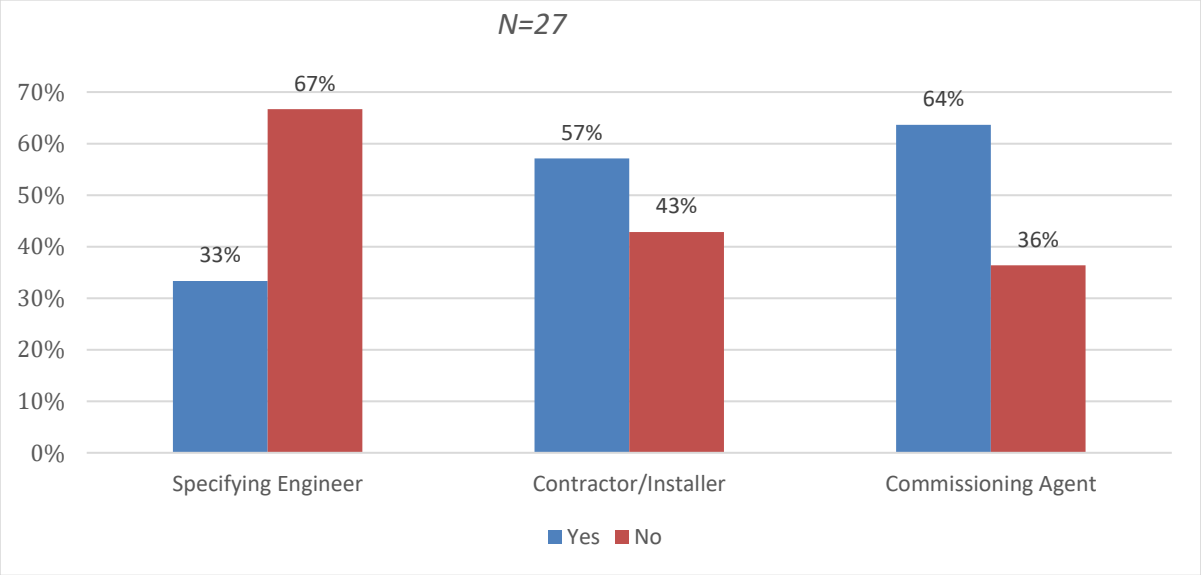
**Other Information Included on the HI ER Label:** Several market actors recommended including additional information on the HI ER label, with the following list representing the specific themes that arose about recommendations for label content additions:

- Explain how the ER label was calculated, including identifying critical inputs such as capacity, design conditions, RPMs, HP, and reference for the "average" range (4 respondents).
- Clarify the defined reference points to provide a boundary for the ER presented on the label, such as dollar savings or annual operating costs under specific conditions. One respondent suggested linking the HI ER Label to other industry standards, such as the ASME rating (3 respondents).

**Influence of the Pump Label:** As shown in Figure 8, respondents reacted differently when asked if the label would influence their pump selection decision. Of note, commissioning agents expressed more support for the ER label than the specifying engineers or contractors.

Most respondents indicated that the HI ER label would influence their decision (52%), while 48% said it would not. Figure 8 illustrates these findings by market actor group, but they should be viewed qualitatively, given the small sample size of respondents.

**Figure 8: Would the HI ER Label Influence Your Pump Selection Decision**




The respondents also provided feedback regarding the likelihood of using ER pump labels to guide their pump selection decision. Several respondents, primarily specifying engineers, were reluctant to rely on the ER Label, as it provided only a rating system rather than the specific performance metrics required for selection, such as gallons per minute, flow rate, and the pump curve.

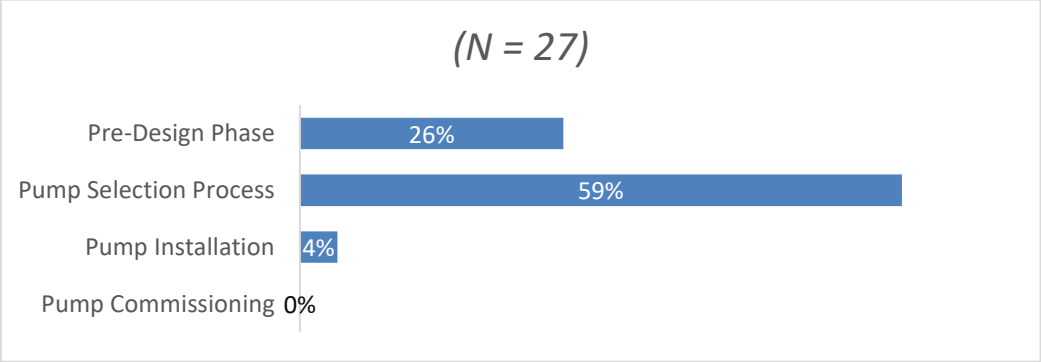
Some contractors indicated that the ER label might be viable for smaller pumps. Still, as one contractor explained, *"for larger pumps, there are so many other factors that go into the decision, this (label) wouldn't help."*

Of note, commissioning agents were more inclined to be influenced by the label, as it would help support the analysis, but only with additional clarifications and explanations.

### 3.2.3 Research Objective #3: Identify opportunities to promote the HI ER Label.

As illustrated in Figure 9, most (59%) of the respondents believed the HI ER Label would be most helpful in the pump selection process, while one-quarter suggested that the pre-design phase would be the ideal place to promote HI ER-labeled pumps. No significant variance in response patterns was noted across market actor groups.

**Figure 9: Most Helpful Stage in the Pump Selection Process for the HI ER Label**




**Types of Projects**

Besides the user profiles, HI also identified likely pump installation scenarios in which the ER label would be most effective. The structured interview built upon this information by asking each participant about the ER label's role in an installation decision.

This set of closed-ended questions asked respondents if the label would be most helpful to inform pump selection decisions for Design/Build, Retrofit, or both types of projects. Eight respondents believed that the HI ER Label would help inform pump selection decisions for Design/Build projects. In comparison, four respondents indicated that the label would be helpful for both retrofit and new construction projects. Three respondents did not believe the label would be helpful in either scenario, while one respondent said that the labels would only be relevant for circulators rather than commercial pumps.

**Purchasing Specifications**

The respondents had mixed opinions regarding the importance of including the HI ER Label in purchasing specifications. While several respondents believed that the independent endorsement would increase the label's credibility and help support the drive for energy-efficient equipment in the Northwest, most expressed skepticism about including this label on a purchase specification. In keeping with the preceding findings, much of the trepidation expressed by respondents regarding purchasing specifications related to a desire for more robust information about the label's development.

> *"I would think so. As an engineer, my question 'is what goes into this (percentage)' There are other standard AWA, other standards that we look at more. These numbers are backed by these other agencies that we know. Then I'd think it would be super useful." (Specifying Engineer)*

The respondents recommended promoting the HI ER Label directly to specifying engineers and manufacturers' representatives, as they are "ultimately the decision-makers."

> *"(Go) straight to engineers…(and) explain intentions."* (Contractor/Installer)

Several respondents suggested promoting the inclusion of the HI ER Label in the submittal sheets and pump information packages, paired with the promotion of energy-efficient pumps in retrofit projects. A few respondents suggested reaching out to other organizations that rate commercial equipment to increase the label's visibility and credibility within the commercial pump market.

# 4 Key Conclusions and Recommendations

The in-depth interviews with the 27 market actors led to the following conclusions and recommendations, summarized next by the research objective.

## *4.1 Conclusions*

***RO1****:* Assess the role of efficiency in the pump selection process.

***Conclusions:***

- ***Energy efficiency is not a key driver in the pump selection decision for any of the three market actor groups.*** In general, the market actors included in this study indicated that the most important criterion for selecting a pump is ensuring it is "best suited for the application." Specifically, these respondents described this as meaning that the pump will operate flawlessly in the desired design conditions. Exploring this finding further revealed that the energy efficiency rating received an average rating of 3.43 on a five-point scale, making it the fourth most important factor out of the eight selection factors assessed. In contrast, "*best suited for the application*" received the highest average rating of 4.73 on a five-point scale.

  ***The HI ER Label will not likely influence pump decision-makers unless primary selection criteria are met first.*** The most important criteria for pump selection identified by study participants focus on suitability, horsepower, and the pump's overall location (or performance) on the pump's operating curve. However, several participants expressed openness to including energy efficiency in their decision-making processes once these first-order selection criteria had been satisfied. Most respondents indicated that the HI ER label would influence their decision (52%). In comparison, 48% said it would not, suggesting that the ER label could ***support*** a pump selection decision, but the information provided by the label is unlikely to be the sole criterion.

***Recommendation:***

- ***The XMP program should work with the Hydraulic Institute to develop a stronger link between energy efficiency ratings and overall pump performance in specific design conditions.*** Rather than emphasizing dollar savings, the label should emphasize the superior operating performance characteristics of pumps with a high ER rating compared to the standard pump. Overall, the ER label should be linked more directly to the message that "HI ER-labeled" pumps may be a way to determine if the pump is *"best suited to the specific application."*

***RO2:*** Assess current levels and patterns of awareness and use of the HI ER label.

***Conclusions:***

- ***Overall awareness of the HI ER Label was low across all market actor groups.*** Specifically, only two respondents had seen the HI ER Label before the interview, resulting in an "Unaided Awareness" rate of 7%. Three additional respondents recalled seeing the HI ER Label once it was shown to them, resulting in an "Aided Awareness" rate of 11%.
- ***The XMP Initiative targets the correct market actors, with a focus on specifying engineers and manufacturer's representatives.*** These market actors were also the original targets identified by the HI in developing user profiles, as described more fully in Figure 3. Of note, specifying engineers

and installation contractors reported slightly higher awareness of the HI ER Label compared to commissioning agents, which is consistent with the HI ER users' profiles research.

***Recommendation***

- ***The XMP program should focus its outreach activities on raising awareness of the HI ER Label among two critical groups: specifying engineers and manufacturers' representatives.*** Educating contractors/installers and commissioning agents may increase awareness about the HI ER Label across the market in general. Still, it will likely not directly influence the pump selection decision.

***RO3:*** Identify opportunities to promote the HI ER Label.

***Conclusions***

- ***The current HI ER Label does not provide sufficient context to be considered valid or trustworthy***. While respondents generally expressed interest in the label, the absence of contextual information prevented them from considering it a particularly valuable resource when making a pump selection decision. Specifically, the label does not include the reference point or additional design conditions that provide sufficient credibility to these pump system experts.
- ***Although the HI ER Label reminded respondents of other energy labels, the format confused first-time observers***. The participants generally did not understand how the energy rating was calculated or how the numbers tied back to energy efficiency.

***Recommendations:***

- ***The XMP program should work with Hydraulic Institute Staff to identify ways to modify the label to ensure clarity, relevance, and trustworthiness for pump purchase decision-makers.*** The HI staff has expressed interest in leveraging the findings from this study to improve the HI ER's label awareness levels. Going forward, the XMP and HI Staff should work together to incorporate the following modifications to the HI label in their outreach efforts to target key pump purchase decision-makers as identified in Figure 3.
    - The ER label calculation method (i.e., "the math")
    - The inputs used to derive the calculations, including capacity, RPMs, and HP
    - The range of values used to rank the ER pump against its peers, such as dollar savings or annual operating costs under specific operating conditions
- ***The XMP program should explore ways to integrate and promote the HI ER Label at the beginning of the pump selection process, specifically during the pre-design phase,*** through its ongoing outreach to manufacturers' representatives***.*** Most respondents believed the label could provide valuable information when the pump systems are initially designed, rather than waiting until the pump submittal phase in a new construction or retrofit project.

# Appendix A: Interview Guide

| Research Objectives | Question Number |
|---|---|
| Respondent Recruitment and Qualifying Questions | A1-A2 |
| "Firmographic" Questions | B1-B3 |
| Role in Pump Selection Process | C1-C7 |
| Awareness of the Energy Efficiency Label | D1-0a |
| Label Understanding | E1 |
| Promotion Opportunities | 0-F6 |

***Note to reviewers***: Instructions regarding wording for the interviewer are highlighted in **green bold type.** The wording of the survey will be based on how the respondent is classified in A2 and the level of awareness in D4B.

**Respondent Recruitment**

*Hello, my name is _____ from Johnson Consulting Group. My firm has been hired by the Northwest Energy Efficiency Alliance (NEEA) to conduct a market research study in the commercial and industrial pumps market. We're talking to organizations like yours who are involved in the pumps market. If you have time, I'd like to schedule a time to talk with you about the pumps market. This interview will take about 15 minutes and in exchange your participation, we will send you an email gift card worth ($50 or $75.00)*

***When is a convenient time to talk*?**

Day: _____

Time:_____

Link: _____

***Thank you for agreeing to participate. I will send you out a link for a GoToMeeting site to conduct this interview.***

**Schedule call back.** I understand you're busy. When would be a good time to call back to schedule this interview? (**If GoToMeeting isn't feasible; confirm telephone number for text message to show during the survey.)**

**Contact Name** _____

**Company Name** _____

**Contact Email** _____

**Telephone Number** _____

**Interview Date** _____

**City** _____

**State** _____

**Type of Business**

1. C&I Specifier ($75.00 stipend)
2. C&I Contractor ($50.00 stipend)
3. C&I Commissioning Agent ($50.00 stipend)

# Appendix A: Interview Guide

**Introduction**

*Hello. Thanks for talking with me today. Would it be alright if I recorded this interview? All your responses will be kept confidential.* ***(Proceed and record if permission is granted; If decline recording, continue interview with notes only).*** *First, I'd like to get a little bit of information about your firm.*

## *A. Qualifying Questions*

*A1.* Is your firm involved in the specification, installation, and/or commissioning (such as testing pump controls) for pumps in the commercial and/or industrial market?

1. Yes
2. No- **Thank and Terminate**
3. Don't Know – **Thank and Terminate**

*Terminate- thanks for your time today but your organization doesn't meet our requirements for this survey. Have a good day.*

*A2.* In terms of your work in the commercial and/or industrial pumps market, which I'll refer to as the C&I market from here on out, what is your firm's primary business?

1. Specifying engineer
2. Contractor/Installer
3. Commissioning Agent
4. Other (Specify)

*Terminate- thanks for your time today but your organization doesn't meet our requirements for this survey. Have a good day.*

## *B. "Firmographic" Questions*

B1. How long has your organization been providing these services?

_____*number of years (best estimate is fine)*

B2. About what percentage of your work each year is related to the C&I pumps market?

_____*% (your best estimate is fine)*

B3. In which states does your firm provide these services? (**Mark all that apply**)

1. Oregon
2. Washington
3. Idaho
4. Montana
5. Other (Specify)

# Appendix A: Interview Guide

## C. Role in Pump Selection Process

*Now, I'd like to ask a few questions about your firm's role regarding C&I pumps.*

C1. Are **you** involved in the pump selection decision-making process?

1. Yes – **Go to C3**
2. No**- Go to C2**
3. Don't Know- **Skip to Section D**

C2. **If not**, what is your role regarding pump installation? (**Open Ended**)

C3. Do you recommend pumps to building decision-makers such as the owners or general contractors?

1. Yes- **Continue**
2. No- **Skip to Section D**
3. Don't Know- **Skip to Section D**

**C4.** What is the **most important factor** that you consider when deciding to (**Note: If A2=1, use "specify" for all related questions; If A2=2, use "install" for all related questions; If A2=3, use "commission" to replace specify/install/commission**) a commercial pump?

_____**Open Ended**

*Likely Responses:*

1. Best suited for the application
   a. When you say "best suited," what exactly comes to mind? (**OPEN ENDED**)
2. NPSH
3. Operating Point/Location of the pump curve
4. Size
5. Price
6. Availability
7. Brand/Manufacturer
8. Replace what's already in place (like-for-like)
9. Energy efficiency rating
10. Performance rating
11. Motor Efficiency Rating
12. Best Efficiency Point (BEP)
13. Other
14. Don't Know

**C5.** On a scale of "1" to "5," where "1" means "Not at all Important" and 5" means "Very Important," how important are the following factors in your pump (**Refer to A2 for either specifying, installing or commissioning**) decision? **(ROTATE ORDER)**

| | | **1-Not at all important** | | | | **5- Very Important** | **DK** |
|---|---|---|---|---|---|---|---|
| 1. | Best suited for the application | 1 | 2 | 3 | 4 | 5 | 99 |
| | **a.** (When you say "best suited" what exactly comes to mind?) **(OPEN ENDED)** | | | | | | |
| 2. | Operating Point/location on the pump curve | 1 | 2 | 3 | 4 | 5 | 99 |
| 3. | Pump size (HP) | 1 | 2 | 3 | 4 | 5 | 99 |
| 4. | Physical size/fit in space | 1 | 2 | 3 | 4 | 5 | 99 |
| 5. | Price | 1 | 2 | 3 | 4 | 5 | 99 |
| 6. | Availability | 1 | 2 | 3 | 4 | 5 | 99 |
| 7. | Brand/Manufacturer | 1 | 2 | 3 | 4 | 5 | 99 |
| 8. | Energy Efficiency Rating | 1 | 2 | 3 | 4 | 5 | 99 |

C6. Do you work with pumps above 5 HP?

1. Yes- **GO to C7**
2. No- **SKIP TO C8**
3. Don't Know- **SKIP to C8**

C7. Using the same five point scale (remind if needed: "1" means "Not at all Important," "5" means "Very Important"), how important is energy efficiency in your (**Refer to A2 for either specifying, installing or commissioning**) decisions for pumps larger than 5 HP?

| | **Not at All Important** | | | **Very Important** | **DK** | |
|---|---|---|---|---|---|---|
| 5+ HP Energy Efficiency Rating | 1 | 2 | 3 | 4 | 5 | 99 |

C8. Do you work with circulators?

1. Yes- **GO to C8**
2. No- **SKIP TO C9**
3. Don't Know- **SKIP to C9**

C8a. How, if at all, are your decision-criteria different for circulators than pumps? (**OPEN ENDED)**

C9. What ***efficiency metrics*** or requirements do you consider when making your pump **(Refer to A2 for either specifying, installing or commissioning) decisions**? (**Read list: Mark all that apply**)

1. Best Efficiency Point
2. Hydraulic Efficiency
3. Motor Efficiency
4. Pump Energy Index (PEI)
5. Duty Point Efficiency
6. Hydraulic Institute Energy Rating
7. Other
8. None of the Above
9. Don't Know

C6. C10. Where do you typically find information about a pump's energy performance? (**Open Ended)**

*Likely responses*

1. Manufacturer's Selection Software
2. Manufacturer's Website
3. Pump database
4. Pump software package
5. Pump dealer/representative
6. Other

C7. C11. Where else do you find information about pump performance? **(Open Ended)**

*Likely responses*

1. Manufacturer's Selection Software
2. Manufacturer's Website
3. Pump database
4. Pump software package
5. Pump dealer/representative
6. Trade associations
7. ASHRAE
8. Hydraulic Institute
9. Other (Specify)

# Appendix A: Interview Guide

## *D. Awareness of Energy Label **(ALL CONTINUE)***

*Thanks. Now I'd like to ask a few questions about the importance of energy efficiency in your pump (**Refer to A2 for either specifying, installing or commissioning)** process.*

**Unaided Awareness**

D1. What energy efficiency labels are you familiar with? (**Open Ended: No Prompting)**

*Likely Responses*

1. Energy Star Labels
2. Consumer Guide Labels (Yellow ones for home appliances)
3. HI's ER Label
4. BPI Metric
5. LEED Gold/Platinum
6. Other (Specify)
7. None/Not Aware

D2. Do you recall ever seeing the *Hydraulic Institute's (HI)'s Energy Rating (ER)* Label for C&I Pumps?

1. Yes—**Go to D2a**
2. No- **Go to D3**
3. Don't Know- **Go to D3**

D2A. If Yes: Where have you seen this label? **(Open Ended)**

D2B. What do you remember about this label? (**Open Ended)**

D3. **If No**: NEEA worked with the Hydraulic Institute to develop an Energy Rating (ER) 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 seeing this ER Label?

1. Yes- **Go to D4A**
2. No- **Go to D5**
3. Don't Know- **Go to D5**

D4A. If Yes: Where have you seen this label? **(Open Ended)**

D4B. What do you remember about this label? (**Open Ended)**

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**If No:** Now I'm going to show you a picture of this ER label. Please let me know if you have ever seen this label.

**(show label via GoToMeeting Screen Shot or send label in a text message)**

D5. Before this conversation, have you ever seen this label?

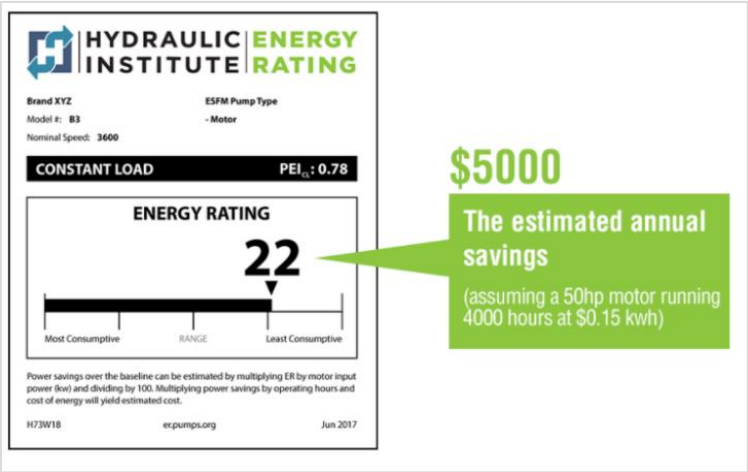
1. Yes- **Go To D5a**
2. No- **Go to Section E**
3. Don't Know/Don't Recall- **Go to Section E**

**Internal Team Note:** (Record **Additional Open Ended Response** describing the participant's reaction when viewing the label, including additional probes for where the ER label was seen or used).

D5a. If Yes: Where have you seen this label? **(Open Ended)**

## *E. Label Understanding (ALL CONTINUE)*

*Now, I'd like to ask you a few questions about the clarity and usefulness of information provided on this label*. (**Show label to all survey respondents**.)




**Label Understanding**

E1. Has this/or would this label influence/d your decision to (**Refer to A2: specify/install/commissio**n) a pump?

1. Yes
2. No.
3. Don't Know

E2. What are your general impressions of this label? **FOR UNAWARE RESPONDENTS**: now that you have seen it)? (**Open Ended**)

E3. *(If not clearly addressed in E2 response)* What do like about this label ()? (**Open Ended**)

E4. What does the label tell you about this pump? (**Open Ended)**

E5. *(If not clearly addressed in E2 response)* What don't you like? Are there any elements that are confusing or difficult to understand? **(Open Ended)**

E6. Is there any other information that you feel should be included on this label to best support your (**Refer to A2 for specifying, install** specification/installation/commissioning) decision-making processes? (**Open Ended)**

E7. Please tell me a little more about that. **(Open Ended)**

## *F. Promotion Opportunities **(ALL CONTINUE)***

F1. (**FOR UNAWARE RESPONDENTS ONLY ASK:** (Now that you have seen it,) Do you think this label should be promoted to organizations like yours in the Northwest market? If so, how? (**Open Ended**)

F2. At what point in the pump (**Refer to A2: specification/installation /commissioning process**) would it be most helpful for this label to be made available? (**Read list)**

1. Pre-design phase
2. Pump selection process
3. Pump installation
4. Pump commissioning
5. None of the above **(Don't Read)**
6. Other

F3. What types of projects, if any, do you think would benefit from having a label on a pump? **(Probe:** new construction, retrofit, design/build, other)

F4. And what types of pump projects, if any, do you work on where a label would not be meaningful? (**Probe:** replacement purchases, burn-out, small jobs, other)

F5. Would having the HI ER label recognized as a purchasing specification make it easier for you to (**Refer to A2 for specify/install/commission**) pumps for your projects?

F5a. Why do you say that? **(Open Ended)**

F6. Is there anything else you would like to add to what we've discussed today? (**Open Ended)**

***Thank you for your time today. I want to confirm your email so we can you a $50.00/$75.00 e-gift card.***

**Confirm email address:_____**