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Natural Gas Water Heater and HVAC Installer Research Report

Prepared for NEEA:
Anu Teja, Sr. Project Manager, Market Research & Evaluation

Prepared by:
Dr. Alex Dunn, Managing Director
Dr. Liz Kelley, Technical Director – Qualitative Research
Shannon Kahl, Technical Consultant
Amanda Maass, Senior Research Analyst
Andrew Mielcarek, Senior Research Analyst

ILLUME Advising, LLC
440 Science Dr., Suite 202
Madison, WI 53711
608.807.2061

Northwest Energy Efficiency Alliance
PHONE
503-688-5400
FAX
503-688-5447
EMAIL
info@neea.org

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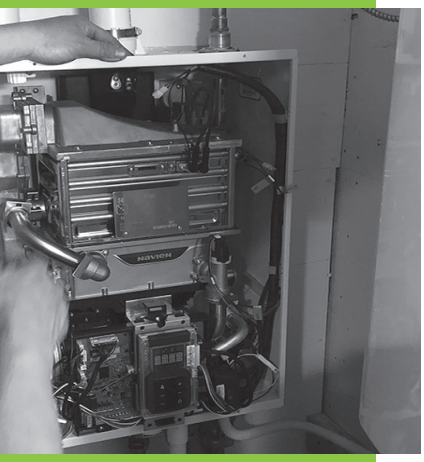
1. Executive Summary

OVERVIEW



NEEA hired ILLUME to conduct exploratory research to support them in designing effective interventions for the uptake and installation of more efficient residential gas HVAC and water heating equipment. The two main objectives of the research were to (1) understand the decision-making process for installations of water heaters and HVAC systems and (2) understand the dynamics of the supply chain.

ILLUME approached this study with a set of defined research questions and activities. Our initial plan was to conduct installer ride-alongs, which would, in turn, lead to in-depth interviews with the customers and distributors we met during those ride-alongs. Since NEEA's research questions were exploratory and sought to build a greater understanding of the day-to-day experience of water heater and HVAC installers, the ILLUME team approached the research from an adaptive and flexible perspective. We created a research plan but intended for it to be agile from the beginning, so, if necessary, we could pivot to ensure we addressed the research questions.

As soon as recruitment started, we realized that we would need to adapt our research plan. The changes we made are indicative of several of our key findings. Specifically, the HVAC and water heater industries are built around relationships, and distributors are an easier entry point than installers. We found that distributors were more receptive to scheduling interviews and were willing to let us linger in their shop to recruit, interview, and observe interactions with installers. We also found that installers were more willing to talk to us face-to-face when we walked into their shop rather than when we were cold-calling them.

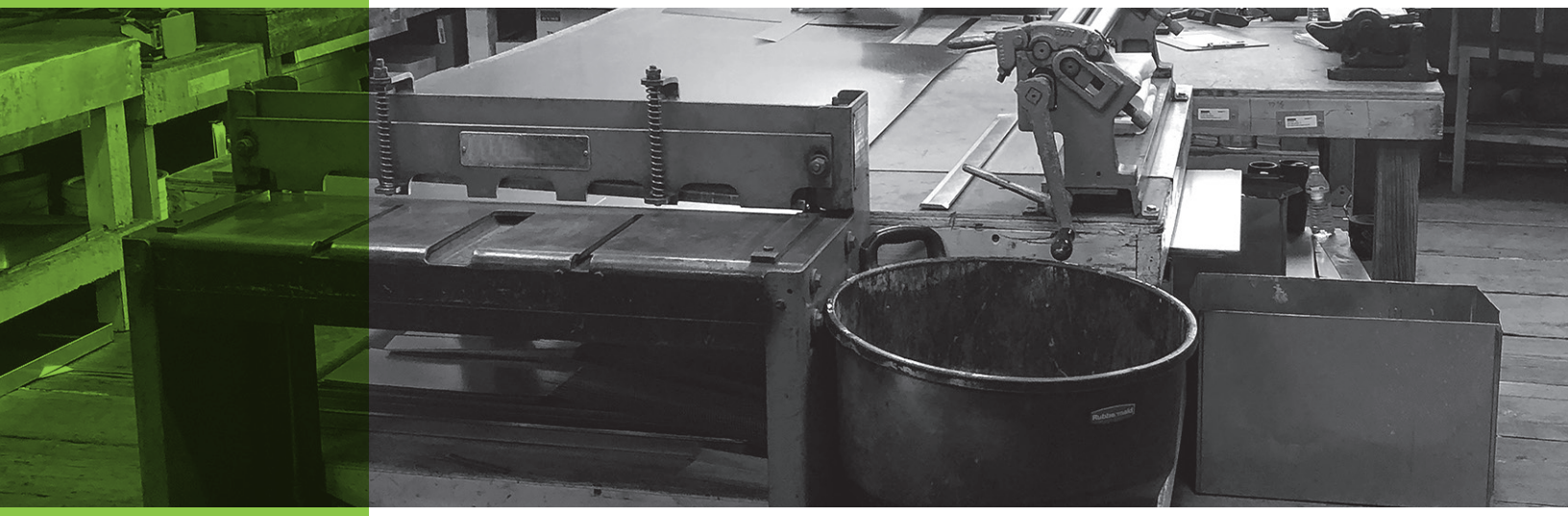
Our fieldwork took a similarly circuitous path, as our team accompanied installers not only on customer sales calls, but also to the DMV, and to conversations between an installer and his nephew about joining the HVAC industry. Our distributor interviews and in-store observations included in-depth conversations about the industry, along with hunting and fishing stories, shared over coffee and doughnuts.

These conversations and interactions provided a depth and richness to the research that would have been impossible to gather through other research methods.

We also spoke with a few customers and followed up with one for a longer phone interview. While these interviews were insightful, we realized that the research questions we wanted to focus on could be better answered by returning to the field for additional distributor visits and installer interviews rather than by additional efforts to identify and recruit recent HVAC or water heater customers for interviews.

This document summarizes our findings from the ethnographic research and provides NEEA with some direction for future initiatives. As the product of exploratory research, it is not exhaustive, rather, it highlights additional directions for further, more targeted research.

The report that follows includes the following: (1) profiles of installers and distributors that illustrate the experiences, challenges, and perspectives of various market actors; (2) major themes and findings as well as the opportunities or challenges they may present to NEEA as they work to promote efficient natural gas HVAC and water heating equipment. Additional, more detailed materials are included in a separate document of appendices.



Completed Research Activities

ILLUME completed in-person observational research, in-depth interviews, and phone interviews. The observational research component included both ride-alongs with installers and in-store observations at distributors. During the ride-alongs, the team accompanied an installer for a half-day to a full day as they went about their business. The in-store observations lasted anywhere from 30 minutes to 3 hours and were conducted along with an in-depth interview. Table 1 provides additional detail on the research activities we completed.

Table 1. Field Research Activities Completed

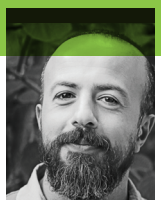
LOCATION	DISTRIBUTOR	INSTALLER	CUSTOMER
Spokane	2 in-store interviews, 1 intercept interview	2 ride-alongs, 2 intercept interviews	1 in-depth interview, 1 in-home interview
West Washington*	1 in-depth phone interview, 2 intercept interviews	3 ride-alongs, 7 intercept interviews	2 in-home interviews
Boise	1 in-depth phone interview		
Portland	2 in-store interviews	3 intercept interviews	
Total	9 interviews	5 ride-alongs, 12 interviews	1 in-depth interview, 3 in-home interviews

*Tacoma, Seattle, Bellingham

OVERVIEW OF MARKET ACTORS

TABLE 2
INSTALLERS

"There's a lot of stuff out there—a lot of brands—and I do try things out but usually I'll try things out, let's say my customer wants to go with a certain specific brand or model or whatever…you know, I'll install it for them and I'll call them in a few months and ask if they're happy with it, just to figure out what's out there."
– Pete, Spokane, WA



"I just lay [out all of the options] and whatever direction [the customer] wants to go they go. So, I usually don't push people.... I mean if they want something nice, like if they want a variable speed heat pump, I'll tell them, "Well, you won't know it's there," because that's the way mine is. I don't feel anything, I don't hear anything...I've sold a lot of systems where it's more about how nice it was than the efficiency, because you could have dealt with the efficiency one or two tiers down. It would have been noisier, not as comfortable."
– Tim, Bellingham, WA

"I don't necessarily have a process when it comes to sales calls. That process may change depending on how somebody answers the door. You are constantly dealing with different people…If it's a customer that wants something, we just tell them this is what we offer and we try to tell them why we sell what we do and, if they really what that brand, then we recommend they go on the manufacturer's web site and look up the dealers."
– Cameron, Seattle, WA

INSTALLER SIZE	SMALL	MEDIUM	LARGE
Business Characteristics	1-3 employees Owner/Operator handles all business operations and most installation and service work Often have no real business structure Many work out of their homes and truck with no physical office or shop	4-10 employees Some office staff to handle administrative tasks More polished business approach Generally have a small physical location with some stock of parts, accessories, and equipment	10+ employees Large office staff with sales, management, and administrative staff Business is a well-oiled machine Large physical location with extensive stock of common parts and accessories and many stock a few units of commonly used equipment
Key Relationships	Distributors are a key connection that provide equipment, training, technical support, and business development support There are less frequent interactions with manufacturers for technical support	Distributors are a key connection that provide equipment, training, technical support, and business development support There are less frequent interactions with manufacturers for technical support May interact with third-party agencies representing: i. Water heater brands ii. Parts, supplies, and ancillary HVAC equipment	Distributors are a key connection that provide equipment, training, technical support, and business development support Distributors provide a higher level of service to the large installers There are less frequent interactions with manufacturers for technical support May interact with third-party agencies representing: i. Water heater brands ii. Parts, supplies, and ancillary HVAC equipment
Needs & Opportunities	Limited time and resources to attend trainings Needs support with business development as they usually lack the time, experience, and resources to devote to this task	Attending trainings is more feasible than for small installers, but it can be difficult to attend training regularly Needs help with refining business development approaches Finding and retaining qualified service technicians and installers is a challenge	Finding and retaining qualified service technicians and installers is a challenge

TABLE 3
DISTRIBUTORS

"We provide a service, we try to help people get what they need. We would like to sell them stuff, but we're not going to sell them stuff they don't need, and we're not going to take advantage of people. If we can't supply it we'll find it where it is and make contact with those people." – Clarissa, Portland, OR

"I don't know how many sales managers I've argued with over the years where they're going 'Sales! Sales! Sales!', and I say no, 'Service! Service! Service!'. If I service my customers, they will give me their sales, at a lot better rate, at a lot more loyalty, then if I just gave them a number on a box." – Bruce, Spokane, WA

"The only thing we've got that a guy can't get somewhere else is service. It's all we got—take care of the customer, and their needs and wants…We don't sell anything different than anybody else does, so service is our driving sales tool." – John, Seattle, WA

DISTRIBUTOR SIZE	SMALL	MEDIUM	LARGE
Business Characteristics	1-5 locations with limited on-site staff Limited scope of product types offered (e.g., water heaters and plumbing only) Offer service and installation trainings on an ad-hoc basis as installers identify common problems or request a training	6-10 locations with dedicated counter staff for technical support Broader scope of products offered (HVAC, plumbing, fireplaces, etc.) Offer service, installation, and business development/sales trainings on ad-hoc and regular basis	More than 10 locations with dedicated counter staff for technical support and additional in-house specialists for certain equipment Broadest scope of products offered (HVAC, plumbing, fireplaces, refrigeration, builder supplies, facility supplies, etc.) Offer service, installation, and business development/sales trainings on ad-hoc and regular basis
Key Relationships	Work primarily with small installers, providing equipment, training, and limited technical support Manufacturers—provide warranty processing numbers and common equipment issues raised by installers Manufacturers reps and third-party agencies—purchase equipment, get technical support, and marketing support Buying groups—negotiate prices on water heaters and ancillary parts and equipment and share business information and strategies with non-competing companies	Work primarily with small and medium installers, potentially some larger installers, providing equipment, training, technical support, and some business development Manufacturers—provide warranty processing numbers and common equipment issues raised by installers Manufacturers reps and third-party agencies—purchase equipment, get technical support, and marketing support Buying groups—negotiate prices on water heaters and ancillary parts and equipment and share business information and strategies with non-competing companies	Work with installers of all sizes but large installers and developers account for most of their business Provide installers with equipment, training, technical support, and business development Manufacturers—Large distributors have stronger relationships driven by larger sales numbers and provide warranty processing numbers and common equipment issues raised by installers Manufacturers reps and third-party agencies—purchase equipment, get technical support, and marketing support Buying groups—negotiate prices on water heaters and ancillary parts and equipment and share business information and strategies with non-competing companies
Needs & Opportunities	They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier Difficult to remain competitive with larger distributors due to smaller market power and inventory capabilities and may be more receptive to third-party agency reps or buying groups as a result	They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier Finding and retaining qualified employees is a challenge	They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier Finding and retaining qualified employees is a challenge

KEY FINDINGS AND CONSIDERATIONS

Preserving Reputation Motivates Installer Decisions

Installer decisions around equipment offerings and the projects they accept are driven by the need to preserve their reputation and to ensure that they are not wasting time and money on call-backs.

- Installers do not want to return to a job; doing so costs them time, money, and potentially their reputation. As a result, most installers we spoke with described some type of 'risk and reward' assessment to determine if they should complete a job.

- Smaller installers might be more willing to install less familiar equipment for the sake of the job, whereas larger, more established installers will turn down work that does not align with their offerings.

Installers approach each house like a puzzle—they need to find the equipment that not only fits into the available space but also meets their customer's needs.

- Home configuration can present both opportunities and challenges for more efficient equipment. More efficient furnaces benefit from being smaller than the older, less efficient units they replace. There is no concern about the furnace fitting and it often frees up space for a central air conditioning coil.

- Installers consider the home configuration and the size of the gas line when making their recommendations. They may not recommend more efficient water heaters, like tankless systems, because these systems often require a larger gas line which can add to the cost.

Relationships Drive the Industry

Distribution centers serve as hubs of activity that go beyond "moving boxes" of equipment. They facilitate the service-orientated relationship between installers and distributors and act as a gathering place for installers to converse over a cup of strong coffee.

- Distributors compete with each other through the services and support they provide installers.

- The size of an installer influences their interactions with distributors. A smaller installer might make daily trips to pick up equipment and supplies. Larger installers are more likely to have their own warehouse with supplies, which minimizes the time their technicians spend making trips to the distributor. In some cases, distributors deliver equipment directly to high-volume installers.

Distributors serve as hubs of activity and meeting places; NEEA could consider exploring partnerships or outreach with distributors to reach installers.

Distributors cultivate relationships with and expect the same high level of service and support from manufacturer and third party agency representatives as they provide to installers.

- Distributors need trainings, resources, and marketing support from the manufacturer to serve their installers. If a manufacturer does not provide that support, distributors will promote a different brand that is more supportive and may cut ties with the less-supportive manufacturer.

- Independent third-party agencies help facilitate the relationship between distributors and manufacturers by providing technical support, sales and marketing support, and trainings. The quality of support from these agencies can impact which products a distributor sells and promotes because it makes the distributor's life easier.

- Each distributor we spoke with noted their participation in distributor networks known as buying groups. These buying groups leverage the purchasing power of a large number of independent distributors and provide distributors with an opportunity to discuss business strategies and share ideas with non-competing businesses.

Third-party agencies and buying groups are important resources for distributors; NEEA could consider leveraging these market actors to provide novel opportunities to impact the water heating and HVAC markets.

Finding Qualified Workers is a Challenge for the Industry

Installers are stretched thin. Their schedules are booked out for weeks and they are shorthanded because there is a shortage of qualified labor in the industry.

- Installers and distributors both attribute the shortage of qualified workers to a lack of exposure to trade work during high school and negative attitudes about going into a trade instead of going to college.

- The labor shortage has several implications for the industry, such as (1) long customer wait times, (2) an increase in one-person shops as some entrepreneurial installers see this abundance of work as an opportunity, and (3) competitive hiring practices among installers which can contribute to higher employee turnover.

The current labor shortage has placed a strain on the entire industry; when considering interventions, NEEA should recognize the limited time and resources installers have for trainings and consider strategies to funnel more qualified workers into the industry.

Continued education and training are important for installers to become more familiar and comfortable with new, higher-efficiency equipment, and to develop their sales and business management skills.

- All of the distributors we spoke with offer regular trainings but say it can be difficult to get installers to attend because of the time and cost commitment, especially during busier times of year.

- Familiarity with tankless water heaters is more of an issue than familiarity with high efficiency furnaces. Many installers perceive some degree of risk with installing tankless water heaters because they are less familiar with the technology and the internal computer components.

Continued training may help installers become more familiar with newer technology and better salespeople, resulting in more installations of higher-efficiency equipment. NEEA could consider providing support or incentives to make training more accessible from both a time- and cost-commitment perspective.

Equipment Selection Considerations

Before an installer ever walks onto a job site, they have already made a number of decisions that will influence what piece of equipment is installed in a customer's home.

These decisions center on the brands of equipment they install and the distributors they buy them from.

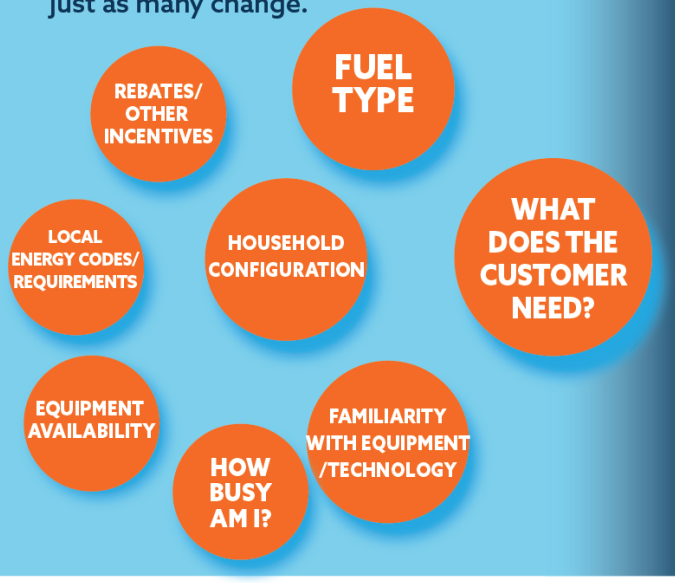
The main drivers behind those decisions are the reliability of the equipment, the service and support offered on that equipment through the distributor and manufacturer, and the ability to get that equipment at a fair price.

Confluence of Installer and Customer Considerations

INSTALLER

Most installers have designed their business so that they are familiar with the equipment they work with, and confident in their ability to install it correctly.

They do not like to get too far out of their comfort zone; however, while a number of factors remain constant with every job, just as many change.



CUSTOMER

Often, customers have not given much consideration to their furnace or water heater until there is a problem.

When it comes time to make a decision, they need to balance each of their needs and considerations with everything that the installer is telling them.

2. Meet the Market Actors

Throughout the research, we spoke with a variety of installers and distributors. We were also able to speak with a handful of customers, and we provide highlights from one of those conversations as well.

In this section, we begin with a profile of Wendell, a customer we met during a service call for his furnace, and progress through the supply chain.

Next, we profile three of the installers with whom we conducted ride-alongs to help illustrate their day-to-day lives and the influences on their business practices. Pete is a small installer, and like most smaller installers, he has one to three employees, manages all financial and administrative aspects of the company, and has a close relationship with his distributors. Tim is a medium installer, and, like other mid-sized installers, he has a few more employees and administrative staff to help him manage the finances and scheduling. Cameron is a large installer. Large installers generally have 10 or more employees, including sales and administrative teams, and stock common parts, accessories, and equipment. Appendix B provides more details on the characteristics of differently sized installers.

We also profile three of the distributors we interviewed to characterize their business approaches and influences on their decision-making. Amy and Carl are mid-sized distributors. Most mid-sized distributors have six to ten locations, primarily offer equipment trainings with some offering business development and sales trainings, and have offsite technical support. John is a large HVAC and water heater distributor. Large distributors typically have more than 10 locations, offer training sessions regularly, and employ in-house specialists for technical support on specific equipment offerings. Appendix C provides more detail on the characteristics of differently-sized installers. Appendix D illustrates the relationships between distributors and other members of the supply chain.

CUSTOMER

WENDELL

SPOKANE, WA

Wendell and his wife have been married for 20 years and, after many years of adventures, they recently decided to settle down and buy their first home. Becoming homeowners has been a steep learning curve for them as they are discovering all the different types of maintenance a house needs. Every decision is a process in their household, which mostly involves reconciling their personalities and preferences, and getting advice from their family and friends. Ultimately, they prioritize their needs by balancing their budget with how their quality of life will be impacted.

> **"Sometimes by happenstance, or it could be any number of things, including being informed –and sometimes that doesn't happen or it's not possible–so you're just kind of flying by the seat of your pants sometimes, too. A lot of it is also relying on the advice of people who do this day in and day out, what they do, and I rely a lot on their experience."**

Wendell plans to wait until his water heater or HVAC system fails before replacing them—unless he came into a lot of money and decided to remodel the house. Right now, replacement is out of his budget so he has not done any research on what would be involved in replacing their systems. Wendell thinks it would be a "big job" that required "a radical change to the infrastructure" because of how the ductwork is configured in their old house.

> **"I wouldn't anticipate wanting to change them, unless I had to...and not to say I wouldn't want to, but it would be a luxury at this point to do it, rather than a necessity."**

If Wendell was ready to replace, he would want to do some research beforehand to understand his options, as well as call in an expert to get their opinion. He would consider the efficiency differences between his options and the cost-effectiveness. Wendell also only wants to purchase what would be practical in their home or what is necessary for them.

> **"I would be willing to pay more for a system...I like the idea of limitless hot water, but practically the way we use water in our household, it's probably not–without a lot of people living here–it would probably be overkill...so I would have to weigh out the option by what we really need versus the cost...in some ways I like the idea of taking advantage of innovative technology and yet on the other hand it may not be necessary."**

Wendell is aware of tankless water heaters, but does not have a robust understanding of how they might benefit his family—he was not aware that they might save money with a tankless system because they would not be heating water throughout the day. He heard that tankless systems provide "endless hot water" but does not think this is particularly helpful for his household since they do not use a lot of water. He was also uncertain about tankless systems because he had read that the gas line usually needed to be increased, which would eliminate tankless as an option for them.

PETE

SPOKANE, WA

SMALL INSTALLER

Pete has been working in the HVAC industry for about 13 years and decided 3 years ago to start his own HVAC company in Spokane. He is a self-proclaimed "troublemaker" who has plans to turn an old firetruck he impulsively bought into his company mascot and play on the theme of "emergency service."

Pete is deeply involved in the Russian community in Spokane and predominantly relies on that community for work and for staff. His community is his family. He goes out of his way to support his community and accommodate his customers, whether it is giving someone a job, working with a family on pricing, or learning to install a new system or brand at the request of a customer.

> "I look at some jobs and I know I can make some money...but then there's other jobs that I try and give back to people a little bit, you know, this family is in need and I try to work with people on pricing and their ability to pay—probably longer than I should but you got to work with people."

Pete has a vision to grow his company but is struggling to balance all the aspects of a growing business. Some days he is so busy getting his team organized, running to the DMV to update truck titles, and answering phone calls that he "doesn't get any actual work done" until the evening. Pete is slowly figuring out strategies to grow and how to manage that growth, whether it is purchasing a Bluetooth earpiece to help answer his calls or working towards becoming a Trane dealer by primarily selling AmeriStar products.

> "I don't think I'm a good example of how to manage a company...I'm all over the place."

Since Pete is wearing many hats at his company and juggling all the operational challenges, sometimes mistakes happen that force him to spend more time on a project than he planned. While we were with him, we heard about a time his crew accidently switched the air supply and the return for a remodel project. They did not realize the mistake until the remodel was complete and the general contractor leading the project called him to say that something went wrong when they 'fired off' the furnace. Pete ultimately had to go back with his crew to fix the issue. He now tries to check-in on jobs throughout the day to ensure they are being done properly and in a timely manner, but this stretches him even thinner and makes it harder for him to get work done.

INSTALLER

TIM

BELLINGHAM, WA

MEDIUM INSTALLER

Tim grew-up working for his parents' HVAC company, which he took over about 30 years ago and has grown to about 10 employees. Tim had hoped for a different career for himself and his son because he sees HVAC companies as "the second riskiest businesses next to restaurants," but HVAC is what he knew so he stuck with it.

His son—22 years old and the installation manager at the company—expressed interest in taking over the family business. Since then, Tim has invested a lot of time taking business courses and creating systems and processes to make the company more organized, profitable, and stable. Over the past few years, Tim has transformed his company from one that takes any job to one that is deliberate in choosing projects to ensure they are able to cover their overhead.

> **"If you're smaller...you just wear too many hats and you just can't really effectively do it all. So, there's a sweet spot when there's just a few people and you can run everything out of your head pretty much. But when you go past that, you can't and that's when you discover, 'I'm in over my head. I've got to get some systems to manage all of this.' So, anyway we've been working on that for a few years and it's getting better."**

Tim's relationship with a representative at his main distributor has been a key influence on his business practices and the equipment they install. Their relationship is built on trust, relatability, familiarity, and support. All of which are important to Tim as he works to transform his company and develop solid business practices.

> **"It's the good old boys' system. He and I had always gotten along. We're like two months apart in age. But what he brought to the table was all these things I was telling you about, like service agreements. We have service agreements with customers, we never had that before. I could just never get it all put together."**

Although Tim acknowledges that his company can make more money on a job if they "push" more expensive systems that are higher efficiency, that approach feels "icky" to him; he prefers laying out all the customer's options and letting them make the decision for themselves.

> **"There are people that are just after the money and they sell...if somebody's good at that and they're in a position of trust, they can really generate a lot of work...We don't want to go there, but we want to go where people are getting stuff that they need."**

INSTALLER

CAMERON

SEATTLE, WA

LARGE INSTALLER

Cameron has been working for this company for about 10 years. Though he has never serviced or installed any equipment himself, he is a salesperson through and through. He was attending college for business and marketing when his current employer reached out to his college advisor looking to hire a new salesperson. Cameron joined the company after multiple rounds of interviews and has been happy with the way things have worked out.

> **"I was working swing shift as a mechanic at a paper mill repair plant. I was in sales off and on...Then my wife got pregnant and I was working the swing shift, and it was going to be another 15 years before I would go into day shift, so I decided that wasn't for me. When my first kid was born, I went to a technical college for business and marketing."**

Despite entering the HVAC business without any hands-on experience servicing and installing equipment, Cameron has taken the initiative to immerse himself and learn the intricacies of the industry and the equipment he sells. He works for one of the largest HVAC installers in the Puget Sound area, which has provided him with steady access to training and education that many seasoned installers and technicians do not have the time to complete.

> **"We definitely pride ourselves on a lot of training... [Our distributor is] constantly doing ongoing training. They have several training rooms on-site, and they do a lot of training with our installers, service techs, sales people, with management and the owners... They've got online training too, so we are continuously going on and getting training."**

Cameron uses his deep knowledge of their products and the support of a dedicated administrative team to offer customers high-quality service and support. He constantly cites statistics from various studies and references Department of Energy best practices. He is in tune with all the utility rebate offerings in the area, but sometimes questions the equipment they promote, because he thinks more efficient and cost-effective solutions exist for customers. Given his extensive knowledge and training, he sees it as his duty to educate his customers on all their potential options. He approaches each house and customer as if they are a puzzle, and it is his job to put the pieces together to present the best possible solution.

> **"I don't necessarily have a process when it comes to sales calls. It may change depending on how somebody answers the door. I've got homeowners that answer the door and they want to sit down and talk, and then you've got customers that open the garage door and say, 'this is my furnace and I want an 80% gas furnace'. You are constantly dealing with different people...It's my job to educate the customer and make sure we get them pointed the right way."**

Appendix E includes examples of how the different installers might handle different installation scenarios.

DISTRIBUTOR

AMY

PORTLAND, OR

MEDIUM DISTRIBUTOR
PLUMBING AND HVAC

Amy has worked on and off in the HVAC and plumbing industry since the '90s. In between military service stints, she has worked as a service tech, an installer, and is currently the branch manager. The company she works for is a large-scale distributor that is primarily located in Colorado and Utah. Since her branch is somewhat isolated from the rest of the company, it operates more like a mid-sized distributor in the area. Despite being more isolated, she still manages to keep up with the latest technologies and market developments by relying on a strong support network. This network is comprised of the people she hires, manufacturers, and, most importantly, her contact at a third-party agency, who provides her with some of her most valuable support.

> "There's a firm that I deal with a lot out of Bluffdale, Utah. It's called MJM Associates, and they represent 15 different manufacturers. And it just so happens that their rep is a guy that used to be a service tech here [in town] that I've known for 15 years, and he's just really sharp, knowledgeable, and knows his stuff. So, it's like, 'Hey, why do I want to put this in and not Brand X?' And he's like, 'Oh, because they don't have the da-da-da...' 'Okay, cool, man. Thanks.' And I call my customer back, it's like, 'Yeah, they don't have a da-da-da,' And they're like, 'Oh, wow you're a genius.' I'm like, 'Yeah, I know.' So, I mean, that makes a good third-party representative—they make you seem like a brilliant person."

Since Amy has worked as both an installer and a distributor, she has unique insight into the needs of both market actors. She uses that insight to provide her customers quality service while also balancing the needs of her company. Amy understands that it is bad for both the installer and the distributor's business when an installer must return to a job due to an equipment issue. She uses her experience and deep knowledge of the industry to ensure that she is selling equipment of the highest quality and that installers have all the information they need to properly install the equipment.

> "[This brand has] been number one forever on the consumer reports type stuff. It's really good, it's heavy. You can pick one up and then pick up another brand of equipment and it's just heavier. They use heavier sheet metal, they use better motors. They just use better stuff and the stuff has the lowest repair rate of any of the equipment that is currently available, up till right now. And I don't want to be doing warranty stuff and all that kind of stuff, so I really like this equipment."

A large portion of Amy's water heater and HVAC equipment sales come from more expensive, higher efficiency equipment. In her experience, people will spend a little more money for higher quality equipment. The main barrier she sees to higher adoption of more expensive, high-efficiency equipment is that installers are afraid to sell it. She attributes some of this reluctance to a lack of sales experience and the shortage of qualified installers. Less-experienced installers think they need to present customers with the lowest cost option to get the sale.

> "A lot of the guys that are newer in the business or whatever are scared to ask for higher money for a higher-end, nicer system. And I talk and it's like, 'Oh, they'll never go for that.' 'How do you know? You didn't ask'...I've walked into a house, and it was a complete mess. They had dogs and raccoons and all kind of weird stuff running through their house. It was the craziest thing I've ever seen. And they ended up buying the most high-end equipment with all the bells and whistles and everything possible for their house, 'cause it was really important to them."

DISTRIBUTOR

BRUCE

SPOKANE, WA

MEDIUM DISTRIBUTOR
HVAC

Bruce is one of the self-proclaimed "old-school" people in the industry. He has been involved with HVAC for nearly 40 years. He began his career as an installer, then moved into service. He now works as both an in-house factory technical representative (FTR) for Rheem & Ruud—a factory trained person who provides on-the-ground technical support—and the equipment manager, who is largely in charge of stocking equipment at his distribution center. As he puts it, he is in the business of selling boxes, and he prefers to sell big boxes.

Bruce learned long ago that the most important thing he can offer his customers is service. He knows that by putting his customers first, he will gain their trust and, in turn, their business. The installers he works with know that if they ever have an issue with a piece of equipment, they can call Bruce and he will talk them through it, even if they did not buy the equipment from him. To Bruce, the service he provides the installers in the Spokane-area drives his business.

> "What I have always wanted is, the installer to call me first. If I have a box that will take care of their needs, then I'm going to sell them that box. If they're looking for a product that I don't handle, or don't have access to, I'm going to tell them who has it. The bottom line is, the next time that installer needs something he's going to call me first."

> "Taking care of the customer doesn't always put money in my pocket. In the long term it might...to me, people buy from people. I've argued with [sales managers] over the years, where they're going 'Sales! Sales! Sales!', and I say no, 'Service! Service! Service!' If I service my customers, they will give me their sales, at a lot better rate, and with a lot more loyalty, than if I just gave them a number on a box."

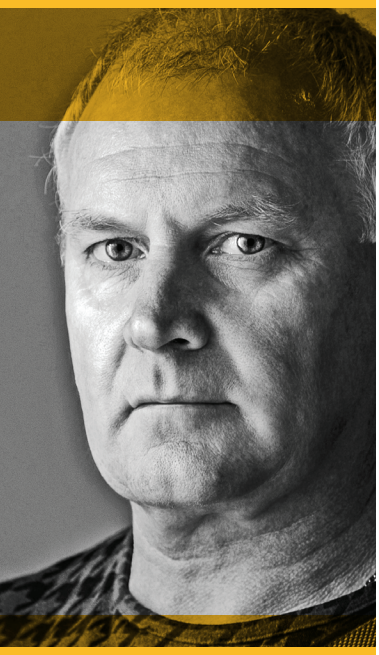
Bruce is the gate-keeper; he decides which equipment comes in and out of his doors. He scrutinizes every piece of equipment that he considers by asking the question, "Would I put this in my house?" Bruce maintains stock of equipment meeting that criteria, representing a wide range of efficiencies and price points, so long as it is a quality product at a fair price. Even though he scrutinizes the equipment he sells for quality and value, simple cost calculations are a key determining factor.

> "Today, from a manufacturing standpoint, everybody wants you to push their high-end high-efficiency blah. In a lot of cases it has too many bells and whistles, it's ridiculously expensive...with my power rates there's no way the consumer's going to get any payback. So, I don't tout that type of equipment...when a consumer thinks they want that, I'm going to explain to them all the reasons why they don't want it."

Bruce recognizes how valuable installers' time is and has dedicated significant resources to providing in-house installer trainings that will be worthwhile. He is the regional training center for one of his brands, and regularly holds trainings on proper installation techniques and troubleshooting for all of the equipment he offers. He finds that offering these trainings significantly reduces the amount of time he has to spend dealing with preventable issues down the road. This means more time to assist his customers, to learn something new about his equipment, or to go fishing.

> "I would worry a hell of a lot more about who puts it in rather than what it is they put in. I can take the top end of somebody's equipment, and the low end of somebody else's equipment, give them to one installer and they're both going to run like a clock for 20 years. I can take the top end of somebody's equipment the low end of somebody else's equipment, give them to another installer, and they're going to be a pain for 20 years."

DISTRIBUTOR



JOHN

SEATTLE, WA

LARGE DISTRIBUTOR
PLUMBING AND HVAC

John has worked for the same distributor for about 30 years. He started when he was a teenager in the warehouse and has since climbed up the corporate ladder. He has worked in sales, opened new regional branches, and is currently working in a corporate management position. His lifetime career in the industry has given him a deep understanding of the needs of each player in the HVAC ecosystem.

John sees his role, and his company's role, as one of pure service and support for installers. John understands that when his customers are successful, he and his company are successful. He constantly uses feedback from in-house sales representatives and branch managers to identify new technologies and systems his customers need. For example, they decided to distribute water heaters and not just HVAC equipment. The impetus for the change came from hearing that installers were losing time/money making multiple stops for equipment rather than completing jobs. By adding water heaters to their stock, they were able to reduce the number of trips installers needed to make to pick up equipment for their day's work.

> "[We] want to be the type of organization that if there is anything new in the market that can help our contractors be more profitable or save labor, we want to be the ones to help [them] understand that... that's really our role, is to help them be more successful in business and do a better job."

John's position on customer service heavily influences the types of equipment he stocks. He is highly selective about the types of equipment they stock—just because a manufacturer presents it to them does not mean they start offering it. John understands how strapped the current HVAC labor force is and primarily looks for equipment that is reliable, high quality, and easy to install to make his customers' lives easier.

> "There is a massive shortage of labor right now...what we really look for are things that save our contractors time and labor so that they can get more jobs done...We try not to promote products that are going to zap them of a lot of time...Anything that we're promoting should be efficient, have the least amount of impact on their labor pool, and it should make life easier for them."

John is also a big believer in training his installers as a means of making their lives easier and businesses more successful because it will ultimately benefit him as their distributor. John provides an array of trainings from installation to business management and sales. John sees sales training as key to getting more efficient equipment installed because it teaches installers how to do a "needs analysis" with the homeowner to find the best solution for their home.

> "Our opinion is [higher efficiency installations] have everything to do with the contractors' sales professional interviewing the homeowner to find out what key things they're concerned with. It's up to the contractor to do the needs analysis with the homeowner to find something that fits their want list. That's how we help contractors because otherwise they're just selling whatever the hell they want...Our opinion is as you walk someone up in efficiencies so should your gross margins increase."

3. KEY THEMES AND FINDINGS

We had the opportunity to discuss many different topics while riding along with installers, having conversations with distributors at their warehouses, and dropping in on installers at their shops. We overwhelmingly heard the importance of relationships and service in the industry. Without those relationships, people reduced their description of the industry to 'moving boxes' around. This section describes the themes that we heard while talking to installers and distributors.

Preserving Reputation Motivates Installer Decisions

Installer decisions around equipment offerings and the projects they accept are driven by the need to preserve their reputation and to ensure that they are not wasting time and money on call-backs.

INSTALLERS WANT TO REDUCE CALL-BACKS

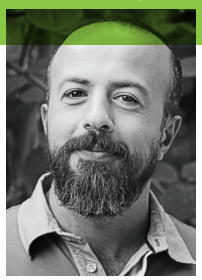
Above everything else, each installer we spoke with emphasized that they do not want call-backs to deal with an issue related to the equipment they installed. As such, installers sell products and systems that they are confident they can install properly and will not require them to make a return trip for service or repair. If a service or repair visit is necessary, they want a distributor they can rely on to provide the service and support needed to address the issue quickly and cost-effectively. The two main driving factors behind this are time and money, and reputation.

Time and money: Installers will guarantee their work for a certain amount of time (we heard a range of times from 90 days to a year). When an installer is called-back during that guaranteed labor period, they do not make any money on those service calls and miss money-making opportunities with other customers. This is especially problematic for smaller companies with tighter margins.

Reputation: An installer's reputation is vital to their success since, for many installers, word-of-mouth is their primary marketing strategy. In a time where customer reviews are accessible across many different platforms, installers are keenly aware of the negative impacts to their business associated with poor customer experience. Therefore, installers select reliable brands and equipment because issues reflect poorly on their business.

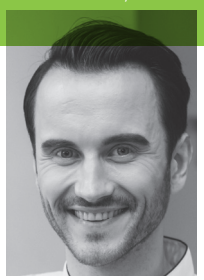
"Well, it comes back to that time constraint. Every piece of equipment has its nuances and so you have to learn those—sometimes [you are] going back and fixing the thing you didn't catch in the directions. So, there's some friction, choosing to do another brand is going to cost you. So, once we're kind of doing something we're kind of slow to switch."

TIM
MEDIUM INSTALLER
BELLINGHAM, WA



"I've gone to Grand Cooley, which is an hour and a half drive. I don't like to do that because...once you start working on something customers think, 'Okay, he worked on it so now if there's another problem I can call him back and he'll come fix it'. So, sometimes it's my fault and sometimes it has nothing to do with what I did."

LARRY
SMALL INSTALLER
SPOKANE, WA



"Sometimes companies will say things to build your trust...I'm a competitor so they'll say whatever they want to say to make me look bad."

BALANCING RISK AND REWARD OF A JOB

Most installers we spoke with described some form of a 'risk and reward' assessment for each job they come across. The primary factors they consider include (1) the likelihood that they will have to return to a job site, and (2) the amount of support they will receive from the manufacturer and distributor. Based on the research we have conducted thus far, there appears to be an inverse relationship between an installer's size and how established they are and how much risk they are willing to assume on a job.

Smaller installers, like Pete, who are trying to grow their business and forge new connections, might be willing to install an unfamiliar brand of equipment because a customer wants it and he does not want to pass up a potential job.

Larger, more established installers, like Tim or Cameron, will back away from a job if it does not align with their business offerings. If a customer wants a piece of equipment that they do not offer, they will tell the customer to look elsewhere.

Installers approach each house like a puzzle—they need to find the equipment that not only fits into the available space but also meets their customer's needs.

When making customer recommendations, installers need to understand and meet the specific needs of their customer while also working within the confines of the household layout to accommodate venting and gas connections. This can provide both opportunities and challenges for more efficient equipment.

The smaller footprint of efficient natural gas furnaces, relative to older, less efficient equipment, benefits both installers and customers. First, it can lead to a more seamless switch when fitting into a space formerly occupied by larger equipment. This presents installers with more opportunities to meet the needs and wants of their customers without being constrained by space. For example, with the increase in central air conditioning installations in the North-west, some installers have used this as a selling point for higher-efficiency furnaces because there is more room available for the indoor evaporator coil if the customer decides to install central air conditioning in the future.

On the other hand, configuration and size of the gas line can present barriers to installers recommending more efficient water heaters, like tankless systems, mostly because the unit cost is prohibitive and can be even more expensive if a larger gas line needs to be run to the home. One distributor in Portland noted that tankless systems do get installed in some older homes, newly-constructed home additions, and houses that are tight on space, but like-for-like replacement is still the most common.

"What's driving what [installers] are purchasing is ease of install. 'How much am I going to have to work at this?'...We have a very small cabinet [furnace] and now the guys are doing easier installs, if they just need to change out the PVC...That's why we do a lot of 96%, they have a shorter frame now, so they can go into those old bodies, or if we want to add a coil, now we don't have to worry about where am I going to put all of it...cabinet size is really a big factor here...[Installers] aren't sheet metal workers anymore. They don't want to make a modification [to the room or equipment]."

AMY
MEDIUM DISTRIBUTOR
PORTLAND, OR

Relationships Drive the Industry

Distribution centers serve as hubs of activity that go beyond "moving boxes" of equipment. They facilitate the service-orientated relationship between installers and distributors and act as a gathering place for installers to converse over a cup of strong coffee.

The distribution facilities we visited bustled with activity throughout the day as installers came and went to pick-up equipment for their jobs. Some distributors have photos on the wall from hunting and fishing trips with their installers, and all distributors seem to have coffee and doughnuts available throughout the day.

Distributors compete with each other through the services and support they provide installers more than the products or 'boxes' they carry, which holds true in both urban and more rural areas. Installers rely on distributors to provide technical and warranty support, training on new equipment, job support, and trouble-shooting on equipment issues. A big part of the risk calculation that installers consider when selecting equipment relates to the level of service and support they will receive from their equipment distributor should an issue arise.

INSTALLERS' SIZE INFLUENCES HOW AND WHEN THEY INTERACT WITH DISTRIBUTORS

The smaller installers we spoke with, like Pete, made more frequent, daily trips to the distributor to pick up equipment and replenish their truck supplies. They primarily interact with the staff at the front counter of the distribution center, who help them identify the materials they need and order equipment. These interactions cultivate more informal relationships between installers and the counter and warehouse staff at distributors. When smaller installers need trainings, they go to the distributor.

The larger installers we spoke with, like Cameron, tend to have their own warehouse with supplies to keep their trucks fully stocked to minimize the time their technicians spend making trips to the distributor. Distributors will also arrange trainings to be conducted at these installers' facilities to accommodate the large number employees attending. Management at the larger installers may have more formal, in-house meetings with management from the distributor to discuss inventory needs, equipment delivery schedules, and new equipment options. In some cases, the distributor will also deliver equipment daily to the installer's shop because of the large volume of equipment they install. These interactions create more formal, strategic business partnerships between management at the installer and distributor, in addition to personal relationships developed over the years of working together.

Distributors serve as hubs of activity and meeting places; NEEA could consider exploring partnerships or outreach with distributors to reach installers.

"When we first got into the tankless business, we were a Noritz distributor…it quickly frustrated us because, as a Japanese company that didn't have a lot of market share in the US, they didn't understand the American consumer or distributor. They didn't understand how to market their products. They didn't understand how to support us as a distributor who knows our contractors and what their expectations were so after two years of frustration with them, we cut bait."

JOHN
LARGE DISTRIBUTOR
SEATTLE, WA

"Some of my vendor partners are better than other vendor partners. If they're in here and they're getting my attention about the right things and they're supporting and motivating me to move in that direction…If they make my life easier then I obviously do that."

AMY
MEDIUM DISTRIBUTOR
PORTLAND, OR

Distributors cultivate relationships with and expect the same high level of service and support from manufacturer and third-party agency representatives as they provide to installers.

RELATIONSHIPS WITH MANUFACTURERS

Just as distributors focus on their level of service to installers, distributors expect manufacturers to provide that same quality of support and services to them. For distributors to provide high quality service to installers, they need trainings, resources, and marketing support from the manufacturer. If a manufacturer does not provide that support, distributors will promote a brand that does, or they will simply cut ties with that manufacturer and stop selling their products.

This came up frequently when discussing tankless water heater brands with distributors. Since tankless systems are a relatively new technology, it is especially important for distributors to support their installers with service and installation troubleshooting as well as sales support. This also ties back to the fact that neither installers nor distributors want call-backs to a job. Having the necessary support and resources from manufacturers is a key way for distributors to mitigate improper equipment installation, call-backs, and processing warranties.

RELATIONSHIPS WITH THIRD-PARTY AGENCIES

Third-party agencies help facilitate the relationship between distributors and manufacturers by providing technical support, sales and marketing support, and trainings. Third-party agencies operate independently from a manufacturer but represent various brands and equipment lines. Third-party agencies are primarily involved in selling water heaters and the ancillary parts and supplies for HVAC systems, but they do not typically work directly with the actual HVAC units. The reasons behind this structure are unclear and should be explored further in future research. The quality of support from these agencies can impact which products a distributor sells and promotes because it makes the distributor's life easier.

"The buying group has this big conference…they partner you up with same size or similar companies throughout the United States and you all sit in this room and they give you this list of questions like 'How are you doing on your inventory? How do you deal with your employees?'… then we share, and so then we're all on the same page… And then we do speed dating for two days and you get 15 minutes in front of [whichever manufacturer] you choose."

CLARISSA
SMALL DISTRIBUTOR
PORTLAND, OR

"It has to do with ideas sharing relative to what parts of your business are moving forward quickly in terms of sales, what types of challenges are you having —is it the availability of labor, how are you finding people, are you having insurance challenges because of accidents, what type of trucks are you using…we just talked about all those things that can influence an independent wholesaler."

JOHN
LARGE DISTRIBUTOR
SEATTLE, WA

RELATIONSHIPS WITH BUYING GROUPS

Across both equipment types, each distributor we spoke with noted their participation in distributor networks known as buying groups (also known as marketing cooperatives or purchasing alliances). The focus of these buying groups is two-fold:

1) Leverage the purchasing power of a large number of independent distributors to get discounts and rebates from manufacturers on equipment and parts, as well as obtain training resources and marketing materials. However, HVAC manufacturers do not negotiate pricing with buying groups on the actual HVAC units. HVAC distributors primarily use the purchasing power of these groups to buy ancillary parts and supplies, such as thermostats. Buying groups that negotiate with water heater manufacturers are typically able to get product rebates.

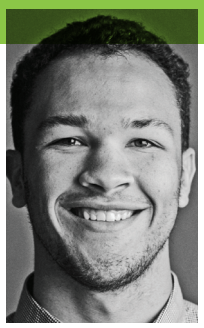
2) Provide distributors the opportunity to discuss business strategies and share ideas with non-competing businesses. This can include a range of topics from stocking practices to hiring strategies and even the type of distribution trucks to use.

Third-party agencies and buying groups are important resources for distributors; NEEA could consider leveraging these market actors to provide novel opportunities to impact the water heating and HVAC markets.

"Typically [HVAC] manufacturers are not part of buying groups, so you won't find Carrier or Trane…they don't participate in those things. The hot water heater guys do, some tankless companies do, but most of the participants in the buying groups from the supplier or manufacturer side are everything else other than [HVAC] equipment."

"What you find is that anything in construction or trade industry right now is lacking on labor... I think high schools have gotten away from teaching these kids to work with their hands. They've taken automotiveshop, wood shop, all these activities are sometimes taken out of the high school system now. They are pounding down 'You gotta go to a four- year college'."

CAMERON
LARGE INSTALLER
SEATTLE, WA



"The guys that are complaining the most about something being wrong are always the one that have never taken the classes. I say, 'Hey, I have this class. I really think it would benefit you. You had this problem on this job. Please come because you need it.' They're like, 'I know, I know, I know'...Unfortunately, when I did the majority of my classes it ended up getting hotter sooner. That's what happens. They don't care to see me if the phone's finally ringing."

AMY
MEDIUM DISTRIBUTOR
PORTLAND, OR

Finding Qualified Workers is a Challenge for the Industry

Across the board, installers are stretched thin. Their schedules are booked out for weeks and they are shorthanded because there is a shortage of qualified labor in the industry.

POTENTIAL CAUSES OF THE LABOR SHORTAGE

Nearly every distributor and installer commented that the labor shortage is primarily due to a lack of young people joining the industry and is tied to a cultural devaluation of trade work. They believe that negative attitudes about not going to college are leaving the steady, good paying jobs that exist in the trades unfilled. Both installers and distributors commented that students are not getting as much exposure to trade work because high schools are primarily promoting four-year colleges as an option to students and cutting extracurriculars that expose students to various trades.

This is especially frustrating and disparaging to installers because they take pride in their knowledge of these complex systems and their ability to "puzzle" through homes to find solutions to people's problems. Installers know how important their work is to maintaining people's quality of life, which makes it even more aggravating and painful when they see the devaluation of their industry in the broader culture.

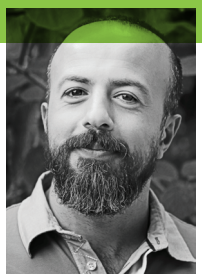
The current labor shortage has placed a strain on the entire industry; when considering interventions, NEEA should recognize the limited time and resources installers have for trainings and consider strategies to funnel more qualified workers into the industry.

LABOR SHORTAGE IMPLICATIONS

The shallow labor pool has also sparked more competitive hiring practices among installer businesses. Skilled installers and service technicians are being poached by other companies who offer more money and/or benefits as an incentive to make the move. The high employee turnover rates can create instability for businesses and further exacerbate wait times for customers.

"I probably will [sell high efficiency equipment] unless I think that there's no point. Sometimes I make a judgement call just based on the customer....I'm not going to lose money in any of [the options] that I'm giving them, but I'll certainly make less money on one [80% efficient] ...I'm just going to do the right thing."

TIM
MEDIUM INSTALLER
BELLINGHAM, WA



"These guys, they don't want to deal with that stuff. These are plumbers, not computer chip guys."

– Tony, Small Distributor, Tacoma, WA

Continued education and training are important for installers to become more familiar and comfortable with new, higher-efficiency equipment, and to develop their sales and business management skills.

Distributors identified the labor shortage as a barrier for installers to receive the continued training they need to learn about new equipment, improve sales skills, and manage their businesses. All the distributors we spoke with offered regular trainings for installers, but they expressed that it can be difficult to get them to attend because of the time and financial investment, especially in the summer and winter when business picks-up. Distributors are proponents for continued installer trainings because many have observed that the installers who do attend their trainings tend to have fewer issues with equipment and more stable business structures.

Most distributors, and a few installers, noted the importance of sales skills when it comes to selling high-efficiency equipment. Distributors identified that installers who have either attended sales trainings or have a natural knack for sales tend to be successful in moving higher-efficiency equipment because they are not afraid to ask if customers are interested.

Ongoing equipment training is also important to increase installers' familiarity with new equipment, such high-efficiency furnaces and tankless water heaters. Equipment trainings provide installers hands-on training so they know how to properly install the equipment and troubleshoot any issues.

Equipment familiarity is one of the barriers for tankless water heaters. Overall, the current sentiment around tankless water heaters among most installers is that "the jury is still out." Many installers, plumbers included, regardless of size, had a high perception of risk when it came to the installation of tankless systems, and were concerned that they would be called back to a job. This, in part, stems from the fact that many installers are less familiar with the technology and the installation nuances between water heater brands. Several installers described common issues with tankless systems involving 'error codes' or internal computer components that they did not know how to address. This influenced those installers' view on tankless systems and their willingness to promote the technology. Equipment trainings can be one avenue to help ease installers' perceived risk with tankless by making the systems more familiar.

High efficiency furnaces are not met with the same perception of risk that some installers associate with tankless water heaters for two reasons: (1) the equipment is more familiar, and (2) installers rarely view converting to a higher efficiency system as burdensome. The decision to install a high efficiency furnace often comes down to the specific customer and their circumstances. Most installers try to understand the customer's situation and needs, which they then use to inform their sales approach.

Continued training may help installers become more familiar with newer technology and better salespeople, resulting in more installations of higher-efficiency equipment. NEEA could consider providing support or incentives to make training more accessible from both a time- and cost-commitment standpoint.

Appendix A. Research Questions & Responses

As discussed in the introduction to the report, this study started off with a set of specific research questions. During our research, we took a different path and uncovered other findings we believe are more pertinent (included in the body of the report). We provide these high-level responses to the study's original research questions to share additional information we learned along the way.

Table 1 includes a list of the detailed research questions. There are several customer-focused research questions that we intended to answer through the interviews with customers. Our research approach shifted, in consultation with NEEA, to include a more in-depth study of distributors and less in-depth study of customers than initially scoped. Consequently, we did not gain sufficient data around the customer experience to answer all the customer-focused research questions, but were able to provide installer insights into the customer experience. We have italicized those questions we did not address, and we have included some suggestions for future research activities.

Table 1. Research Questions

RESEARCH QUESTIONS
Objective 1: Understand the decision-making process for installations of water heaters and HVAC systems
1. Why do customers choose to install a water heater or HVAC system?
2. When do customers choose to install a new system? – This question was not answered by the research conducted
3. What is the typical first contact customers have with installers? How do they identify and contact them?
4. How do decisions differ when customers make an emergency replacement compared to a planned one?
5. What factors do customers consider when making purchase and installation decisions?
a. Who initiates the discussion of efficiency level?
b. What information and recommendations about energy efficiency did the installer provide?
6. What influences or informs installers' product recommendations?
7. Which group (plumbers, HVAC installers, or HVAC + plumbers) is most successful at sales of efficient units and units overall? Why? – This question was not answered by the research conducted
Objective 2: Understand the dynamics of the supply chain
8. Who are the major players in the water heater and HVAC supply chain?
a. What systems are in place to ensure proper equipment installation?
b. What do consumers know about the value of proper equipment installation?
9. How do installers and distributors communicate their needs? Interact?
10. With whom do installers interact in the supply chain? Why do they interact?
a. Do manufacturers and installers ever work with each other directly? In what cases?
b. What is the role of developers or builders in the HVAC supply chain?
c. Do different installer types exist among HVAC installers as they do in the water heating supply chain? If so, do the different types impact interactions with the supply chain?

RESEARCH QUESTIONS
11. What influences distributors' stocking and promotion practices?
a. How does installer size and location (urban/rural) affect installer access to distribution networks, and, therefore, access to efficient equipment?
b. To what extent are buying groups, marketing co-ops, and purchasing alliances present and to what extent do these groups interact with the supply chain and influence purchasing decisions?
12. What influence do installers have on the supply chain as a whole? Their direct connections?

Objective 1: Understand the decision-making process for installations of water heaters and HVAC systems

The research the ILLUME team conducted was primarily with installers and distributors. Only a few customers were included in the sample. Many of the following responses, therefore, represent the installer and distributor perspective on customer behavior and decision-making and may need further refinement through additional customer research.

Research Question 1: Why do customers choose to install a water heater or HVAC system?

Customers call installers because:

- They want their equipment to be serviced or they have an annual maintenance contract.
- They hear a noise coming from their equipment or notice something is not working properly and call an installer to check the equipment.
- The equipment has stopped working and they need it fixed.
- They are planning a renovation.

Customers choose to install because:

- It is not worth repairing their existing equipment because of the equipment age and/or the repair cost.
- The system is condemned or irreparable (e.g., heat exchanger cracked, boiling hot water in garage).
- The customer is renovating or remodeling their house.
- The customer desires a new top-of-the-line piece of equipment. *Note:* this is not common.

Research Question 3: What is the typical first contact customers have with installers? How do they identify and contact them?

According to the installers we interviewed, the vast majority of interactions between installers and customers begin with a phone call. A customer typically calls an installer when their equipment is malfunctioning or has completely stopped working. Customers rarely call an installer before their equipment fails or malfunctions unless they are planning to remodel. When they do, it is usually because of dissatisfaction with noise, comfort, high energy bills, or concerns around the age of the equipment.

With the customers we spoke with, we observed that some conduct general research to gain a basic understanding of equipment types and pricing.

Installers noted that most customers find out about them via word-of-mouth and will conduct some research on the installer by reading reviews on sources like Yelp, the Better Business Bureau, and Angie's List.

Research Question 4: How do decisions differ when customers make an emergency replacement compared to a planned one?

Installers reported that most HVAC replacements are done in "emergency" situations where the unit unexpectedly fails. That said, customers still will consider their options and go through a similar process as those doing a planned replacement, especially during the shoulder seasons and when temperatures are mild. In winter, the urgency to install a new furnace may have a greater influence on the customer's decision-making. Future research should explore this topic from the customer's perspective.

In the case of water heaters, customers are also typically replacing their equipment when it unexpectedly fails, but they want their equipment replaced as quickly as possible year-round. Some installers noted that customers who replace their water heater before it stops working are more willing to consider a tankless water heater. This is most likely due to the fact that that these customers were already interested in a tankless system prior to meeting with the installer, rather than anything to do with product availability or the installer's recommendations.

Research Question 5. What factors do customers consider when making purchase and installation decisions?

Customers will consider:

- **Installer recommendation** – This is key when customers are deciding what equipment to install. Customers see installers as the expert and rely heavily on their recommendations.
- *Equipment Cost* – This is an important consideration for customers. Some customers have a more restricted budget, which limits the equipment they can afford to install. Customers with more flexible budgets may justify more expense to invest in a system that will last and fit their needs.
- Installers and distributors often commented that an HVAC system is the third largest purchase a person will make in their lifetime, behind purchasing a home and a car.
- **Urgency of replacement** – Water heater replacements are generally more urgent than heating/furnace replacements.
- **Value of installer** – Some installers, especially those with a strong sales team and reputation, are able to charge a bit more because they can also sell the added value and trust associated with their brand. Even though the customer might pay a bit more for the equipment, that higher cost includes the peace of mind that it will be installed properly, the equipment and work is warrantied, and they will receive quality service.
- **Energy Efficiency** – there is a growing awareness of the importance and value of energy efficiency among the average consumer, but equipment cost can sometimes be a barrier to customers purchasing higher-efficiency equipment. The installer's sales skills and availability of utility rebates can help push customers to purchase the higher-efficiency equipment.

- **Value of non-energy benefits** – Generally, customers are interested in the reliability and durability of a product. Some customers do end up installing higher-efficiency equipment because of the non-energy benefits, including greater comfort control and system noise with variable speed systems and the instant/unlimited hot water with tankless systems.
- **Fuel cost –** Moving to a higher efficiency level might not make financial sense given low fuel costs, especially if the customer is planning to move in the near future.
- **Expected time in home –** We heard that if a customer was planning on living in that home for more than five years, they might be more inclined to choose higher efficiency equipment. People who have plans to move in the near future are more likely to choose lower efficiency equipment because they will not see the payback. This is especially true in cases where the home is being sold and part of the sale deal is for a new system to be installed – as one installer quipped, "not my house, not my problem." There is a similar decision-making process that occurs with rental properties.
- **Equipment familiarity –** Equipment familiarity is not a huge driver, as most customers are not aware of what equipment they have before it needs to be replaced. Though installers noted that, if a piece of equipment has lasted a particularly long period of time, some customers just want the exact same piece of equipment that they had.

Research Question 5a: Who initiates the discussion of efficiency levels? Who drives the demand for more efficient equipment – installer or customers?

This varies significantly on a case by case basis and can be driven either by installer type/sales proficiency or baseline knowledge and specific customer desires. At any rate, efficiency is but one of the many factors installers and customers consider during the equipment decision-making process.

Most installers will provide customers with a tiered set of options that start with a low-cost, baseline efficiency unit and then increase in cost and efficiency. Installers present these options to customers and answer any customer questions. In cases where the customer asks for the installer's recommendation, the installer asks clarifying questions to better understand the needs and wants of a customer including their budget and the importance of benefits like an even temperature distribution throughout the house, the noise-level of the unit, and its efficiency. Installers noted that these non-energy benefits (unit noise-level and household comfort) can be important drivers to push customers towards higher-end equipment.

Some installers in the region hold the personal belief that these days, all equipment is efficient, especially compared to systems in the past. Additionally, installers noted that energy prices are so low that the money customers save by moving up in efficiency does not offset the higher cost of the equipment. That said, installers still talk customers through all of their options and try to help them make the best decision for their particular circumstances. Some installers noted that utility rebates can help close that price gap and move people toward more efficient equipment.

Research Question 5b: What information and recommendations about energy efficiency did the installer provide?

We observed limited direct sales interactions between installers and customers (one mid-size company and two large companies). Generally, installers give customers several options on equipment. As one installer put

it, "With an 80% furnace, 80% of your money is getting turned into heat. With a 95% furnace, 95% of your money is getting turned into heat." Some have brochures and provide customers with a lot of information on the type of equipment they are recommending.

Anecdotally, we heard from some distributors that the discussion of efficiency is often dependent on the sales skills and knowledge of the person interacting with the customer. Some contractors might not ask about how important efficiency is to customers (especially in emergency situations) and they end up with a like-for-like replacement. Installers with a more dedicated salesperson or sales-savvy technician can better gauge the importance of efficiency to the customer, along with comfort, noise, or other non-energy concerns that are remediated by a higher efficiency unit, and these more sales-savvy technicians may be able to sell them a more efficient system.

Research Question 6: What influences or informs installers' product recommendations?

- **Fuel type –** Gas versus electric is the primary factor an installer will consider when recommending equipment. Some utilities do offer significant incentives for fuel switching, but this is usually only considered with large-scale remodels. Fuel switching would likely not be considered in an emergency replacement situation.
- **Brand affiliation –** Most installers are loyal to one or two brands. Brand loyalty and brand familiarity is largely driven to ensure proper installation and reduce the number of callbacks. Several installers noted that they are hesitant to install equipment that is not part of their normal portfolio because there can be subtle installation differences that may result in callbacks. Likewise, installers typically are not willing to install equipment that the customer purchased themselves because they do not want to be held accountable if the equipment is not of as high a quality as the equipment the installer would normally get from the distributor.
- **Household configuration –** Specifically, location of equipment within the residence, equipment size (dimensions and capacity), and the size of the gas line.
    - The location of the equipment within the residence impacts venting. However, it is unlikely that this alone would ever prevent the installation of a high-efficiency piece of equipment.
    - The physical dimensions of equipment and equipment location also impact the type of equipment that can be installed. One water heater distributor said that this is particularly important with water heaters because some have been redesigned to be more stout than tall, which can make it difficult to fit into the same space as the old water heater. This is less of an issue with high efficiency furnaces, which tend to have a smaller footprint than older furnaces.
    - The size of the gas line impacts the amount of work an installer must do and, therefore, the overall project cost. This is primarily a consideration when installing tankless water heaters. For some installers, the need to re-size the gas line will automatically eliminate tankless as an option that they are willing to install.
- **Desire for cooling** – More often than ever before, customers in the Northwest are considering cooling options in their homes. There are two main approaches we heard from installers to accommodate customers' increasing interest in cooling options:

- An electric heat pump paired with a baseline efficiency furnace – The theory is that the heat pump is able to accommodate the majority, or all, of a household's heating needs. The baseline furnace is only used as a back-up system in extreme cold. The rarity of these events justifies the low-cost, low-efficiency option.
- A higher-efficiency furnace with space for a cooling coil – This approach allows the system to be "AC-ready" so that whenever a customer decides they want or can afford to add AC, the cooling coil can be easily added to the system. This is the preferred approach for customers who are replacing a furnace and like the idea of having the option to add AC at a future date.

- **Customer constraints/circumstance** – This includes finances, expected time in the home, and urgency to replace the system.
  - Finances are a key motivator, though we heard from multiple interviewees (installers and distributors) that some installers will assume that a customer is unwilling to spend the money for a more expensive, high-efficiency unit. One distributor commented that these installers project their own "cheapness" onto the customers and may inadvertently miss an opportunity for a bigger sale.
  - Expected time in home impacts the allowable ROI a customer is willing to consider.
  - Urgency to replace the system is more of a concern with water heaters than with HVAC units. There is a seasonality to the urgency of repairing or replacing HVAC systems (e.g., if it is extremely cold the urgency increases). With water heaters, there is a high sense of urgency year-round because there is a greater impact on people's day-to-day lives when they do not have hot water.
- **Local/state codes**
  - This is primarily a consideration with new construction projects where the state and local energy codes require certain efficiency levels on equipment or that a number of energy credits are achieved.
- **Rebate opportunities**
  - Different utility jurisdictions have different rebate opportunities. Some installers will suggest certain products based on the available rebates. Installers commented that these rebates are helpful in moving people to higher-efficiency systems, especially if the customer has budget constraints.
  - Installers typically had a general awareness that utilities offered rebates, but some installers were more aware than others.
- **Familiarity with equipment or technology**
  - This is especially important when it comes to tankless water heaters. While HVAC equipment has steadily evolved over time, the basic technology behind a conventional water heater has not changed much in the last 100 years. Some installers have an

aversion to tankless technology because it is perceived to be a complicated piece of technology that they may not be able to fix if something were to go wrong.

- One distributor described that, in order to push more tankless systems and increase installer familiarity with the equipment, she provided a hands-on training where installers could look inside the equipment to better understand the inner workings.

- As stated above, HVAC equipment has steadily evolved over time, so that even the newest, highest efficiency equipment is not drastically different from the baseline efficiency units. The main notable difference is the use of PVC piping for ventilation and condensation drains, which is not perceived as an installation barrier.

Objective 2: Understand the dynamics of the supply chain

Research Question 8: Who are the major players in the water heater and HVAC supply chain?

Please refer to *Appendix D. Theorized HVAC & Water Heating Equipment Supply Chain* for the major players in the supply chain.

*While we did not speak to any retailers directly, we did seek information on their role in the HVAC market through discussion with other market actors and research of retailer websites***.**

Retailers (Home Depot, Lowes, etc.) are becoming increasingly involved in the residential HVAC market. Contingent upon the brand, customers at these stores have two options: 1) Purchase a piece of equipment and find an installer on their own, or 2) purchase a piece of equipment and select an installer through the retailer's network of certified installers. Some brands do not allow consumers to directly purchase equipment from the retailer without first receiving in-home consultation from a certified installer. These brands may also employ representatives in-store to directly interact with customers on behalf of the manufacturer. Other brands do not appear to enforce restrictions on sales direct to customers.

The distributors and installers we spoke with had a negative perception of retailers' growing presence in the market because they think the retailer products are inferior quality to those sold through distributors. Some participants referred to the "Home Depot line," which is where manufacturers sell retailers a product that looks identical and has the same specifications as the wholesale distributors' equipment but is made with plastic components instead of metal. These products are indistinguishable to consumers and are offered at a lower price-point than is available through an installer or distributor. Many installers will not install equipment from a retailer, and if they do, they will not guarantee their work because they are not confident in the quality of the product.

Research Question 8a: What systems are in place to ensure proper installation?

The four key precautions to ensure proper equipment installation are:

- **Equipment sales only to licensed installers (HVAC only)** – HVAC distributors cannot and will not sell to unlicensed HVAC installers or to consumers. This helps to ensure that any piece of equipment that leaves an HVAC distributor will be installed by a qualified, licensed technician.

- This protection does not exist in the water heater market, where customers are able to purchase water heaters directly from a distributor. Customers are also able to purchase HVAC equipment through retail stores (Home Depot, Lowes, etc.), though several installers detailed how they will not install this equipment for customers as it leads to too many problems.
- Unlicensed installers are able to acquire equipment through other means, for instance, through retail stores or through connections to licensed installers, and then enter the market. Unlicensed installers will offer low prices, but usually will not warranty their work or leave certain indicators that might enable another technician or the customer to identify them down the road if an issue emerges. Typically, licensed installers will leave a sticker on the equipment along with an installation/service log to record the issue and what was done to the equipment. The absence of a sticker or service log *may* indicate the installer was not licensed.

- **Ongoing equipment trainings** – Every distributor (HVAC and water heater) offers training to their installers concerning proper equipment installation and service practices. The frequency and scope of these trainings varies by distributor but are relatively proportional to the size of distributor (larger distributors offer more frequent trainings and smaller distributors offer trainings as requested by installers). Typically, distributors charge for these trainings. Some distributors believe in providing training free of charge because it is in their best interest to have customers who are properly installing equipment to reduce the number of warranties being processed and time spent resolving avoidable issues.

- **Access to technical expertise** – There are a several avenues by which installers can access technical expertise: manufacturer representatives, field service reps, technical representatives, and third-party representatives.
  - Manufacturer representatives – Every manufacturer maintains a technical support line that installers can call to receive direct over-the-phone technical support. Installers typically use this line as a last resort while in the field trying to resolve an issue, because hold times can be long, and they do not have the same rapport or relationship with the manufacturer as they do with their distributor.
  - Field technical representatives – Technical representatives are designated by a manufacturer as the regional expert of a specific brand, product line, or equipment model. They operate independently of the manufacturer and are often an installer or someone within a distributor. They are the regional expert for all questions and issues that installers in the territory may have for a given piece of equipment. When necessary, they will go into the field and work directly with the installer to solve the issue.
  - Field service representatives – Field service reps are employees of mid-sized and large-scale distributors who have been trained by the manufacturer(s) to provide technical support exclusively for that distributor's customers. Much like the manufacturer's technical reps, they are the experts on their specific brand, product line, or equipment model. They are employees of the distributor and operate independently of the manufacturer. This is an added value provided by distributors – if installers have an issue with equipment, they do not need to wait on hold for the field technical rep or the

manufacturer to get support. The installer can simply contact their local distributor in-person or over the phone.

- Third-party representatives – Third-party reps are stand-alone representatives of a line of brands or equipment that operate independently from any manufacturer or distributor. They are primarily involved with water heaters (specifically tankless) and the ancillary parts and supplies for HVAC systems, but they do not work directly with the actual HVAC units. These representatives are experts on the products they represent, and installers can call on them when they have issues or questions. Additionally, they support the industry by conducting trainings on behalf of manufacturers.

- **Business-specific precautionary measures** – Depending on the specific business, installers may utilize either installation checklists or quality control (QC) checks conducted by a lead technician or manager.

Research Question 8b: What do consumers know about the value of proper equipment installation?

Based on our limited customer interactions, customers seem largely unaware of what is involved in the proper installation of equipment. From the customer perspective, if it works then it was installed properly. Customers see installers as the expert, and they rely on them for recommendations and expect them to do the job correctly.

One large-scale installer we observed commented that approximately two in ten installers conduct heat load calculations on homes to properly size a furnace. When submitting a bid for a job, he would ask the customer to show him the heat load calculation that the other company(s) conducted. Customers reportedly never knew what he was talking about as they were never conducted.

Research Question 9: How do installers and distributors communicate their needs? Interact?

The distributor is the main touchpoint for installers and serves as the hub of activity (especially for smaller installers who may make multiple trips daily) and support for installers in the field. Distributors get installers the equipment they need, provide technical support, help ensure they have all the ancillary parts they need to install the equipment, and provide training – including technical, sales, and business trainings.

Research Question 10: With whom do installers interact with in the supply chain? Why do they interact? Research Question 10a: Do manufacturers and installers ever work with each other directly? In what cases?

Installers do not often interact directly with manufacturers. They will sometimes call manufacturers for technical support, but generally prefer to work with their local distributor because manufacturers can be difficult to reach due to long hold times and they are not nearby. Installers call manufacturers when they have tapped their resources at the distributor (e.g., the distributor has attempted to troubleshoot the issue and failed).

Some installers will also interact with third-party manufacturer representatives and agencies, though the nature of these relationships is not yet fully understood and should be explored further in future research.

Research Question 10b: What is the role of developers or builders in the HVAC supply chain?

Based on our conversations with installers, developers and builders interact with the supply chain in a similar way to customers. Some may have purchase agreements with certain manufacturers to install their products. Installers are then hired by developers and builders to put in the equipment. Additional research needs to be conducted to more fully understand their role in the supply chain.

Research Question 10c: Do different installer types exist among HVAC installers as they do in water heater supply chain (independent/franchise/distributor)? If so, do the different types impact interactions with the supply chain?

In the literature review, we identified three installer types among water heater installers: independent, franchise, and distribution. During this research, we spoke only with independent installers and one water heater installer who also served as a small-scale distributor. Given that we observed no difficulty accessing equipment or distribution among independent installers, we theorize that franchise installers would not face any such difficulty either.

Research Question 11: What influences distributors stocking and promotion practices?

Distributors stocking and promotion practices are largely driven by installer demand. Essentially, distributors stock what they know they can sell. Beyond this simple distinction, there are other outside factors that influence stocking practices and equipment marketing.

- **Third-Party Agencies:** Depending on the specific arrangement, representatives for these agencies may have sales quotas for a given time in a specific region (we did not speak with any third-party agencies directly and thus cannot provide these specifics). One of the smaller water heater distributors we spoke with had recently offered a promotion (discounted price) on a specific tankless water heater brand that had been negotiated through the third-party agency.
- **Buying Groups:** When buying groups negotiate large purchase orders, this can sway individual distributors to stock a specific brand or equipment.

Research Question 11a: How does installer size and location affect installer access to distribution networks and access to efficient equipment?

Installer size does not affect access to distribution networks or access to efficient equipment. So long as an installer is properly licensed (HVAC), they have access to any distributor they choose; everyone, regardless of licensing, has access to water heater distribution. While installer size does not affect access to distribution networks or equipment, it does impact the nature of the relationship between installer and distributor. Smaller installers may need more assistance through project scoping and design (with equipment selection and installation specifics), while larger installers tend to have more of a partnership with distributors.

Location plays a bigger role in the access to distribution networks and efficient equipment than installer size, but generally that impact is minor. If there is any wait time for equipment, it is typically no more than 24-hours. At any rate, these considerations seem to affect the availability of large commercial equipment more than individual residential units, as each distributor maintains a robust stock of all equipment that frequently turns over.

Research Question 11b: To what extent are buying groups, marketing co-ops, and purchasing alliances present, and to what extent do these groups interact with the supply chain and influence purchasing decisions?

Each distributor we spoke with confirmed their company's participation in a buying group and that they are important resources for distributors in both the HVAC and water heater markets. For both technologies, they offer distributors opportunities to share business information and strategies with non-competing companies from across the country or region. Water heater distributors can also leverage their buying power to negotiate with manufacturers on purchase agreements. The full scope of buying groups' influence in the HVAC and water heater markets should be explored further.

Research Question 12: What influence do installers have on the supply chain as a whole? Their direct connections?

Installers have a strong influence on the supply chain overall because they are the link between the consumer and the rest of the market. Consumers rely heavily on installers' recommendation because they are viewed as the expert. Installers also provide equipment feedback to distributors and discuss their business needs. This can influence the distributor's offerings and resources, which then influences the distributor's interactions with manufacturers.

Appendix B. Installer Characteristics

Installer Size	Small	Medium	Large
Business Characteristics	• One to three employees • Owner manages all financial and administrative tasks • Owner conducts service calls and installs equipment • May work out of home or very small shop •One or two service or installation technicians • May maintain stock of parts and accessories • Doesn't generally stock equipment • Little in place in terms of standardized business practices, service agreements for customers, etc.	• Four to ten employees • Dedicated administrative staff helps manage finances and administrative tasks • Multiple service & installation techs to handle multiple jobs simultaneously • Likely to stock common parts and accessories • May stock one or two pieces of commonly used equipment, especially water heater installers • Standardized business practices in place or beginning to take shape	•Ten or more employees • Very organized and may have multiple teams (new construction, service techs, installation, etc.) • Sales, management, and administrative teams • Extensive stock of common parts and accessories used •Likely to stock a few units of commonly used equipment • Established business structure with standardized practices and protocols
Key Relationships	• Distributor is the only market actor with whom they have regular contact i. Installer picks up equipment on a job by job basis ii. Will come to the distributor for trainings when feasible iii. Larger distributors may offer them some business development assistance • Will occasionally reach out to manufacturer directly when facing service or installation issues • More likely to consult with distributor first for service or installation issues	• Distributor is the only market actor with whom they have regular contact i. Installer picks up equipment on a job by job basis ii. Will come to the distributor for trainings when feasible, likely to attend with some regularity iii. Larger distributors may offer them some business development assistance • Will occasionally reach out to manufacturer directly when facing service or installation issues, but more likely to consult with distributor first	• Distributor is the only market actor with whom they have regular contact i. Coordinate on all orders and run a dedicated truck to the installer multiple times per week, or in some cases daily ii. Will coordinate with distributor on trainings, which will be held at the installer's location iii. Larger distributors may offer some business development assistance

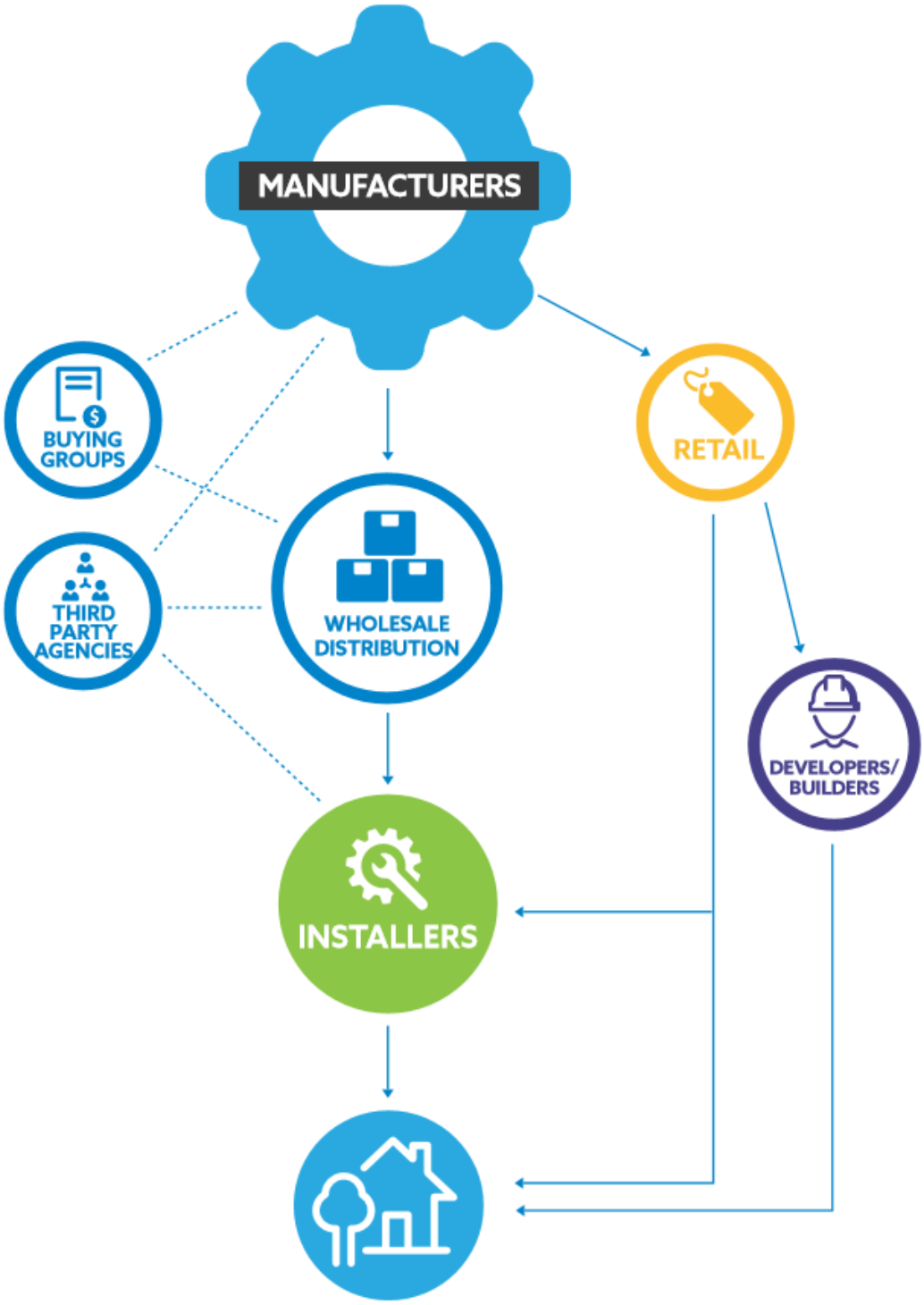
Installer Size	Small	Medium	Large
		• More likely to consult with distributor first for service or installation issues • May interact with third-party agencies representing: i. Water heater brands ii. Parts/supplies/ancillary HVAC equipment	• Will occasionally reach out to manufacturer directly when facing service or installation issues • More likely to consult with distributor first for service or installation issues • May interact with third-party agencies representing: i. Water heater brands ii. Parts/supplies/ancillary HVAC equipment
Needs & Opportunities	• Limited time and resources to attend trainings • They need assistance developing their business and making sure they're financially solvent should they ever run into a big problem i. Distributors already offer some trainings concerning this, but many small installers cannot justify the time or cost to attend.	• Attending trainings is more feasible than for small installers, but it can be difficult to attend training regularly • They've already made some attempt to establish standardized systems and business practices, but they may need more support to finalize those systems • Finding and retaining qualified service technicians and installers is a challenge	• Finding and retaining qualified service technicians and installers is a challenge

Appendix C. Distributor Characteristics

Distributor Size	Small	Medium	Large
Business Characteristics	• 1-5 locations • Limited scope of product types offered (e.g. water heaters and plumbing only) • Service and installation trainings offered ad-hoc as installers identify common problems or request a training. • Limited on-site staff that can assist installers/technicians with troubleshooting	• 6-10 locations • Broader scope of products offered (HVAC, plumbing, fire places, etc.) • Service and installation trainings offered ad-hoc and regularly (seasonally and as new equipment is released) • Might offer business development/sales trainings and consultation • Dedicated counter staff to assist installers/techs with troubleshooting	• Greater than 10 locations • Broadest scope of products offered (HVAC, plumbing, fireplaces, refrigeration, builder supplies, facility supplies etc.) • Service and installation trainings offered both ad-hoc and regularly (seasonally, and as new equipment is released) • Offers business development/sales trainings and consultation • Dedicated counter staff to assist installers/techs with troubleshooting • Employ in-house specialists for technical support on certain equipment offerings (HVAC and water heating)
Key Relationships	• Direct interactions with manufacturers limited to providing updates to manufacturers concerning warranty processing numbers and common issues being raised by installers • Manufacturers reps and third-party agencies to purchase equipment, get technical support, and marketing support • Buying groups to negotiate prices on water heaters and ancillary parts and equipment, as well as, share business information and strategies with non-competing companies	• Direct interactions with manufacturers limited to providing updates to manufacturers concerning warranty processing numbers and common issues being raised by installers • Manufacturers reps and third-party agencies to purchase equipment, get technical support, and marketing support. • Buying groups to negotiate prices on water heaters and ancillary parts and equipment, as well as, share business information and strategies with non-competing companies	• Direct interactions with manufacturers limited to providing updates to manufacturers concerning warranty processing numbers and common issues being raised by installers • Manufacturers reps and third-party agencies to purchase equipment, get technical support, and marketing support. • Buying groups to negotiate prices on water heaters and ancillary parts and equipment, as well as, share business information and strategies with non-competing companies

Distributor Size	Small	Medium	Large
Needs & Opportunities	• They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier • Difficult to remain competitive with larger distributors due to smaller market power and inventory capabilities	• They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier • Finding and retaining qualified employees is a challenge	• They need ongoing technical support and resources from manufacturers to ensure they are able to support the needs of their installers and make their lives easier • Finding and retaining qualified employees is a challenge

Appendix D. Theorized HVAC & Water Heating Equipment Supply Chain



Appendix E. Installation Scenarios

Scenario	Pete	Tim	Cameron
Scenario 1: A customer calls because their furnace has stopped working. It is early in the winter season, but the customer can stay fairly comfortable in the house if they wear a few extra layers. It is a 12 year old, 80% AFUE furnace. A component of the furnace has failed, but the heat exchanger is still functional. The replacement part is readily available at the local distributor. The customer's primary concern is cost, but they are interested in exploring all of their options as they plan on being in the house for another 15-20 years.	After looking at the unit for a few minutes, I figured out that the blower belt was frayed. I could fix it easily enough and my main distributor has the part in stock, so I could get the furnace up and running today. Since cost is the customer's biggest concern and everything else on the furnace looks great, I'm just going replace the part. I replaced the belt and told him to call me if he had any more issues. I haven't heard anything from the customer, so everything must be working well. I made sure to put my branded service sticker on the furnace, so they think to call me first if another issue comes up. Problem solved!	I was able to diagnose the frayed blower belt in a few minutes, and because I work with this brand a lot, I already had the part on my truck and could fix the issue on the spot. I told the customer that I could replace the part right then, but asked if they wanted to explore replacing the system since it was older and may continue to have issues with parts failing. As we were talking the customer mentioned that they had been in the house for a while with no intention of moving, and had been considering options for air conditioning. I presented the customer with a number of options. They wound up selecting a 96% AFUE single-speed furnace. We selected a unit that was small enough to stack with a cooling coil in case they decided they wanted to add that on someday. Problem solved!	Our company's service tech diagnosed a broken blower belt. He explained they can easily replace the part but suggested he talk to me about replacement options since the unit is getting older and the customer mentioned that they had no intention to move any time soon. When I got to the customer's house, we had a brief chat about what they didn't like about their current system. During our conversation, I found out that they had been considering air conditioning for a while. I presented the customer with a number of options. They wound up selecting a top of the line heat pump that we backed up with an 80% furnace. The heat pump will take care of all their cooling and most of their heating needs, so that furnace will only be running about 5% of the time anyway. Problem solved!

Scenario	Pete	Tim	Cameron
Scenario 2: A customer calls because their furnace has stopped working. There is a cold snap and it is a large, old house that is not well insulated or weatherized, so the customer is uncomfortably cold. It is an 18 year old, 80% AFUE furnace located against a wall in an unfinished basement, and the heat exchanger is cracked. Nearby, there is a water heater that looks to be about the same age as the furnace. The customer's primary concern is speed and cost. They are not planning on staying in the house for long and are saving up for their forever home. But it is also very cold and they want something in as quickly as possible.	I always look at the heat exchanger first, so I immediately saw that was cracked. I told the customer that I had to condemn the system because a cracked heat exchanger is a serious safety risk. I immediately started giving the customer replacement options. With the location of their system, I told them it wouldn't be very hard to run the venting for a more efficient furnace, which I usually recommend because it could save them some money in the long run and wouldn't take much longer to install. I scheduled a pickup with one of the distributors I work with for the morning. I had the unit swapped out and they were all taken care of in under 24 hours.	The heat exchanger is always one of the first things I look at, so I immediately saw that was cracked. I let the customer know that I had to condemn the system because a cracked heat exchanger is a serious safety risk. We immediately started talking about replacement options. I told them I could easily run the venting for a more efficient furnace with the way their basement was configured, which could save them some money in the long run. I also recommended that they weatherize their home to fully benefit from how efficient their new furnace is. I happened to have a unit that would fit back at the shop, so I ran back to the shop and we had them up and running that same day. I noticed their water heater was pretty old too; they weren't interested in spending any more money that day but said they'd call me first if it had an issue.	We have trained the techs to make sure the heat exchanger is one of the first things they look at, so once he saw that it was cracked, he immediately called me and I came out to the job site to start talking about replacement options. Given the configuration of the basement, I told them it wouldn't be too difficult to run the venting for a more efficient furnace, which could save them some money in the long run and wouldn't take too much longer to install. I had one of our guys at the shop run a unit over right away. I noticed their water heater was pretty old too; I said we could save them some time and money and have the guys bring a new water heater over on the truck right away with the new furnace. They took a little warming up but I eventually talked them in to it. Both new units were installed that day.

Appendix F. HVAC and Water Heating Equipment

Largest Differences
Access to HVAC equipment is more limited - Only Licensed HVAC contractors are able to purchase HVAC equipment, while anyone (customers included) has the ability to purchase and install a water heater. Whether as a result of this greater access or some other market factor, the water heater market has more price flexibility and greater possibility for bargaining and negotiation on price with manufacturers. For instance, we see this manifesting in several ways: • **Buying groups:** water heater distributors are able to leverage purchasing power and negotiate prices on equipment. Buying groups offer no purchasing power for HVAC equipment (though they do for parts and supplies). • **Third party sales reps:** Water heater distributors will purchase equipment (up to 95% of all water heaters purchased for some distributors) and occasionally negotiate deals for equipment through third party sales reps. Third party sales reps do not offer HVAC equipment (though they do for parts and supplies).
Broken water heaters are an emergency, broken HVAC systems are usually an inconvenience: In the Northwest, HVAC systems are only a true necessity for brief periods of the year, whereas people always need hot water. Consumers are willing to spend more time considering their options, conducting research, and shopping around for HVAC systems; unlike water heaters, which consumers need to be repaired or replaced as soon as possible.
Upgrading to higher efficiency systems is more easily justified when it comes to furnaces than with water heaters: The differences in cost between lower efficiency and higher efficiency furnaces is relatively less drastic compared to water heaters, especially when upgrading to tankless systems. Tankless water heaters are still quite expensive compared to tank systems, which presents barrier to tankless installation.
Moderate Differences
Changes to HVAC technology has been subtler than the dramatic changes with water heaters: Unlike water heaters, the inner workings of HVAC systems have generally remained the same as system efficiency increased. Accordingly, the learning curve for installers to adjust to the subtle changes in HVAC systems is less steep, and perceived as more accessible, when compared to that of installers learning to work with tankless water heaters.
Tankless water heaters have more physical/locational considerations than efficient furnaces: Newer, higher efficiency furnaces tend to be smaller than older models; accordingly, the move from a baseline efficiency furnace to a high efficiency system involves minimal infrastructure considerations. By contrast, the infrastructure changes needed to accommodate tankless water heaters are perceived to be more onerous. Adjustments for tankless systems can include the re-sizing and re-configuration of gas lines and ensuring there is sufficient electrical supply to the equipment.
Similarities
Installer recommendations are highly influential in customer decision-making: For both water heaters and HVAC systems, consumers rely heavily on their installer's recommendations when selecting equipment. Distributors and installers identified that this reliance makes the installer's sales skills and ability to assess the customer's needs important in getting higher efficiency systems installed.
There is a significant shortage of qualified labor: Across all the trades there is a shortage of qualified employees entering the workforce; this makes it difficult for small businesses to scale up in the face of increased demand. As a result, many installers are booked out for weeks to months in advance. This potentially leads to under-qualified (unlicensed) installers absorbing some of this backlog, introducing possible issues with proper installation.

Appendix G. Installer Ride-Along Observation Guide

Upon arrival at the installer's business location we will introduce ourselves, answer any questions the installer has, and if possible, conduct a 30-minute interview with the installer before proceeding to the first customer or distributor site. If the installer is unable to spend 30 minutes in advance of customer/distributor visits we will ask questions in transit and on-site as we are able.

Introduction

Hi, thank you so much for meeting with us today. As a reminder, this research is being conducted on behalf of a regional organization interested in learning more about the many decisions installers make when selling and installing water heaters and HVAC systems, and how customers and distributors affect these decisions. We'll be visiting a total of 12-16 installers in your area. To be clear, we are not here to make any assessment or judgement of how well you do your job. We're interested in how things work.

In our time together, we will ask you questions about what you do and how the (HVAC/ Water Heater) market works from your perspective, including your perspective on customer behavior and choices based on your experience in the area. We're interested in learning about how the market operates on the ground. We're interested to see customers' attitudes towards, and knowledge about HVAC/Water heating equipment, and the kinds of questions or clarifications they ask. We encourage you to be as open as possible so that we have a full picture of the market in general, and the installer's role within it. We will also approach customers/distributors with a few questions. However, we will not push them to respond or participate. All information gathered will be reported anonymously.

Do you have any questions before we begin?

Pre-Ride-Along Interview (30 min)

Please note that these are the topics that we expect to cover over the course of the ride-along. This is intended as a topical guide and not a script. We will not necessarily ask questions in these exact words or in this exact order or ask each installer every question. Depending on the circumstances of each ride-along some questions will be asked in advance, in transit or while at the customer site. The researchers will use their discretion to determine how and when to address each topic.

1. To get started, please tell me a little bit about yourself and the business.
   [If not mentioned probe for the following]:
   a. How long have you been in this business?
   b. How long has the business been in operation?
   c. How many employees work here?
   d. What territory do you serve?
   e. What type of installer would you classify this business as? Independent, franchise, distributor, or something else?
   f. What do you feel sets your business apart from other installers in the area?

g. What are the various ways that jobs come into your shop and which are the most common paths? [**PROBE for:** design/build firms, distributors, maintenance contracts, direct from consumers, others?]
h. How are jobs assigned to installers at your shop? **[PROBE for**: availability or experience with a specific technology or application; differences in water heater and HVAC if installs both**]**
i. **[IF WATER HEATER INSTALLER]** Approximately how many water heaters and of what type do you install in a year?

2. During our ride-along, we hope to be able to experience first-hand how you conduct a customer visit, but first, we'd like to ask some questions to find out what generally takes place when you talk to a customer about a potential sale or to make a recommendation on repairing versus replacing equipment.

[Clarify whether describing an early replacement or an emergency]

a. How do customers typically first contact your business? **[PROBE for**: phone, email, online form outbound calling, etc.**]**
    i. How do they find out about you? **[PROBE for**: direct mail, billboard, social media, etc.**]**
b. What information do you get from the customer and give to them before the appointment?
c. What types of research do customers usually do before you arrive on site? If they already know they are replacing equipment, do they typically have specific equipment in mind?
d. When going on a repair or sales visit, how do you share information about what you you've found and your recommendations with the customer? (printout, write-up, invoice, email, etc.)
e. What impacts your recommendation to either replace or repair?
f. How often do customers proceed directly with the equipment you recommend?
g. How often do customers make decisions on site? How often do they request time to conduct research or consider other options?
h. How do any of these elements change if they are making an early replacement versus an emergency replacement? In emergency-type situations, is there any difference between situations where the old equipment has already stopped working and when it's barely functioning?

3. Generally speaking, why do you think customers choose to install a new water heater or HVAC system? **[Probe for:** failure, repair costs too high, remodeling, looking to save money, looking to save energy, etc.**]**
    a. What proportion of your customers replace a system before it fails? What seems to be driving this decision? **[Probe for:** Attitudes/beliefs towards efficiency, the environment, demographics, cost, rebates**]**
        i. **[IF INSTALLS BOTH]** Does this vary between water heaters and HVAC equipment?

4. What factors do customers consider when making purchase and installation decisions?
    a. How important do you think familiarity is in equipment replacement? How often do customers seek to replace their current equipment with something different? **[IF NEEDED:** For example, replacing a standard storage water heater with a tankless water heater or replacing a ducted heating system with a ductless heat pump**]**
    b. What influences your product recommendations? **[Probe for:** stock on hand, distributor stocking practices or promotions, utility rebates or tax credits, customer requests**]**
        i. Are there any particular brands you prefer to installer? Why? **[Probe for:** water heaters]
        ii. Do you have a preferred fuel? Do you ever promote fuel switching to a customer? Why?
    c. Does the consideration of energy efficiency come into play? Who initiates the discussion?
    d. What information and recommendations about energy efficiency do you provide? Do you provide this information to all customers or to the customers that specifically ask?
    e. Do you find that certain types of customers are more likely to install energy efficient equipment?
        i. Are customers who replace their equipment while it is still working reasonably well or those who are replacing equipment that has failed or is near failure more likely to install higher efficiency equipment?

5. **[IF WATER HEATER INSTALLER]** We'd like to gain a better understanding of higher efficiency water heaters and how those installations might differ from standard water heaters.
    a. Have you or your firm ever installed higher efficiency water heaters?
        i. **[If Yes]:** How often do you recommend high efficiency water heaters?
        ii. **[If Yes]:** Approximately what percentage of your water heater installations are higher efficiency?
    b. How long are lead times for high efficiency water heaters?
    c. Do you offer tankless water heaters?
        i. **[If Yes]:** In what situations do you install or recommend them?
            1. Vintage/age of home? Condition of home?
        ii. Are they offering the newer more efficient tankless gas water heaters?
    d. Are there any components you commonly see fail on high efficiency water heaters after they are installed?
        i. How long after the unit is installed do these failures typically occur?
    e. Are there any barriers to installing a high efficiency water heater in an existing residence?
    f. Did you receive any training on the installation of high efficiency water heaters prior to installing them?
        i. **[If Yes]:** Who provided the training and what were the main topics?
        ii. **[If Yes]:** Was the training helpful with the installations? Why or why not?
        iii. **[If No]:** Is there anything you wished you were trained on prior to installing high efficiency water heaters?
    g. Are there any specific installation challenges that installers need to be aware of with higher efficiency water heaters that aren't typically problems with standard water

heaters? **[PROBE for:** freeze protection, coordination of condensate management, local code requirements, controls interface, etc.]

h. Is there anything else you think we should know about water heater installations that we haven't covered?

6. During our ride-along, we also hope to be able to experience first-hand how you interact with distributors, or whoever you purchase equipment from and learn a little more about how you select equipment to stock.
    a. How often do you communicate with your distributor? In-person? Through phone or email?
    b. Do you purchase equipment as needed, or does your company maintain stock?
        i. Are there ever delays in obtaining any types of equipment? **[PROBE for:** energy efficient equipment**]**
        ii. If you maintain stock of equipment, how do you decide what to carry?
    c. Who does your business purchase equipment from? **[PROBE for:** manufacturers, distributors (supply VS equipment, independent VS manufacturer owned), retailers, anything else?**]**
    d. Is there anyone else in the supply chain who your business communicates with? How do you communicate with each one?
    e. **[If purchases from more than one business type]:** How do things vary dependent upon who you purchase equipment from? **[PROBE for:** cost, time to receive equipment, customer service, etc.**]**
    f. Do your relationships with any of these entities impact the type of equipment you recommend? How long it takes to receive the equipment?

7. Does your company ever work directly with manufacturers? Under what circumstances?

8. Does your company offer financing for residential customers? If yes, how often do customers take advantage of the financing offered?

9. Does your company have systems in place to ensure proper equipment installation?

10. Do you think customers understand the importance of proper equipment installation?

11. What are your thoughts on the presence of retailers like Home Depot and Amazon in the installation market? Has it impacted your business at all?

12. Before we head out, do you have any other questions or comments?

Installer Observations

Researchers will observe the following while on customer visits:

- Interactions with customer
    - Any differences between new versus repeat customers;
    - Differences in how contractors and customers move through the space of the home;
    - The kind and tenor of the conversations and discussions between contractor and customer;
    - Who do contractors speak with and to? Who in the household is the gatekeeper?

    - What questions the customer asks
- Discussions around replacement in planned versus emergency situations
- Customer response and reaction to contractor's actions and discussions
- Variations in types of systems presented; equipment selected, and installations scheduled across customer visits
- Discussions around efficient and non-efficient equipment and the
    - Benefits and costs of different equipment types and efficiency levels discussed
        - How installer presents efficient units (e.g. are they part of a good/better best option?)
        - Number of efficient and non-efficient options presented
    - Who initiates discussion of energy efficiency
- The likely natural gas customer segment (based on observations about where the customer lives, age and some of their values to *qualitatively* assign customers to one of the four natural gas customer segments)

Customer-Specific Observations

COMPANY NAME:	**RIDE-ALONG DATE:**	**REASON FOR VISIT** (NOTE EQUIP CONDITION-WORKING WELL, BARELY WORKING, FAILURE):				
# Bedrooms # occupants	Person(s) present during visit	New or repeat customer?	Estimated year built	Type of home & Condition (ranch, townhome, etc.)	Equipment location:	

STAGE	**DURATION (MINUTES)**	**WHO DOES INSTALLER SPEAK TO?**	**INFORMATION PROVIDED (DESCRIBE):**	**CUSTOMER QUESTIONS ASKED:**	**INTERACTION NOTES (BODY LANGUAGE, FACIAL EXPRESSIONS, TONE, WHO ACTS AS GATEKEEPER, HOW INSTALLER AND CUSTOMER MOVE THROUGH HOME):**
Greeting/ Intro					
Inspection/ Repair/ Installation					
Discussion/ Next Steps					

Types of Equipment Presented/Installed:	(note efficiency)	Equipment selected:	Installation Scheduled:
General Notes (include decision criteria and customer or installer quotes):			
Discussion around energy efficiency (who initiated, when was it brought up and what was discussed?)			

Researchers will observe the following while on distributor visits:

- Interactions with distributors
    - The main topics of conversation
    - Relationship between installer and distributor
    - Discussion context
- Discussion around what items are available for immediate pick up versus an order
- Distributor response and reaction to installer inquiry and requests
- Discussions around efficient and non-efficient equipment
    - Who initiates the conversation and how the other party reacts
- Length of time spent on the visit

Distributor-Specific Observations

DISTRIBUTOR NAME	DATE	LOCATION

DISTRIBUTOR TYPE (SUPPLY/EQUIPMENT)		DISCUSSION AROUND ENERGY EFFICIENCY (WHO INITIATED, WHEN WAS IT BROUGHT UP AND WHAT WAS DISCUSSED?)
Ownership Structure (Independent/Manufacturer Owned)		
Customer Type(s) Served		
Location (Urban/Rural)		
Stock Duration (how long does stock last)		Items available for immediate pick up versus those that need to be ordered?
Reason for Visit		Main conversation topics
Other Notes (Relationship between installer/distributor, length of visit, discussion context, etc.)		

Appendix H. Customer Interview Guide

This document provides an overview of the research and the customer in-depth interview guide for the Phase 2 in-depth interviews with customers. Preparation for this phase of our research will begin during the installer ride-alongs. During these ride-alongs the research team will: 1) attempt to conduct brief interviews (or full interviews if circumstances allow) with the customers where time permits, and 2) recruit customers for the Phase 2 in-depth interviews.

FULL CUSTOMER IN-DEPTH INTERVIEW

Please note that these are the topics that we expect to cover over the course of the interview. This is intended as a topical guide and not a script. We will not necessarily ask questions in these exact words or in this exact order or ask each customer every question. The researchers will use their discretion to determine how and when to address each topic.

Probe on (especially for water heaters):

- *Whether the customer had any particular brands in mind*
- *The customer had a particular fuel preference (e.g. were they interested in switching fuels?)*

INTRODUCTION

Hi, thank you so much for speaking with us today. As a reminder, this research is being conducted on behalf of a regional organization interested in learning more about the many decisions customers make when purchasing and installing water heaters and HVAC systems.

During the interview, we will ask you questions about your installation journey and what factors influenced your installation decisions. We encourage you to be as open as possible so that we have a full picture of your installation experience. I'd like to record our conversation so for our own reporting and to make sure we don't miss any of the valuable feedback and input you're providing. We won't share this recording with anyone. All information gathered will be reported anonymously.

Do you have any questions before we begin?

OVERVIEW OF HOUSEHOLD

1. **To get started, I'd like to learn a bit more about you, your household and your home, could you please tell me a little bit about yourself and your household. [If not mentioned probe for the following]:**
    a. How long have you lived in this home?
    b. How old is the home?
    c. Who lives in the home? **[PROBE for:** for age distribution of persons in the home**]**

2. **What improvements have you made to your home? What improvements would you like to make?**
    a. How do you prioritize your household improvements? What factors do you consider? **[PROBE for:** cost, urgency, aesthetics, gas-related improvements etc.**]**

i. Have you made any improvements to increase the energy efficiency of your home or to reduce your energy bill?

b. What resources and information do you rely on when making household improvements?

3. **What types of maintenance on major household systems do you, or someone else do regularly around the house (e.g. changing air filters, test water heater pressure relief valve, replace smoke detector batters, etc.)?**
   a. Who does this maintenance?
      [IF contractor]:
      i. How did you find the contractor you use?
      ii. What factors did you consider when selecting the contractor?
   b. How often do you, or someone else do the maintenance? What prompts this frequency?
   c. Why is the maintenance done? How do you know it needs to be done?

MOTIVATIONS FOR INSTALLATION

1. **What prompted you to first reach out to the installation company you used? [PROBE for:** equipment failure, remodeling, improving efficiency, etc.**]**
   a. **[PROBE for:** equipment condition if needed**]** Was your equipment still working reasonably well, not working at all or in need of major repair/on its last leg?

2. **[IF INSTALLED OR INSTALLATION SCHEDULED]** Could you have repaired or installed your equipment on your own?
   a. **[If YES]** Why did you replace instead of repairing?

   [If early replacement – equipment working reasonably well]:
   a. So, your equipment still worked prior to replacing it? What prompted you to look in to purchasing new equipment before the old one failed?
   b. When it comes to major household systems like this, do you usually replace early or wait until it breaks? What impacts this decision?
      i. Can you give me an example of another time when you have replaced something early?
   c. How long have you been planning the replacement of this equipment?

   [If emergency replacement – equipment failed or about to fail/major repairs]:
   a. How quickly were you able to replace the old equipment after it failed or you learned that major repairs if needed? **[PROBE for:** whether or not they could have done the repair or replacement on their own**]**
   b. Was the failure of your old equipment expected or did it come as a surprise?
      [If expected]:
      a. How long have you known that the system needed to be replaced?
      b. How did you know it needed to be replaced?
      c. Did you have plans to replace the equipment? Why or why not?

3. **[IF REPAIRED]** Why did you decide to repair your equipment rather than replacing it?
    a. When do you think you will replace it? **[PROBE for reason:** failure, have money saved**]**

SYSTEM SELECTION

Next, I'd like you to give me a "tour" of the utility room or basement (wherever your heater and hot water heater is). Please talk openly as we walk through the space. *[The researcher will prompt the participant using the following questions:]*

1. **What was your approach to selecting the equipment you installed/are considering? Please walk me through the steps you took, the information you reviewed, the equipment features you considered, and anything else pertinent to your decision-making process**.

2. **What features did you consider?**
    a. Were you able to install/do you think you'll be able to install equipment with the features you wanted? Why or why not?
    b. **[If Water Heater]** Did you consider installing a tankless water heater?
        i. How did you hear about tankless water heaters?
        ii. What did you hear about them from other people? **[Probe for:** installers recommendations, opinions of others who have them or considered them**]**
        iii. Why did or didn't you purchase a tankless water heater?

3. **Did you do any research to help you decide what type of [equipment type] to install?**
    a. What kind of research? Where did you look? Who did you talk to?
    b. Did you conduct the research before or after you contacted your installer?
    c. How did that research impact your decision-making?
    d. What additional information or resources would have been helpful while conducting this research?

4. **Is the equipment you installed/are considering similar to the equipment you are replacing (e.g. same brand, system size, make/model, equipment type, fuel type, etc.)?**
    [If needed: for example, if you had a furnace, did you consider any different heating systems like ductless heat pumps, or did you consider replacing a standard storage water heater with an on-demand water heater or heat pump water heater**]**
    a. **[IF YES]** What led you to install/consider a similar system?
        i. Did you consider any options that were different from your existing equipment?
        ii. Did you research any other equipment types?
    b. **[IF NO]** What led you to install/consider a different system?

5. **Concerning the equipment you installed/are considering, what was the most important factor in your decision? [PROBE for:** Importance of installer recommendation, research, cost, increasing efficiency, etc.**]**
    a. What else did you consider when making this decision? **[PROBE for:** Efficiency levels, different types of equipment, cost, installer recommendation, etc.**]**
    b. How did you prioritize these factors?

c. **[IF Efficiency not mentioned]** Was the efficiency level of the equipment something you considered? How, if at all, did it impact your decision or considerations?
d. **[IF Price not mentioned]** It sounds like **[list factors mentioned]** were more important than the cost of the equipment, is that correct? How did you determine your budget for the new equipment?

INSTALLER INTERACTIONS

1. **I'd like to understand how you selected installers to work with. How did you find the installers that provided quotes? [PROBE for**: Google, direct mail, billboard, social media, word of mouth, etc.**]**
    a. **[IF NOT COVERED ABOVE]** What prompted you to start searching for an installer? **[If needed]** How long ago was that?
    b. Did you receive quotes from multiple installers?
        i. How many different installers did you receive quotes from?
        ii. Did all of those installers visit your home?
    c. **[IF EQUIPMENT INSTALLED OR INSTALLATION SCHEDULED]** What factor was most important when selecting the contractor that installed/will install your equipment? **[PROBE for**: availability, price, equipment availability, etc.**]**

2. **What interactions have you had with the company that installed or will install your equipment/the installer that was at your home?**
    a. How did you initially contact them? **[PROBE for**: phone, email, online form, etc.**]**
    b. During your initial contact with that installer, what did you discuss? What information did they provide you?

3. **Did you and your installer discuss different equipment options? What types did you discuss?**
    a. Were these options similar to or different from your old system?
    b. How did these options differ? **[PROBE for:** equipment type, brand, cost, efficiency, etc.**]**
        i. How influential was your installer's recommendation in selecting an equipment option?

4. **How did that installer share their recommendations with you? [PROBE for:** printout, write-up, quote, invoice, email, verbally, etc.**]**
   [IF NOT COVERED ABOVE]
    a. What types of information did they provide with their recommendations? **[PROBE for:** price, efficiency level, equipment descriptions**]**
    b. Did they provide you with any additional resources for information like equipment brochures or websites to refer to or other materials?
    c. Did you conduct any price comparison research on the recommendations the installer presented to you?

5. **How influential was your installer's recommendations in making decisions about your equipment?**
    a. How influential was their recommendation to either replace or repair?

b. How influential was their recommendation on equipment type?

6. **How long did it take you to decide which equipment you were going to install?**
    a. Did you make a decision during your initial visit or phone call with the installer?
    b. **[IF NOT ALREADY COVERED ABOVE]** Did you conduct additional research or look into other equipment or installer options?
        i. What type of research did you conduct? Where did you look? Who did you speak with?
        ii. What other options did you consider?

7. **What, if anything, did you discuss with your installer about the efficiency of the units you were considering?**
    a. Did your installer give you any information or recommendations about energy efficiency levels?
        i. What information or recommendations did they provide?
    b. Was this because of questions you asked or part of the information they provided automatically?
    c. **[IF INSTALLED OR INSTALLATION SCHEDULED]** How influential was their recommendation in your choice of efficiency level?

CONCLUSION

Those are all the questions we have for you. Is there anything else you would like to share about your experience installing your new equipment?

Thank you so much for taking the time to speak with us. If you could provide us with your email address, we can send your $75 Visa gift card to you right now. It will be sent through a service called Tango Card. Once you receive the email, you will have the option to use the gift card electronically or have a physical gift card sent to you in the mail.

FOLLOW-UP CUSTOMER IN-DEPTH INTERVIEW

The following section is for cases where the interview begins on-site during the installer ride-along. Many of the questions are the same as the previous section but take into account information that may have been previously gathered.

Please note that these are the topics that we expect to cover over the course of the interview. This is intended as a topical guide and not a script. We will not necessarily ask questions in these exact words or in this exact order or ask each customer every question. The researchers will use their discretion to determine how and when to address each topic.

INTRODUCTION

*Hi, thank you so much for speaking with us today. As a reminder, we met a couple weeks ago when **[INSTALLER NAME]** was at your home to **[REASON FOR VISIT]**. This research is being conducted on behalf of a regional organization interested in learning more about the many decisions customers make when purchasing and installing water heaters and HVAC systems.*

During the interview, we will ask you questions about your installation journey and what factors influenced your installation decisions. We encourage you to be as open as possible so that we have a full picture of your installation experience. I'd like to record our conversation for our own reporting and to make sure we don't miss any of the valuable feedback and input you're providing. We won't share this recording with anyone. All information gathered will be reported anonymously.

Do you have any questions before we begin?

OVERVIEW OF HOUSEHOLD

1. When we spoke then, you told me a little bit about yourself and your home like **[paraphrase information gathered previously].** Is that correct?
   [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]
   a. How long have you lived in this home?
   b. How old is the home?
   c. Who lives in the home?

2. You also told me that **[paraphrase information gathered about improvements made and desired improvements].** Is that correct?
   [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]
   a. How do you prioritize your household improvements? What factors do you consider? **[PROBE for:** cost, urgency, aesthetics, etc.**]**
      i. Have you made any improvements to increase the energy efficiency of your home or to reduce your energy bill?
   b. What resources and information do you rely on when making household improvements?

13. **What types of maintenance on major household systems do you, or someone else do regularly around the house (e.g. changing air filters, test water heater pressure relief valve, replace smoke detector batters, etc.)?**
    a. Who does this maintenance?
       [IF contractor]:
       i. How did you find the contractor you use?
       ii. What factors did you consider when selecting the contractor?
    b. How often do you, or someone else do the maintenance? What prompts this frequency?
    c. Why is the maintenance done? How do you know it needs to be done?

MOTIVATIONS FOR INSTALLATION

1. When we spoke last, you told me a bit about what prompted you to reach out to **[Installation Company Name] [paraphrase information gathered previously].** Is that correct?
   [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]
    a. **[PROBE for:** equipment condition if needed**]** Was your equipment still working reasonably well, not working at all or in need of major repair/on its last leg?

2. **[IF INSTALLED OR INSTALLATION SCHEDULED]** Could you have repaired your equipment?
    a. **[If YES]** Why did you replace instead of repairing?

   [If early replacement - equipment working reasonably well]:
    a. So, your equipment still worked prior to replacing it? What prompted you to look in to purchasing new equipment before the old one failed?
    b. When it comes to major household systems like this, do you usually replace early or wait until it breaks? What impacts this decision?
    c. How long have you been planning the replacement of this equipment?

   [If emergency replacement - – equipment failed or about to fail/major repairs]:
    a. How quickly were you able to replace the old equipment after it failed?
    b. Was the failure of your old equipment expected or did it come as a surprise?
       [If expected]:
       a. How long have you known that the system needed to be replaced?
       b. How did you know it needed to be replaced?
       c. Did you have plans to replace the equipment? Why or why not?

3. **[IF REPAIRED]** Why did you decide to repair your equipment rather than replacing it?
    a. When do you think you will replace it? **[PROBE for reason:** failure, have money saved**]**

SYSTEM SELECTION

1. **[IF SALES VISIT]** What has happened since that visit…
2. Have you installed a new **[EQUIPMENT TYPE]?**
    a. **[IF NO]** Why not? **[PROBE for:** Reason they didn't install equipment – cost, still getting quotes, appointment scheduled, repaired equipment, decided to wait (until failure?)**]**

3. **[IF YES]** When we spoke last, you told me a bit about your approach to selecting the equipment you installed, **[paraphrase information gathered previously].** Is that correct?
    a. **[IF NO]** Please walk me through the steps you took.
    [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]

    b. What features did you consider when selecting this equipment?
    c. Were you able to install/do you think you'll be able to install equipment with the features you wanted? Why or why not?
    d. **[If Water Heater]** Did you consider installing a tankless water heater?
        i. How did you hear about tankless water heaters?
        ii. What did you hear about them from other people? **[Probe for:** installers recommendations, opinions of others who have them or considered them**]**
        iii. Why did or didn't you purchase a tankless water heater?

4. **Is the equipment you installed/are considering similar to the equipment you are replacing (e.g. same brand, system size, make/model, equipment type, fuel type, etc.)?**
    [If needed: for example, if you had a furnace, did you consider any different heating systems like ductless heat pumps, or did you consider replacing a standard storage water heater with an on-demand water heater or heat pump water heater**]**
    a. **[IF YES]** What led you to install/consider a similar system?
        i. Did you consider any options that were different from your existing equipment?
        ii. Did you research any other equipment types?
    b. **[IF NO]** What led you to install/consider a different system?

5. **Concerning the equipment you installed/are considering, what was the most important factor in your decision? [PROBE for:** Importance of installer recommendation, research, cost, increasing efficiency, etc.**]**
    a. What else did you consider when making this decision? **[PROBE for:** Efficiency levels, different types of equipment, cost, installer recommendation, etc.**]**
    b. How did you prioritize these factors?
    c. **[IF Efficiency not mentioned]** Was the efficiency level of the equipment something you considered? How, if at all, did it impact your decision or considerations?
    d. **[IF Price not mentioned]** It sounds like **[list factors mentioned]** were more important than the cost of the equipment, is that correct? How did you determine your budget for the new equipment?

6. During our first conversation, you told me a bit about the research you did prior to the visit, **[paraphrase information gathered previously].** Is this correct?
    [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]
    a. **[IF YES]** Have you done any other research since then to help you decide what type of **[equipment type]** to install?
    e. What kind of research? Where did you look? Who did you talk to?
    f. Did you conduct the research before or after you contacted your installer?
    g. How did that research impact your decision-making?

What additional information or resources would have been helpful while conducting this research?

INSTALLER INTERACTIONS

1. During our first conversation, you told me a bit about how you selected the installer to work with, **[paraphrase information gathered previously].** Is this correct?
   [PROBE FOR ANY OF THE FOLLOWING THAT WAS NOT COVERED]
   a. What prompted you to start searching for an installer? [**If needed]** How long ago was that?
   b. Did you receive quotes from multiple installers?
      i. How many different installers did you receive price quotes from?
      ii. Did all of those installers visit your home?
   c. How did you find the installers that provided quotes? **[PROBE for**: Google, direct mail, billboard, social media, word of mouth, etc.**]**
   d. **[IF EQUIPMENT INSTALLED OR INSTALLATION SCHEDULED]** What factor was most important when selecting the contractor that installed/will install your equipment? **[PROBE for**: availability, price, equipment availability, etc.**]**

2. **What interactions did you have with the company that installed or will install your equipment/the installer that was at your home?**
   a. How did you initially contact them? **[PROBE for**: phone, email, online form, etc.**]**
   b. During your initial contact with that installer, what did you discuss? What information did they provide you?

3. **Did you and your installer discuss different equipment options? What types did you discuss?**
   a. Were these options similar to or different from your old system?
   b. How did these options differ? **[PROBE for:** equipment type, brand, cost, efficiency, etc.**]**
      i. How influential was your installer's recommendation in selecting an equipment option?

3. **How did that installer share their recommendations with you? [PROBE for:** printout, write-up, quote, invoice, email, verbally, etc.**]**
   [IF NOT COVERED ABOVE]
   a. What types of information did they provide with their recommendations? **[PROBE for:** price, efficiency level, equipment descriptions**]**
   b. Did they provide you with any additional resources for information like equipment brochures or websites to refer to or other materials?
   c. Did you conduct any price comparison research on the recommendations the installer presented to you?

4. **How influential was your installer's recommendations in making decisions about your equipment?**
   a. How influential was their recommendation to either replace or repair?

b. How influential was their recommendation on equipment type?

5. **How long did it take you to decide which equipment you were going to install?**
    a. Did you make a decision during your initial visit or phone call with the installer?
    b. **[IF NOT ALREADY COVERED ABOVE]** Did you request time to conduct additional research or look into other equipment or installer options?
        i. What type of research did you conduct? Where did you look? Who did you speak with?
        ii. What other options did you consider?

6. **What, if anything, did you discuss with your installer about the efficiency of the units you were considering?**
    a. Did your installer give you any information or recommendations about energy efficiency levels?
        i. What information or recommendations did they provide?
    b. Was this because of questions you asked or part of the information they provided automatically?
    c. **[IF INSTALLED OR INSTALLATION SCHEDULED]** How influential was their recommendation in your choice of efficiency level?

CONCLUSION

Those are all the questions we have for you. Is there anything else you would like to share about your experience installing your new equipment?

Thank you so much for taking the time to speak with us. If you could provide us with your email address, we can send your $75 Visa gift card to you right now. It will be sent through a service called Tango Card. Once you receive the email, you will have the option to use the gift card electronically or have a physical gift card sent to you in the mail.

Appendix I. Distributor Interview Guide

This document provides an overview of the research and the guide for the in-depth distributor interviews. We will conduct 2-3 distributor interviews in-person in Spokane the week of October 15 and we will interview the remaining distributors by phone during the week of November 5.

DISTRIBUTOR IN-DEPTH INTERVIEWS

As circumstances allow, we will attempt to ask distributors some introductory questions during the ride-alongs. These in-depth interviews will build on the information, if any, gathered during the ride-alongs or start from the beginning if we were not able to ask questions of the distributor during the ride-alongs.

INTRODUCTION

Hi, thank you so much for speaking with us today. As a reminder, this research is being conducted on behalf of a regional organization interested in learning more about the many decisions distributors make when purchasing and selling water heaters and HVAC systems, and how manufacturers, installers, and end-users affect these decisions. We'll be speaking with a total of 12 distributors in your area. To be clear, we are not attempting to make any assessment or judgement of how well you do your job. We're interested in how things work.

In our time together, we will ask you questions about what you do and how the (HVAC/ Water Heater) market works from your perspective, including your perspective on installer and customer behavior and choices based on your experience in the area. We're interested in learning about how the market operates on the ground. We're interested to see installers' attitudes towards, and knowledge about HVAC/Water heating equipment, and the kinds of questions or clarifications they ask. We encourage you to be as open as possible so that we have a full picture of the market in general, and the distributor's role within it. All information gathered will be reported anonymously.

Do you have any questions before we begin?

INTERVIEW GUIDE (45 MIN)

Please note that these are the topics that we expect to cover over the course of the interview. This is intended as a topical guide and not a script. We will not necessarily ask questions in these exact words or in this exact order or ask each distributor every question. The researchers will use their discretion to determine how and when to address each topic.

Items to dig into more from initial interviews/ride-alongs:

- *Distributors as gatekeepers*
- *Influence of the distributor coop and any more details on org. structure of these and relationships*
- *Relationship with FSRs and their role in introducing new equipment*

BUSINESS CHARACTERISTICS AND INTRODUCTIONS (7 MIN)

1. **[IF INTERVIEWED DURING RIDE-ALONG]** When we spoke a couple weeks ago, you told me a little bit about yourself and your role including **[paraphrase information gathered previously].** Is that correct? **[PROBE FOR ANY OF THE FOLLOWING THAT WASN'T COVERED]**
   [IF NOT INTERVIEWED] Why don't you start off by telling me more about yourself? **[PROBE FOR ANY OF THE FOLLOWING]**:

   a. What is your role?
   b. How long have you worked here?
   c. How long has the business existed?
   d. How big is your service area?
   e. What types of businesses do you serve?
   f. Supply or equipment distributor?
   g. Independent or manufacturer owned?
   h. Franchise, single-locations, chain?

SUPPLY CHAIN DYNAMICS (25 MIN)

As a way to facilitate the conversation, we will email the supply chain diagram (or share on-screen) and ask distributors to react to the illustration and make any corrections or additions. We will ask each interview participant to describe this structure from their perspective, and reference it as needed throughout the interview.

2. From your perspective, can you describe how the supply chain works for **[WATER HEATER/HVAC]** equipment? That is, starting with the manufacturer, what are all the different pathways equipment can take before it reached the end user? **[Probe for …**
   a. Presence of direct connection between manufacturers and installers and its function/dynamic.
   b. Presence of direct connection between distributors and retail distribution and/or hardware stores and its function/dynamic.
   c. Presence of connection between distributors and builders and their role in the supply chain.
   d. Presence of buying groups, marketing coops and/or purchasing alliances and their role in the supply chain. **[Probe for:** more detail on how distributors work with them and how they influence stocking; contacts at buying groups or cooperatives**]**
   e. What is the role of builders or developers in the supply chain?

3. We're trying to understand how relationships between distributors and installers work. Can you tell me about some of the installers you commonly work with? **[Probe for**: installer business type (independent/franchise/something else), size, location, volume, etc.**]**
   a. How do you normally communicate?
   b. How often do you communicate with installers? In-person? Through phone or email?

c. Can you describe how a typical phone call or visit from an installer might proceed?
d. Do they purchase equipment as needed, or do some maintain stock?
    i. What is a typical turn-around for an order? How quickly is an average order filled?
    ii. Are there ever delays in providing any types of equipment? **[PROBE for:** energy efficient equipment**]**
e. How does their business impact **your** stocking practices or other business decisions? **[PROBE for:** Independent/franchise/something else, urban/rural, small/large, customer types, sales volume, etc.**]**
f. How does their business impact **their** stocking practices or other business decisions? **[PROBE for:** Independent/franchise/something else, urban/rural, small/large, customer types, sales volume, etc.**]**
g. What influence do installers have on the supply chain overall?
h. Are there differences in your relationship with installers? **[PROBE for:** what drives the difference**]**

4. What manufacturers do you work with?
    a. Why have you chosen to work with those manufacturers? **[PROBE for:** influences**]**
    b. how do you communicate with manufacturers? Does this vary depending upon relationship/sales volume?
    c. What services do manufacturers provide for your business? **[PROBE for:** training, product information, etc.**]**

5. Can you briefly describe your stocking practices?
    a. What influences these?
    b. How long does it take you to turn over your stock?
    c. How often do installers have to wait for specific equipment types? What types?
    d. What is the current market like for efficient equipment?
    e. Who is currently driving the demand for more efficient equipment?
    f. What influence do installers have on the supply chain as a whole? What about you?
    g. **[IF WATER HEATER DISTRIBUTOR]** What are your most popular types of water heaters?
        i. Who is asking for them? **[PROBE for:** customers VS installers**]**
    h. **[IF WATER HEATER DISTRIBUTOR]** What can you tell us about the current market for tankless water heaters? **[PROBE for:** Percentage of sales, brands, who buys them, any insights**]**

6. Can you briefly describe your promotion & marketing practices?
    a. What influences these? **[PROBE for:** special promotions on equipment, manufacturer driven promotions, seasonal timing, advertising and marketing, web presence etc.**]**

7. **[If connection with retailers/hardware stores is confirmed]** What are your thoughts on the presence of retailers like Home Depot and Amazon in the installation market? How has it impacted your business, if at all?
    a. Does your business have any relationship with retailers or hardware stores? If so, can you describe what that's like? **[PROBE for:** sales volume, communication mediums and frequencies, service and support relationships**]**
    b. How do they impact the supply chain?
    c. What about the presence of affiliated contractor networks?

ENERGY EFFICIENCY (5 MIN)

8. How, if at all, do you think energy efficient equipment provides value to customers? To installers?
9. Has energy efficiency had an impact on the market for HVAC/water heaters? **[PROBE for:** impact of programs like Energy Star; relevance to the market; changes over time.**]**
10. In your opinion, where does the demand for energy efficient equipment come from? In other words, which party is most influential in the sales of efficient equipment? **[PROBE for:** impact of customer requests, installer recommendations, manufacturer promotions, utility rebates, distributor promotions, other factors**]**

HIGH EFFICIENCY WATER HEATER MARKET (5 MIN)

11. **[IF WATER HEATER DISTRIBUTOR]** We'd like to get a better understanding of efficiency water heaters and how sales and distribution might differ from standard water heaters.
    a. Does your firm sell higher efficiency water heaters? **[PROBE for:** Standard Tank ENERGY STAR, tankless, HPWH**]**
        i. [If Yes]: Approximately what percentage of your water heater sales are higher efficiency?
    b. How long are lead times for high efficiency water heaters? How does this differ from standard efficiency water heaters?
    c. Is there anything else you think we should know about water heater distribution that we haven't covered?

CUSTOMER DECISION MAKING (7 MIN)

If time permits and it is relevant based on the previous conversation, the interviewer will also gather distributor opinions about customer decision-making.

We'd like to get a sense of what you think customers consider when deciding to purchase new equipment.

12. Generally speaking, why do you think customers choose to install a new system? **[Probe for:** failure, repair costs too high, remodeling, looking to save money, looking to save energy, etc.**]**
    a. **[IF SELLS BOTH]** Does this vary between water heaters and HVAC equipment?

13. What factors do you think customers consider when making purchase and installation decisions?
    b. How important do you think familiarity is in equipment replacement? How often do customers seek to replace their current equipment with something different? **[IF NEEDED:** For example, replacing a standard storage water heater with a tankless water heater or replacing a ducted heating system with a ductless heat pump, brand loyalty**]**
    c. What influences installer product recommendations? **[Probe for:** stock on hand, distributor stocking practices or promotions, utility rebates or tax credits, customer requests**]**
    d. Does the consideration of energy efficiency come into play? Who initiates the discussion?
    e. Do you find that certain types of customers are more likely to install energy efficient equipment?
        i. Are customers who replace their equipment while it is still working reasonably or those whose equipment is not functioning or barely functioning more likely to install higher efficiency equipment?
    f. Do any of these customer considerations influence your decision making? If so, how?

CONCLUSION

Those are all the questions we have for you. Is there anything else you would like to share about your experience with [HVAC and/or Water Heating] systems?

Thank you so much for taking the time to speak with us. If you could provide us with your email address, we can send your $150 Visa gift card to you right now. It will be sent via a service called Tango Card. Once you receive the email, you will have the option to use the gift card electronically or have a physical gift card sent to you in the mail.