



# Juneau Ductless Heat Pump Market Survey Survey Results

*December 31, 2020*



**Prepared for:**  
Alaska Heat Smart  
*Juneau, AK*



**Prepared by:**  
Information Insights  
*Fairbanks, AK*



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Washington, D.C., 20585

**Primary author:**  
Information Insights, Inc.



**Secondary authors:**  
Alaska Heat Smart  
Cold Climate Housing Research Center-  
National Renewable Energy Laboratory



**Project team:**  
Alaska Electric Light & Power  
Renewable Juneau  
Southeast Alaska Building Industry Association  
Environmental and Energy Study Institute  
Panasonic Life Solutions Company  
Rocky Mountain Institute



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*Cover photo by: Alan Wu, 2010*

## **List of Acronyms**

<b>DHP</b>	Ductless heat pump
<b>HPM</b>	Respondent considering installing a ductless heat pump (“heat pump maybe”)
<b>HPO</b>	Respondent that owns a ductless heat pump (“heat pump owner”)
<b>NASHPO</b>	Respondent that owns a heat pump that is not a ductless heat pump (“non-ductless air source heat pump owner”)

## Table of Contents

Survey Overview .....	7
Part I - Profile of Ductless Heat Pump Owners and Potential Owners in Juneau .....	8
Part II - Survey Response Overview .....	9
<b>Respondent Demographics</b> .....	9
1) Breakdown of heat pump owners .....	9
2) For potential owners, where are you in the decision-making process? .....	9
3) What is the energy efficiency rating of your home or business? .....	10
4) What is the approximate age of the home or building in which the business .....	10
is located?	
<b>Heating Systems</b> .....	10
5) How do you heat your home or business? .....	10
6) Did you or would you stop using or reduce usage of other heating devices .....	12
after installing the ductless heat pump?	
<b>Ductless Heat Pump Use</b> .....	12
7) Sizing for ductless heat pump owners only .....	12
How many rooms do you heat with the ductless heat pump? .....	12
How many heads or interior units does your ductless heat pump have? .....	12
8) What seasons of the year do you use your heat pump? .....	12
9) When did you install your heat pump? .....	16
<b>Reasons for Adoption / Consideration</b> .....	16
10) What did you consider when making the decision to install a ductless heat .....	16
pump?	
11) What do you like about the idea of installing a ductless heat pump? .....	16
12) Why haven't you installed a ductless heat pump yet? .....	16
13) What is the payback period that had to or has to be met? .....	18
14) Are you satisfied with your decision to install a ductless heat pump? .....	18
15) Ranking of factors DHP owners like about their ductless heat pump .....	18
16) Ranking of factors DHP owners dislike about their ductless heat pump .....	18
<b>Information Sources</b> .....	20
17) Thinking about information sources you used when deciding to install a .....	20
heat pump, please rank from most useful to least.	
18) What would make the decision to install a ductless heat pump easier? .....	20
Appendix A - Aggregated Data from Renewable Juneau Surveys .....	22
Appendix B - Cold Snap Survey .....	28
Appendix C - Alaska Heat Smart Contacts-to-Date .....	31

## Survey Overview

### **Purpose**

The City and Borough of Juneau, Alaska has set an ambitious goal to reach 80% renewable energy deployment for heating and transportation by 2045. To help reach this goal, the local nonprofit Alaska Heat Smart formed in 2019 to inform Juneau residents about ductless heat pumps (DHPs), provide one-on-one residential DHP assessments, and help homeowners learn how a DHP could work in their home. Because heat pumps of all types rely on the local hydropower electricity grid to operate, they can play a large part in reaching the City and Borough of Juneau's renewable energy goals.

In 2020, Alaska Heat Smart partnered with a larger team to plan Thermalize Juneau, a campaign that combines Alaska Heat Smart's energy advising with DHP and energy efficiency measure installation assistance and bulk discounts. This group conducted the Juneau Ductless Heat Pump Market Survey in September – October 2020 to inform Thermalize Juneau participant recruitment strategies. The survey identified current DHP user experiences, the reasons behind the DHP installations, occupant satisfaction, perceived energy savings, and usage patterns.

### **Methodology**

The Ductless Heat Pump Market Survey was developed by Information Insights, Inc., in coordination with the Cold Climate Housing Research Center and Alaska Heat Smart staff and board members. The survey team jointly developed initial questions for the survey, then created a list of survey-appropriate questions and logic. These were entered into an online survey software, and finally selected heat pump owners reviewed the online survey format. The questions for the full survey are available upon request to the project team<sup>1</sup>.

The target audience for the survey was individuals who currently own and use DHPs in Juneau as well as those who are considering installing a DHP in Juneau. To ensure the survey was completed by this audience, the survey included several screening questions to identify geographic location, ownership of a home or business, and ownership of a DHP or interest in installing a DHP. A total of 247 individuals started the survey, with 156 passing the screening questions and completing the full survey. Of the 156 respondents who completed the survey, 67 were DHP owners and 89 were considering installing a DHP. Of those who did not complete the survey due to disqualification from the screening questions, 21 had heat pumps that were not DHPs and the remaining 70 either were not considering installing a DHP, did not own a DHP, or were not located in Juneau. For the 21 other heat pump owners, 5 owned ground source heat pumps, 7 owned air to water heat pumps, and 9 had central or other type of air source heat pumps.

The survey **opened** on September 22, 2020. The project team sent email invitations to 178 individuals on a contact list of current and potential heat pump owners provided by Alaska Heat Smart. The list had been gathered from home assessments, correspondences, and previously held workshops with residents in Juneau. The survey team also utilized a second mode of response collection by distributing the survey link through Alaska Heat Smart partner social media sites and emails sent out by Alaska Heat Smart staff and board members. The survey closed on October 22, 2020.

The **response rate** for those invited via email was 50% (178 invited, 89 responses). Releasing the survey to the full community via social media enabled the survey to reach a wider audience.

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<sup>1</sup> Find the most up-to-date contact information on project team websites. Information Insights: [infoinsights.com](https://infoinsights.com); Cold Climate Housing Research Center: [cchrc.org](https://cchrc.org); Alaska Heat Smart: [akheatsmart.org](https://akheatsmart.org)

## Part I – Profile of Ductless Heat Pump Owners and Potential Owners in Juneau

The primary purpose of this survey is to better understand DHP owners and potential owners in the Juneau, Alaska market. The following primary results will inform the Thermalize Juneau recruitment campaign.

- **Age of building or home:** Across both survey groups of DHP owners and potential owners, the majority of homes/buildings are 20+ to 50+ years old.
- **Primary vs supplemental:** A majority of DHP owners and potential owners are looking for DHPs to entirely replace or significantly reduce the use of other heating sources. The largest percentage of DHP owners (42%) are using a single head heat pump. Further, the majority of DHP owners (86%) are using their heat pump to heat two or more rooms.
- **Purchase considerations:** For both DHP owners and potential owners, reducing fossil fuel usage and reducing energy costs were top factors in deciding or considering to purchase a DHP.
- **Payback:** Potential DHP owner respondents (44%) have a specific payback period in mind, while fewer current DHP owners (30%) had such an expectation. This disparity (in addition to a higher percentage of owners expecting a longer payback period) may suggest that early heat pump adoptions are more common among households with greater financial means, where cost is less of a barrier.
- **Make the decision easier:** For both DHP owners and potential owners, less expensive installation costs are at the top of the list for making the decision easier. For potential owners, low interest financing options are the second most significant factor. Both groups feel similarly about the importance of improved pricing/operation cost estimates, which is a close third for potential DHP owners.
- **DHP satisfaction:** 93% of DHP owners expressed satisfaction with their decision overall. The top positives for DHPs are less expensive space heating and not having to purchase fuel oil, and closely followed by a relatively small number of maintenance requirements.
- **DHP dissatisfaction:** For both DHP owners and potential owners, the high up-front cost of DHPs is a top consideration. For owners, installation cost ranked at the top of the list on dissatisfaction. For potential owners, most indicated the cost is the largest barrier, followed closely by those who still need more information.
- **Information:** The majority of the potential DHP owners are in the research stage. This suggests that the creation of standardized, trustworthy introductory information, including a clearly defined process of consultation and decision-making, would be beneficial to those considering an installation. DHP owners identified personal internet research, local installers, and locals with DHP installations as the most useful information sources in their decision-making process. There is a significant opportunity for Alaska Heat Smart to fill this need.

## Part II – Survey Response Overview

### Respondent Demographics

#### 1. Breakdown of heat pump owners

Of the 156 completed surveys, 67 respondents own a DHP (43%) and 89 are considering installing one (57%).

In total, 88 heat pump system owners started the survey. Of those, 76 (86%) own an air source heat pump (88% ductless, 11% central, and 1% other), 7 (8%) own air to water heat pumps, and 5 (6%) own ground source heat pumps.

#### 2. For potential owners, where are you in the decision-making process?

As shown in Figure 1, the vast majority (71%) of potential DHP owners are still in the research stage, with 48% seeking general information and 23% exploring specific options for their needs (comparing features, brands, determining locations, etc.) 21% are currently talking to installers and receiving quotes, 7% are consulting with industry experts, and 1% are looking at home installation examples. This suggests that the creation of standardized, trustworthy introductory information, including a clearly defined process of consultation and decision-making, would be beneficial to those considering an installation.

Where are people in the decision-making process?

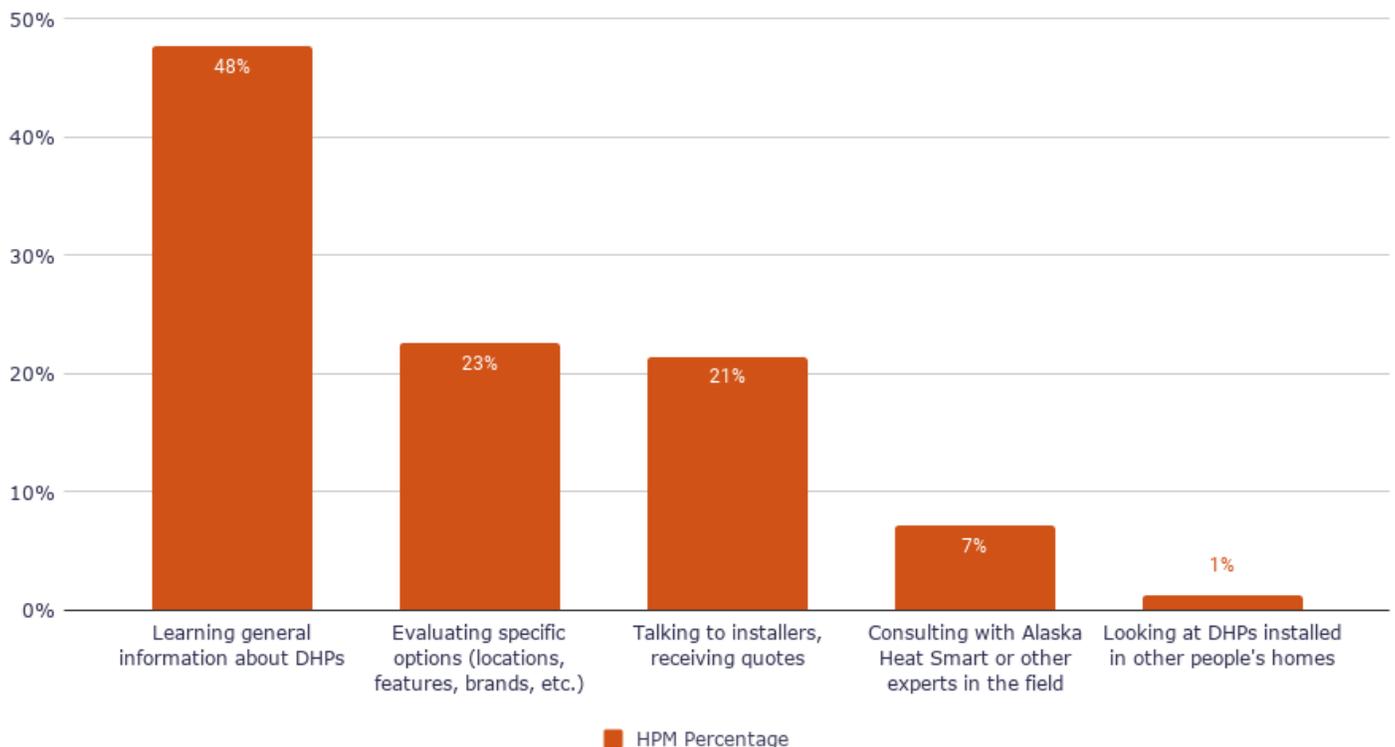


Figure 1: Position of respondents in decision-making process

3. *What is the energy efficiency rating of your home or business?*

Respondents were asked whether their building had an energy efficiency rating. Most potential DHP owners either did not have homes/business with a rating (39%) or were unsure (35%), with only about a quarter (26%) answering “yes.” The majority of non-ductless air source heat pump owners (60%) had businesses/homes with an energy efficiency rating, with only 20% selecting “no,” and 20% unsure. Most DHP owners (49%) had homes/businesses with energy ratings, about a third (34%) lacked a rating, and only 16% were unsure.

Figure 2 demonstrates that heat pump owner home energy efficiency differs widely by heat pump type. Homes with non-ductless air source heat pump owners (NASHPO) had the highest efficiency of all groups, with 55% of respondents rated at five star and above, while only 18% of DHP owners (HPO) achieved this rating. Instead, 64% of DHP owners had home energy efficiency ratings between three and four-star plus. DHP potential owner (“heat pump maybe,” or HPM) homes are also relatively high efficiency, with 35% rated at five star and above.

4. *What is the approximate age of the home or building in which the business is located?*

Across all groups, the majority of homes/buildings were 20+ to 50+ years old, though non-ductless air source heat pump owners were slightly less concentrated in these age ranges. Non-ductless air source heat pump owners represented the highest concentration (11%) in the less than 5-year age category compared to 8% of DHP owners and no potential owners. Non-ductless air source heat pump owners were also the only group with some respondents who did not know the age of their building (11%). In the middle building age ranges, 10% of potential DHP owners had buildings between 10 and 20 years old (0% NASHPO/HPO) and 3% of DHP owners had buildings between 5 and 10 years old (0% NASHPO/HPM).

**Heating Systems**

5. *How do you heat your home or business? (Respondents selected all that applied)*

Table 1 shows the breakdown in heating systems across DHP owners (HPO) and potential owners (HPM). Respondents were allowed to select multiple heating systems. Over a third (39%) of the 66 HPO respondents to the question rely on electric baseboards in addition to their heat pump, with the next most commonly used systems by DHP owners being wood stoves (27%), toyo stoves, and electric space heaters (both 14%). Nine percent (9%) rely on oil-fired boilers to supplement their DHP. The most common heating systems in use among those considering a DHP include oil fired boilers (33%), electric baseboards (28%), toyo stoves (27%), and oil-fired furnaces (24%). Eighteen percent (18%) use wood stoves. Pellet stoves, pellet boilers, propane fireplaces, and electric boilers and furnaces were less common among both groups with use in under 10% of homes.

Free responses also included electric heat fans, infrared

**Table 1:** Heating systems by HPO vs. HPM

Heating System	HPO	HPM
Heat pump	100%	0%
Oil fired furnace	5%	24%
Oil fired boiler	9%	33%
Toyo stove or equivale	14%	27%
Electric baseboard	39%	28%
Electric boiler	6%	4%
Electric furnace	0%	2%
Electric space heater	14%	10%
Woodstove	27%	18%
Pellet stove	8%	7%
Pellet boiler	2%	2%
Propane fireplace	6%	3%

*Note: Because respondents were prompted to select all options that may apply to their situation, response totals do not necessarily sum to 100%.*

### Energy Efficiency Rating

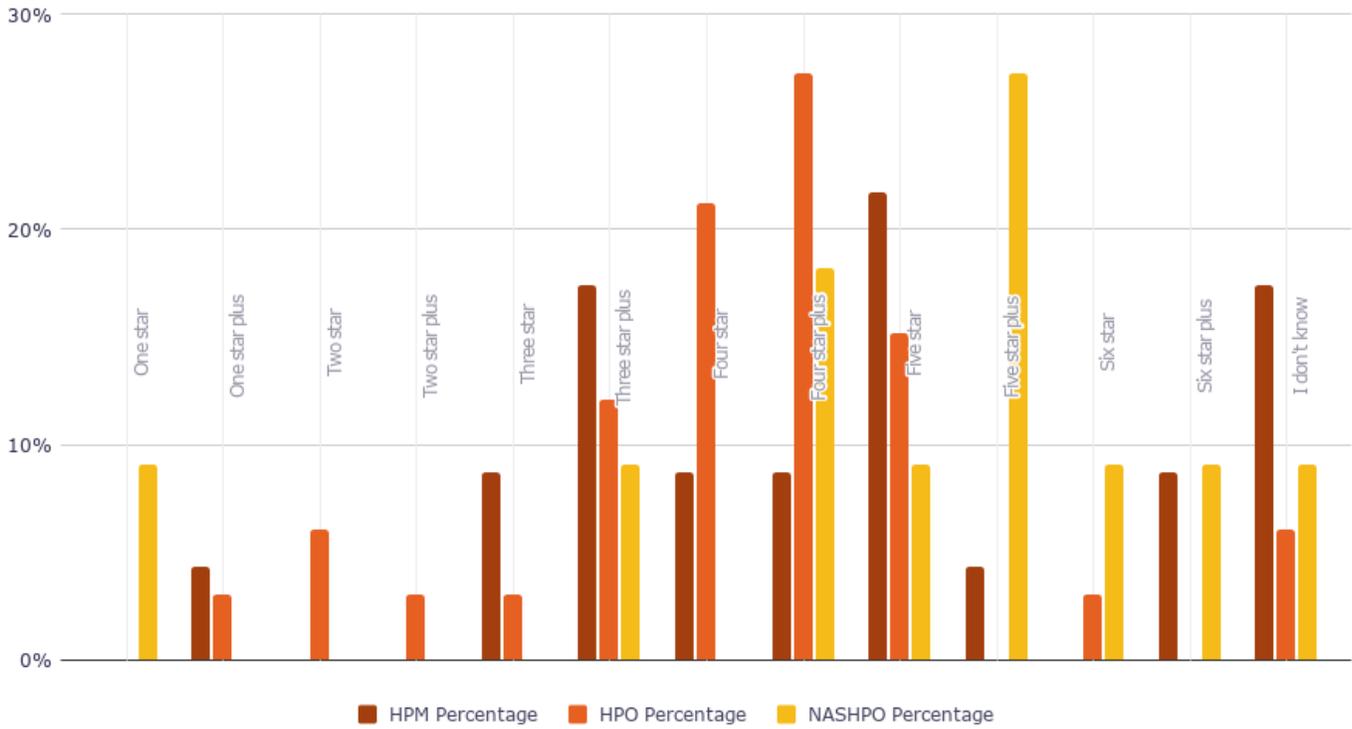


Figure 2: Energy efficiency ratings

### Approximate Building Age

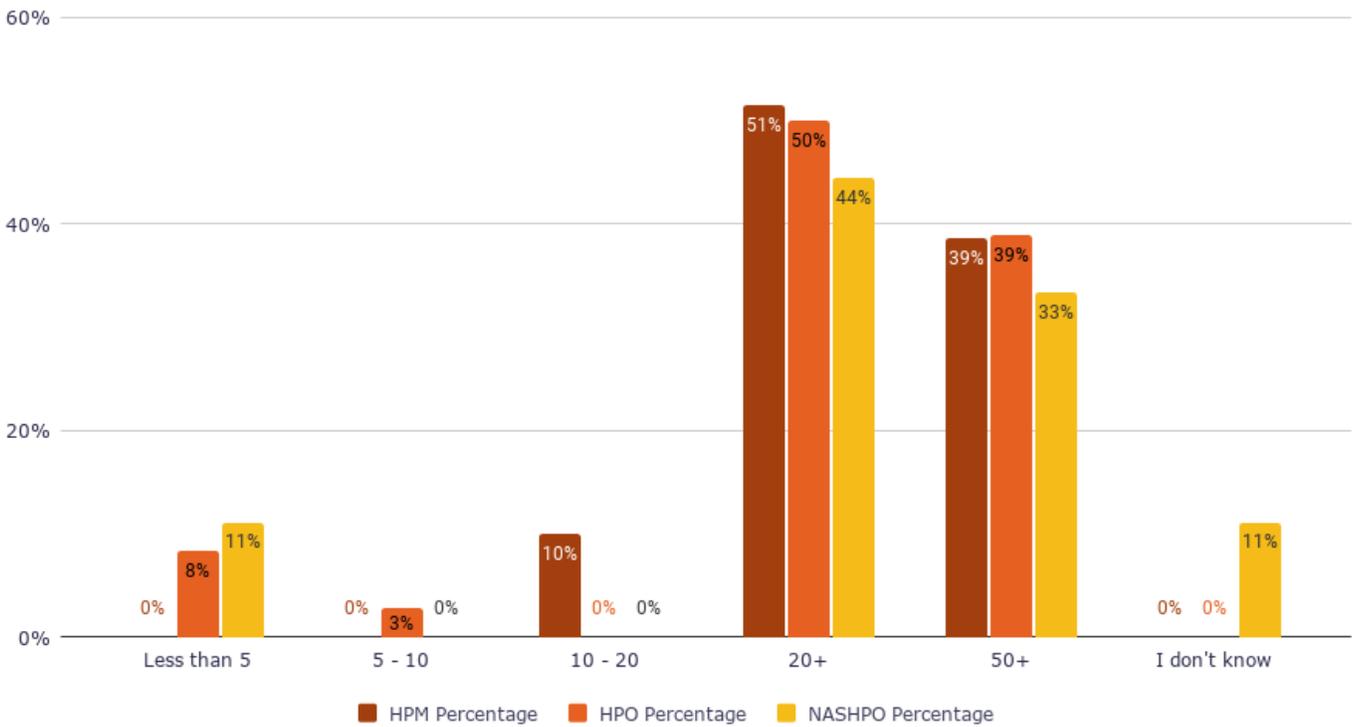


Figure 3: Approximate age of home or building

heaters, propane-sealed combustion boilers, and wood fireplace inserts.

Alaska Heat Smart 2018 and 2020 survey data on heat pump owners showed similar supplementary heating systems as 2020 DHP surveyed owners, with most (43%) using an electric baseboard system and a quarter using woodstoves. The 2018 survey also showed that 20% had oil systems still in use as supplementary/backup heating. The remainder owned backup electric systems (7%), electric wall heaters (7%), pellet stoves (4%), electric fireplaces (4%) and propane systems (2%).

6. *Did you or would you stop using or reduce usage of other heating devices after installing the ductless heat pump?*

Figure 4 displays the planned DHP use for those considering DHP installations. Most respondents (49%) plan to use a DHP as a primary heating source (replace/stop using one or more devices), while 24% plan to use DHPs as a supplementary source. The remainder, 27%, are unsure of their plan. In the comments, multiple respondents also mentioned keeping older systems to use as a backup in the case of power outages and cold temperatures. These responses suggest a need for resources that convey realistic expectations for DHP function based on housing variables (like construction and size) and ways of mitigating potential DHP drawbacks in an Alaska context.

Figure 5 shows that 54% of DHP owners stopped using all other systems and now use their DHP as a primary heat source, while the remaining 46% use their DHP as a supplementary system. 39% were able to reduce usage of their original system, while 7% had no usage reduction in their other heating devices. Free response comments indicated that some respondents in this latter category may have experienced no usage reduction because they use different systems to heat different areas of their homes.

### **Ductless Heat Pump Use**

7. *Sizing for ductless heat pump owners only: How many rooms do you heat with the ductless heat pump?*

Figure 6 shows how many rooms DHP owners can heat with their systems. A vast majority of owners (72%) heat three or more rooms, 14% heat two rooms, and 12% heat only one room.

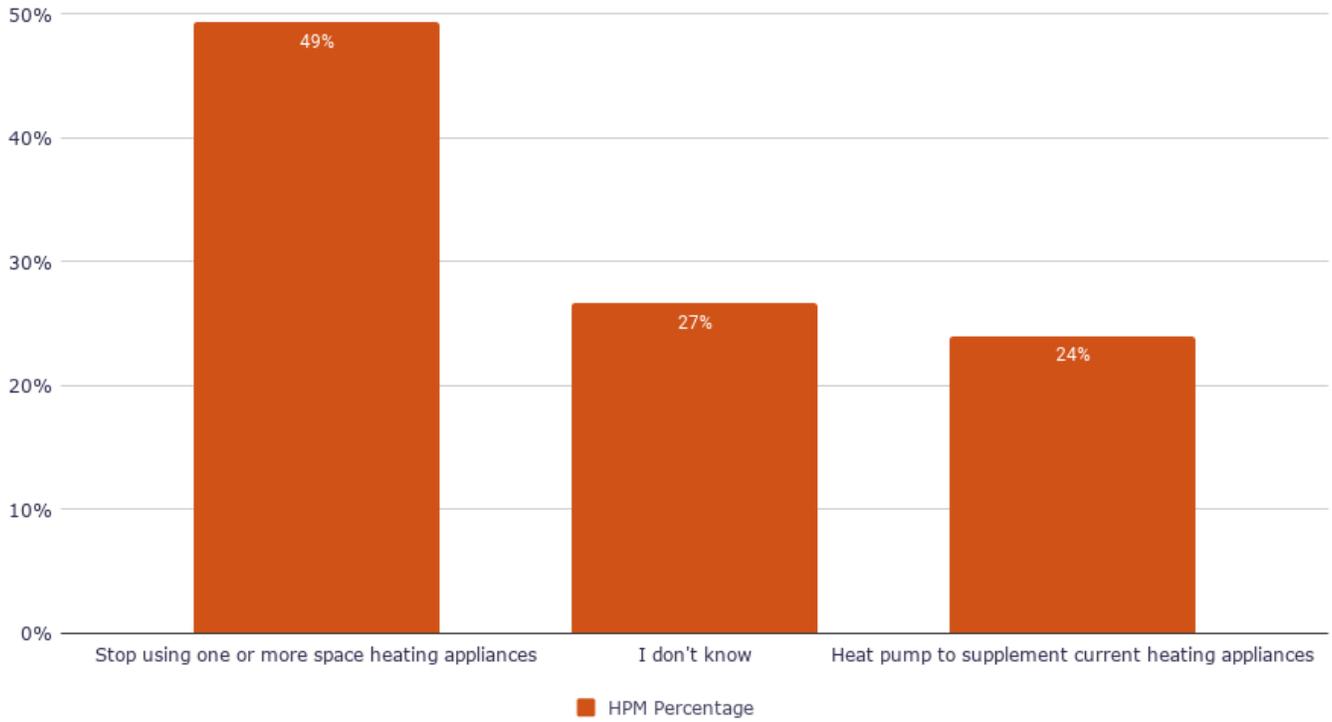
*Sizing for ductless heat pump owners only: How many heads or interior units does your ductless heat pump have?*

Figure 7 displays the number of head or /interior units each DHP owner has installed in their home or building. Most (42%) only have one unit, 17% of respondents have two units, 13% have three units, 10% have four units, 6% have five, and 13% have more than five. This range may indicate differences between residential and business DHP use in the number of units.

8. *What seasons of the year do you use your heat pump? (Respondents selected all that applied)*

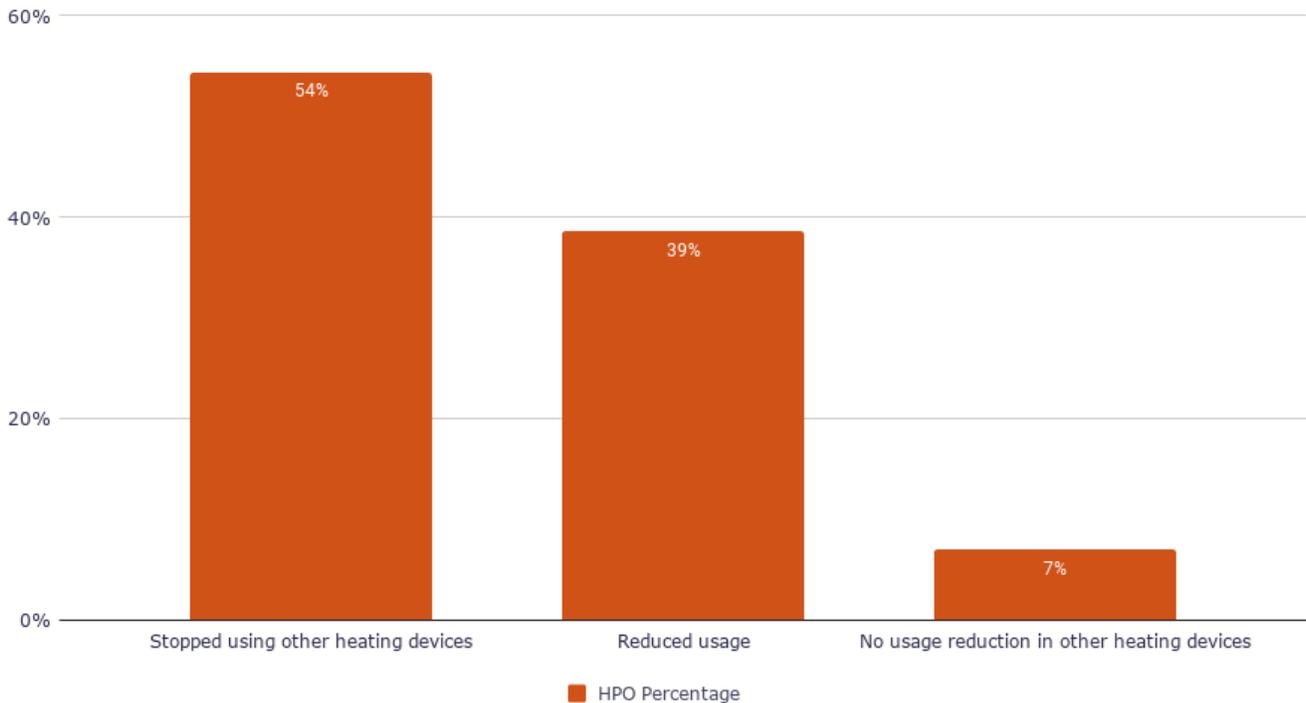
DHP owners were asked about the time of year they use their DHP system. As seen in Figure 8, most owners use their DHP consistently through the winter, fall, and spring, with 98%, 97%, and 92% respectively. DHPs were used less overall in the summer with 70% utilizing heating mode during this time of year and 47% using cooling mode. These responses show consistent use throughout most of the year, with a slightly diminished need for heating/cooling systems in the summer months.

### Plan for old system pre-heat pump purchase



**Figure 4:** Plan for other heating devices among those interested in DHPs

### After heat pump install, what was done with original system?



**Figure 5:** Current DHP owners use of other heating devices

### Number of Rooms Heated

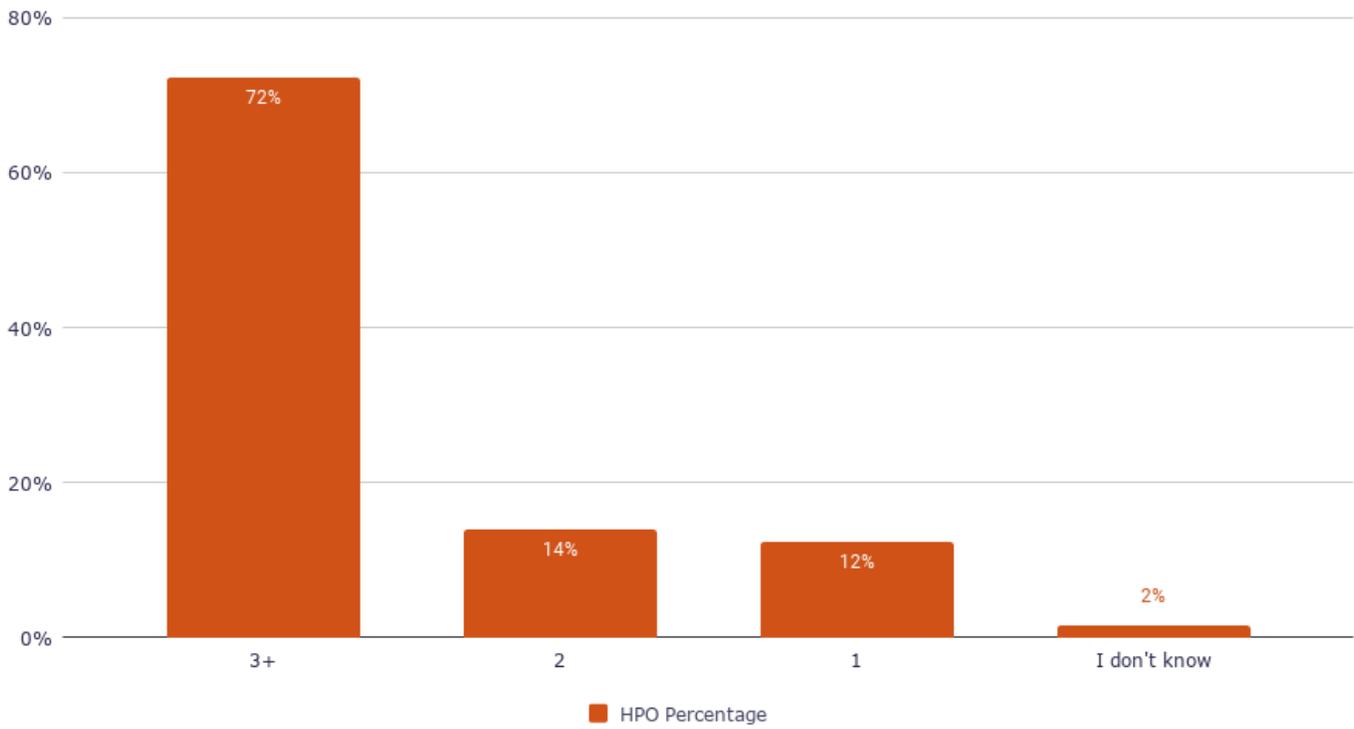


Figure 6: Rooms heated with DHP

### Numbers of Heads/Interior Units

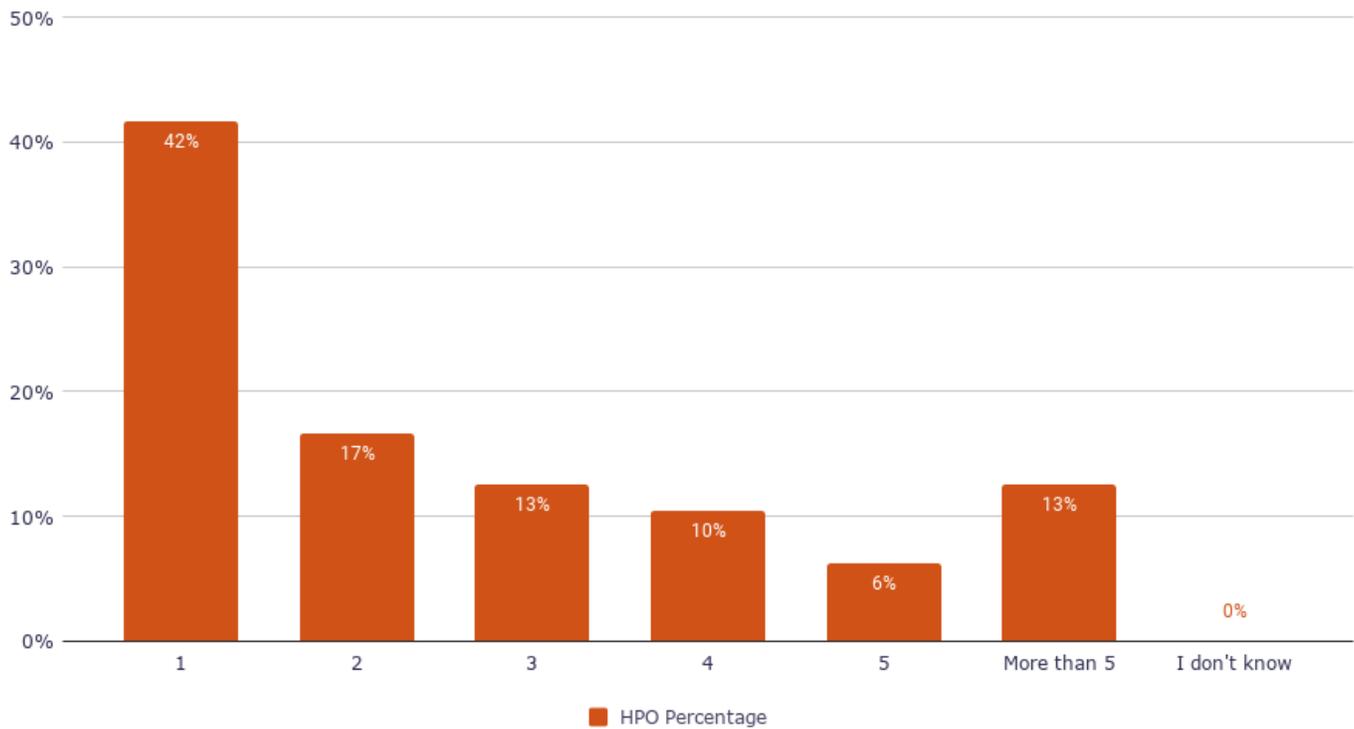


Figure 7: Number of heads or interior units

### Seasons of Heat Pump Use

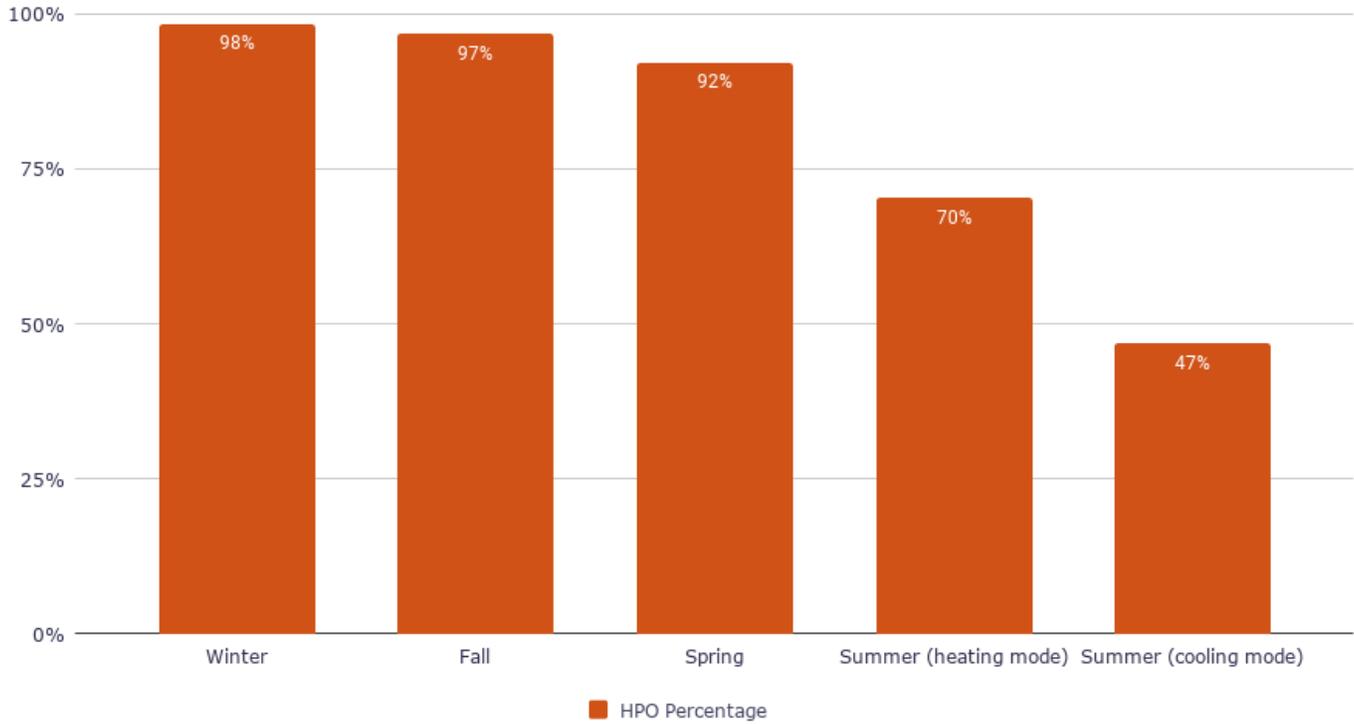


Figure 8: Seasons in which DHP is used

### DHP Installation Date

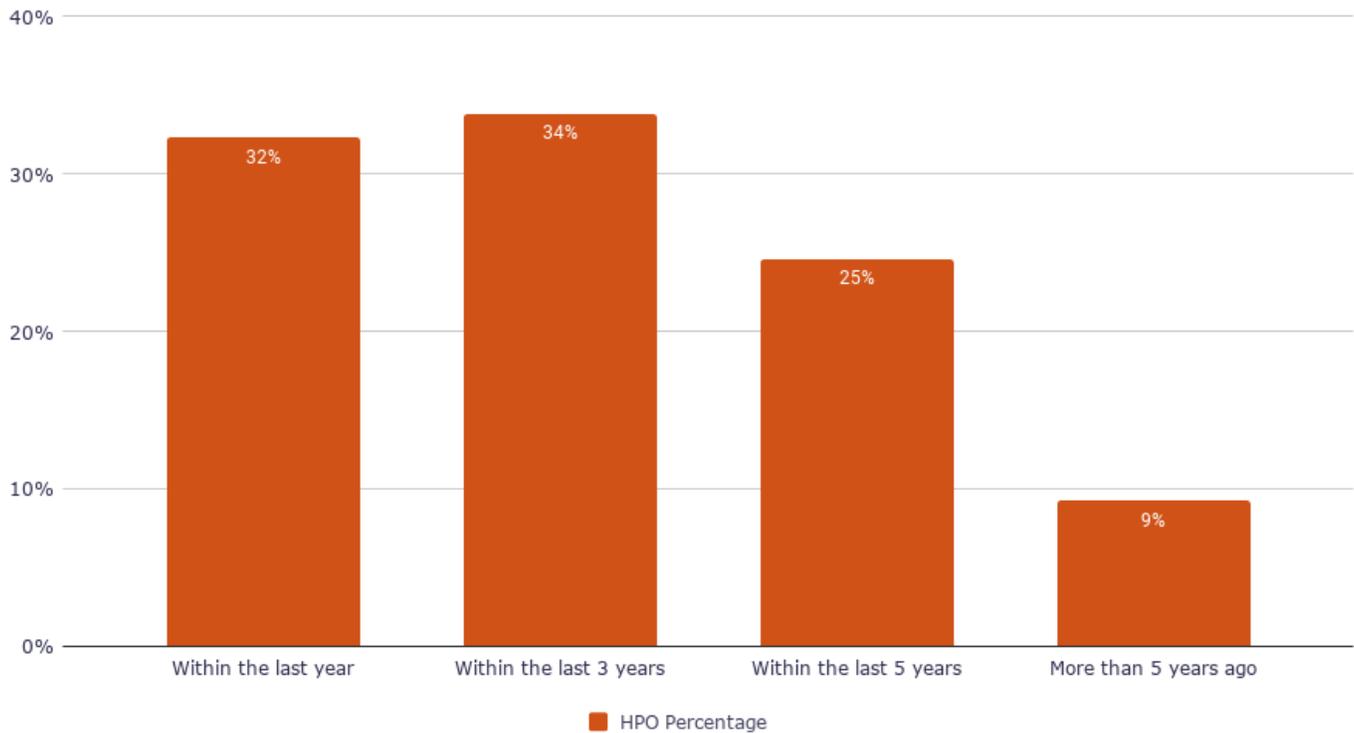


Figure 9: Date of DHP installation

9. *When did you install your heat pump?*

The majority of surveyed DHP users installed their heat pump recently, with 91% installing it within the last 5 years. Figure 9 shows that only 9% of heat pump owners installed their DHP more than 5 years ago.

**Reasons for Adoption/Consideration**

10. *What did you consider when making the decision to install a ductless heat pump? (DHP owners ranked the factors listed)*

DHP owners were asked to rank what they considered when making the decision to install a heat pump in order of importance; responses are shown in Table 2. General environmental/climate considerations, fossil fuel usage reductions, and lower costs of heating were all ranked high and have very close averages. Reduced oil spill liability, better indoor air quality, ability to deliver heat to needed locations, and convenience were all given moderate rankings. End of service life of current system and the ability to have air conditioning were on the low end of the spectrum, with the least amount of importance to respondents overall.

**Table 2:** Ranking of contributing factors to respondents' interest in installing a heat pump.

Rank	What did you consider?
1	General environmental/climate considerations
2	Reduce fossil fuel usage
3	Lower cost of heating
4	Reduce oil spill liability
5	Better indoor air quality
6	Ability to deliver heat to locations where most needed
7	Simpler or more convenient to use
8	Existing system(s) has reached end of service life
9	Ability to have air conditioning

11. *What do you like about the idea of installing a ductless heat pump? (Potential DHP owners selected all that applied)*

Figure 10 displays the responses of potential DHP owners when asked about what they like about the idea of installing a DHP. The majority (71%) indicated a reduction in fossil fuel use as a motivating factor, followed closely by 65% who liked the idea of lower energy use. Many respondents were also drawn to cost incentives, with 60% liking the idea of less expensive space heating and 58% looking forward to not having to buy fuel oil. In addition to these factors, 40% liked the minimal maintenance requirements of heat pumps, and 38% looked forward to better indoor air quality. With fewer responses, 30% of respondents like the ability to cool in the summertime. Free response comments also mentioned potential dehumidifying features and lower noise levels than their current systems.

12. *Why haven't you installed a ductless heat pump yet? (Potential DHP selected all that applied)*

Figure 11 displays reasons for not installing a DHP among potential DHP owners. This shows the primary barriers to DHP adoption among those interested in installing the technology. Most respondents (43%) indicated cost/expensive installation as a reason for not yet installing a heat pump system, closely followed by the 40% of respondents who are still gathering information to make their decision. Next, 34% indicated their current heating system's good operating condition as a factor. 22% of respondents do not feel confident that the potential heating cost savings will justify the expense of installation. Other factors included exploring other retrofits first (7%), concerns about the heat pump system not operating year-round (4%), and a lack of installers (2%).

Free response comments also brought up other issues that respondents face. A commonly mentioned experience was issues with and a general lack of trust in installers (unresponsive, provide unreasonable quotes). Many need more information on their specific needs (space, existing infrastructure) and are

### What do you like about the idea of installing a ductless heat pump?

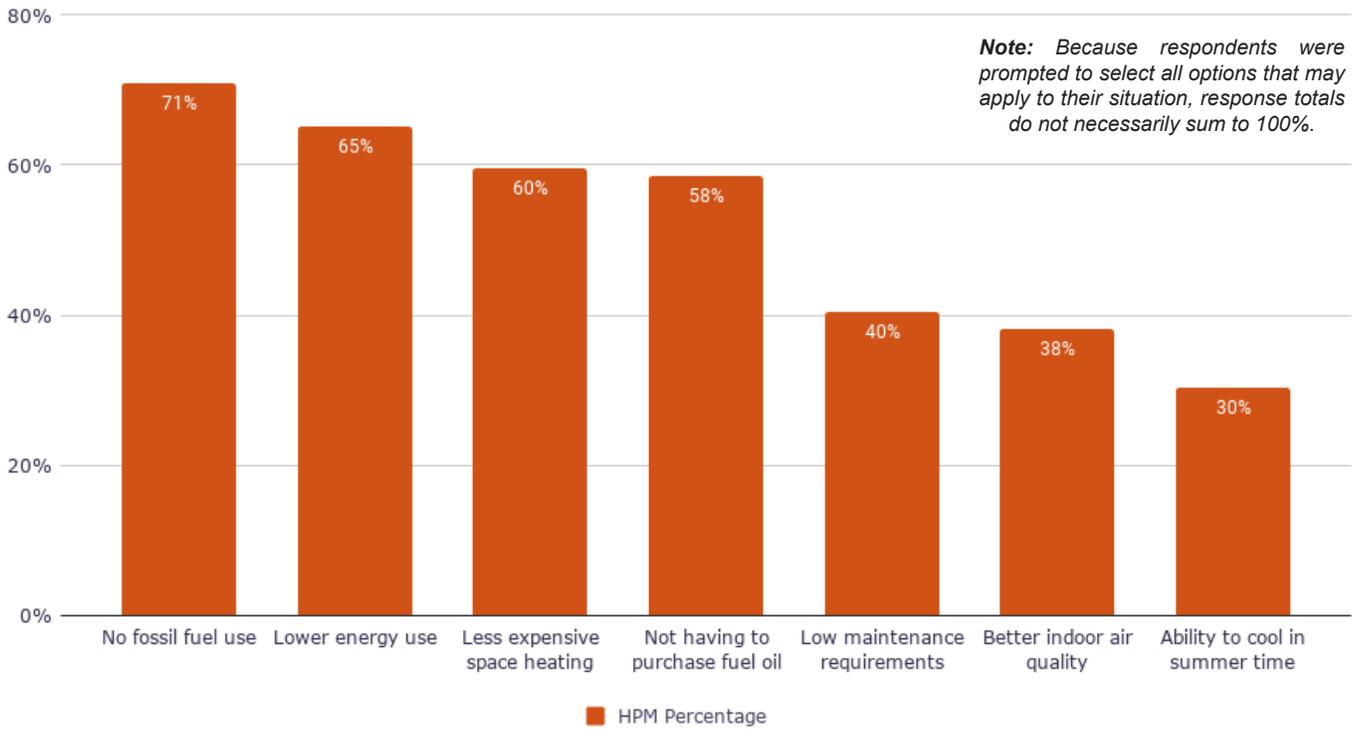


Figure 10: Appeal of DHPs

### Reasons for not installing a heat pump

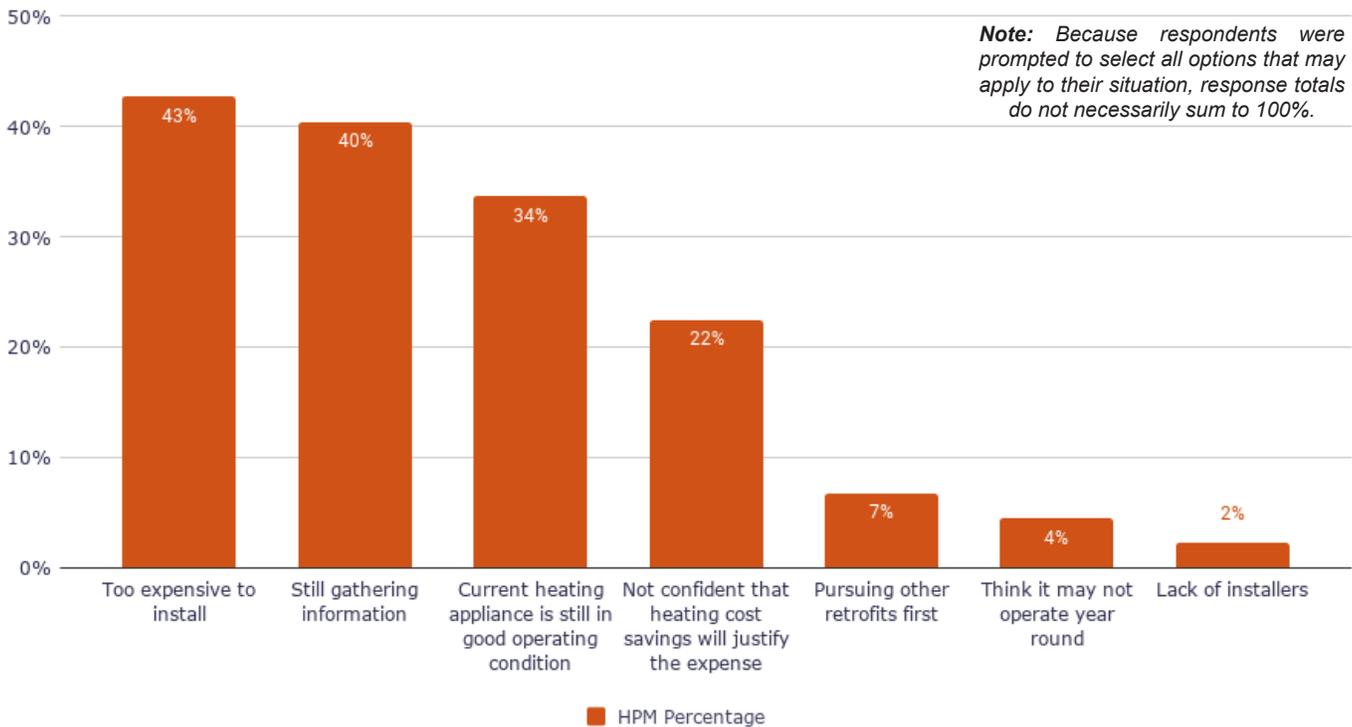


Figure 11: Reasons for not yet installing a DHP

unsure if a DHP is the best system for them compared to other heat pump types. Others mentioned concerns about the approval of their Homeowners Association for outdoor units.

13. *What is the payback period that had to or has to be met?*

Figure 12 showcases a comparison of expected payback periods between those considering DHP installation (HPM) and current DHP owners (HPO). Most respondents in both groups had no payback period in mind, though this number was far higher for DHP owners (34% of HPMs vs. 64% of HPOs). This disparity, in addition to a higher percentage of owners expecting a longer payback period, may suggest that early heat pump adoptions are more common among households with greater financial means, where cost is less of a barrier. The second most common expected payback period was 3 to 6 years (23% HPM, 14% HPO). 22% of those considering heat pumps are not sure of a payback period, compared with only 5% of owners. This indicates that increasing the accessibility of realistic cost/payback estimates would be beneficial.

14. *Are you satisfied with your decision to install a ductless heat pump(s)? (DHP owners only)*

In Figure 13, the vast majority of heat pump owners (93%) expressed satisfaction with their decision overall, with 26% somewhat satisfied and 67% very satisfied. Only 8% expressed some level of dissatisfaction. This mirrors sentiments in the Alaska Heat Smart April 2018 DHP survey, where 97% of respondents were satisfied with their DHPs, compared to only 3% dissatisfied.

15. *Ranking of factors DHP owners like about their ductless heat pump*

DHP owners were asked to rank elements they like about their heat pump, showcased in Table 3.

Less expensive space heating and not having to purchase fuel oil were ranked highest and tied on the list of heat pump positives, closely followed by a relatively few maintenance requirements. Improved indoor air quality and more heat availability were also important to owners' satisfaction, with averages less than 0.1 apart. The ability to cool in the summertime was ranked lowest in terms of its impact on owner satisfaction, suggesting that this feature is less of a need/priority for Alaska heat pump owners.

16. *Ranking of factors DHP owners dislike about their ductless heat pump*

As seen in Table 4, the most disliked factors about heat pumps are their installation cost, followed by aesthetics,

Table 3: Factors ranked according to impact on satisfaction

Rank	Factors
1	Less expensive space heating
2	Not having to purchase fuel oil
3	Few maintenance requirements
4	Better indoor air quality
5	More heat available
6	Ability to cool in summertime
Other (please specify)	
<b>Reduced emissions (4), no fuel smell (2), reduced fire hazard (1), cost effectiveness (1), energy efficiency (1)</b>	

Table 4: Factors ranked according to impact on dissatisfaction

Rank	Factors
1	Cost of installation
2	Aesthetics
3	Cost of operation
4	Noise
5	Frequent maintenance issues
6	Too complex to operate
Other (please specify)	
<b>Inability to set consistent temperature with a thermostat (2), cool spots in house during winter (2), learning curve - different heating than old system (1)</b>	

### Anticipated payback period for heat pump installation

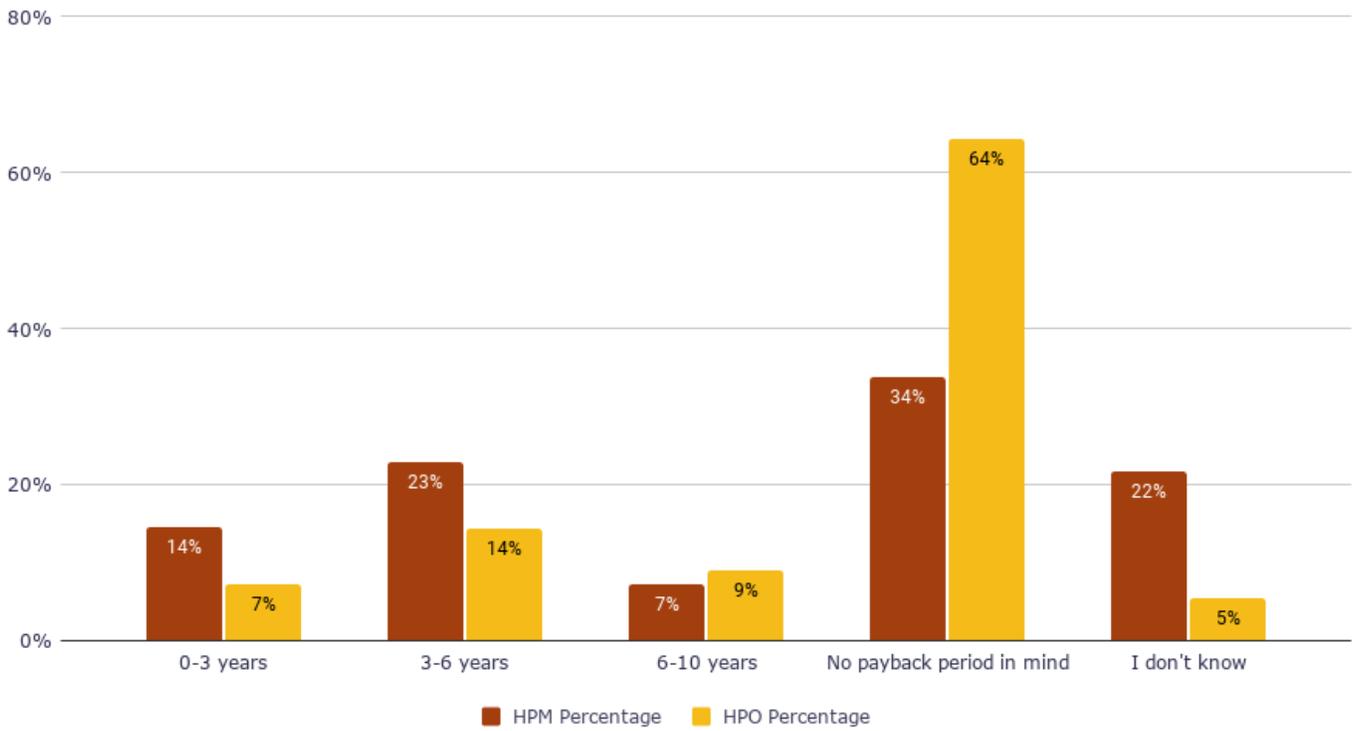


Figure 12: Acceptable payback periods

### Heat Pump Satisfaction

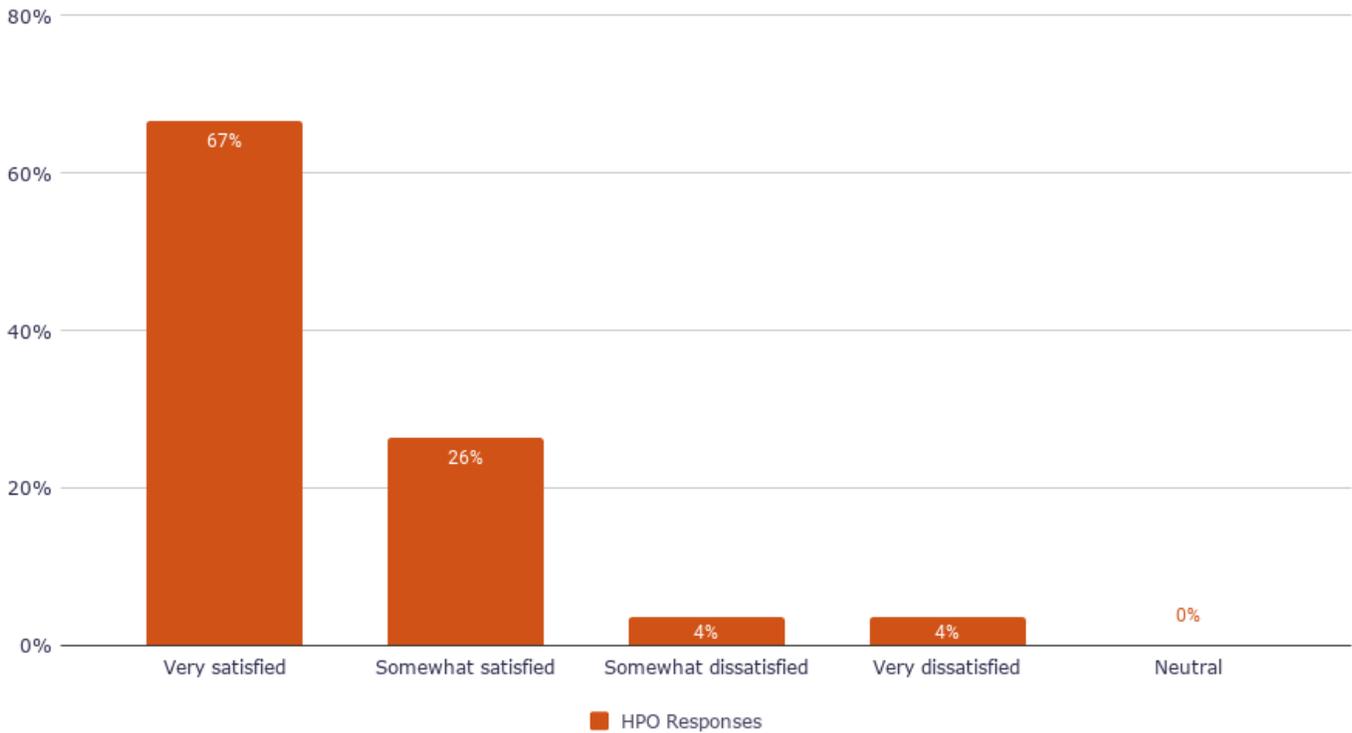


Figure 13: DHP satisfaction

operation costs, and noise levels. The next most disliked factors include a high frequency of maintenance issues and their complexity to operate; averages for these were close, with a difference of 0.3. Free response comments mentioned disliking the inability to set a consistent temperature with a thermostat, inconsistent heating zones across the building, and the learning curve associated with operation.

**Information Sources**

17. *Thinking about information sources you used when deciding to install a heat pump, please rank from most useful to least (DHP owners ranked the factors listed)*

Respondents were asked to rank the usefulness of different information sources on a five-point scale (1 = very useful), providing an overall ranking from the weighted averages of each source. In Table 5, personal internet research, local installers, and locals with DHP installations are shown to be the most useful information sources (they are tightly clustered with the difference in averages less than 0.6), while resources like Renewable Juneau Heat Pump Workshops, heat pump owners outside of Juneau, heat pump calculators, and manufacturer representatives were (tightly clustered with averages less than 0.2 apart) ranked about half as useful by respondents. Alaska Heat Smart webpage and consultations were ranked the lowest on this list. This is a reflection of Alaska Heat Smart’s recent (Jan. 2020) entry into heat pump advising and consultations. For those who installed a heat pump in the last year (end of 2019 through Oct. 2020), 30% reported using the consultations and 29% used the webpage, reporting they are useful or very useful. For those who installed heat pumps earlier, only 17% reported using the consultations and 14% reported using the webpage for information on existing systems. This suggests that Alaska Heat Smart has significant room to grow their presence in the Juneau heat pump market. Additional free response comments mentioned receiving useful information through word of mouth as well as trainings/classes.

**Table 5:** Usefulness of different information sources

Rank	Information Sources
1	Personal research via internet
2	Local installer(s)
3	People in Juneau with DHPs
4	Renewable Juneau Heat Pump workshop
5	People outside of Juneau with DHPs
6	Heat Pump calculator
7	Manufacturer representative
8	Alaska Heat Smart webpage
9	Alaska Heat Smart consultation
Other (please specify)	
<b>Events/speakers (1), classes (2), neighbors/word of mouth (4)</b>	

18. *What would make the decision to install a ductless heat pump easier? (Respondents selected all that applied).*

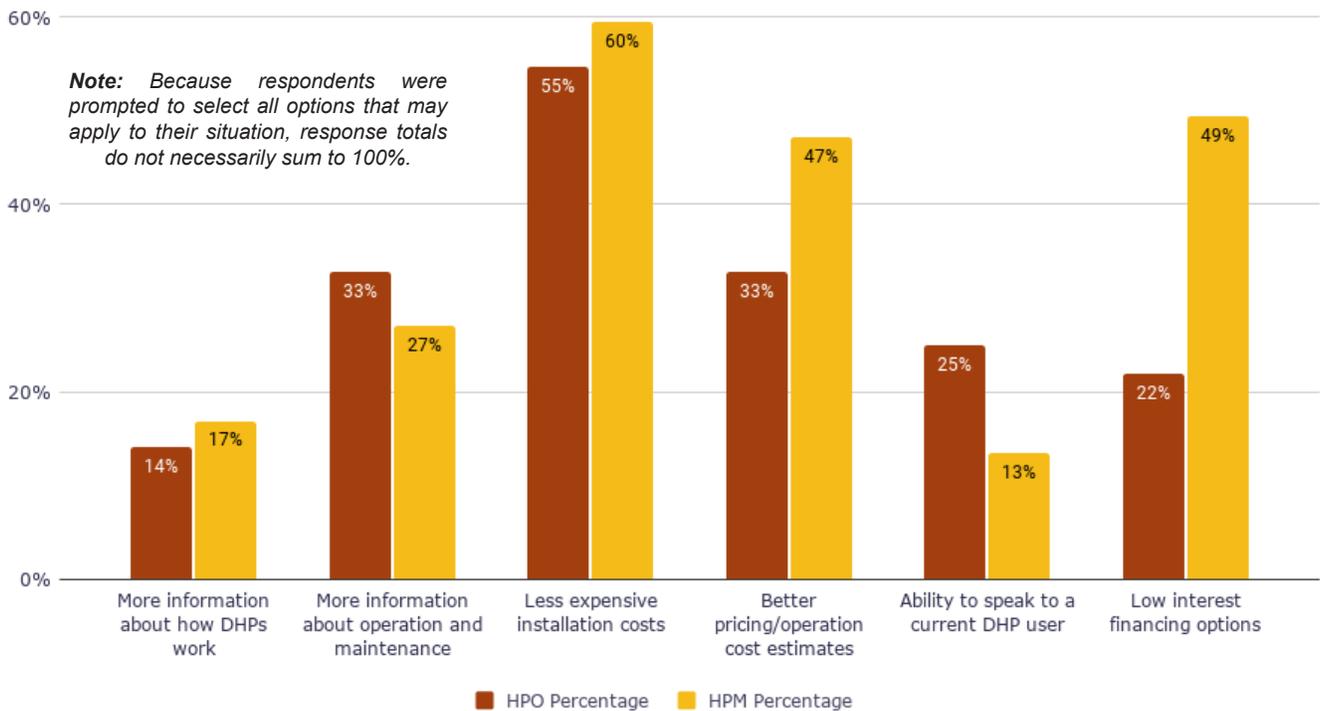
Figure 14 identifies factors that would have made the decision (for both owners and potential owners) to install a heat pump easier. Most respondents in both groups felt that “less expensive installation costs” would have influenced their decision (55% HPO, 60% HPM). For potential owners, “low-interest financing options” was the second most significant factor (49%) in their decision, compared with only 22% of owners. Both groups also emphasized the importance of “improved pricing/operation cost estimates” though this was more significant for potential owners (47%) than owners (33%). More DHP owners (33%) felt that “information about operation and maintenance” would have been helpful than potential owners (27%). Similarly, more heat pump owners (25%) found benefit in the “ability to speak to a current DHP user” before making their decision than potential owners (13%). “More information about how DHPs work” was one of the least selected factors for both groups (14% HPO, 17% HPM).

Most comments from owners also emphasized that interactions with trustworthy, reliable, and competent

installation contractors would have helped their decision, in addition to more price options for electrical contractors, better access to individualized consultations (including realistic timelines), and assistance in understanding bids.

Comments from potential owners shared the owners' emphasis on access to consultations and better contractor options, though they also mentioned greater access to funding options (subsidies/grants) and the ability to consult with an independent party as key helpful factors. Less commonly mentioned factors were options for upgrading electrical/heating infrastructure to support a DHP unit, and resources to compare DHP brands.

### What would have made the decision to install a heat pump easier?



**Figure 14:** Desired information to make DHP decision easier

## Appendix A – Aggregated Data From Renewable Juneau Surveys

Renewable Juneau is a local nonprofit organization committed to helping transition Juneau to a clean energy future. The organization conducted two in-person heat pump workshops for interested Juneau residents in April and November 2018 and followed these workshops with two participant surveys. The April 2018 survey had 88 respondents, and the November 2018 survey had 42. The following data includes aggregated responses for both surveys, where possible. If data reflects responses from only one survey, that is noted.

### 1. What is your current heating system? (Respondents selected all that applied.)

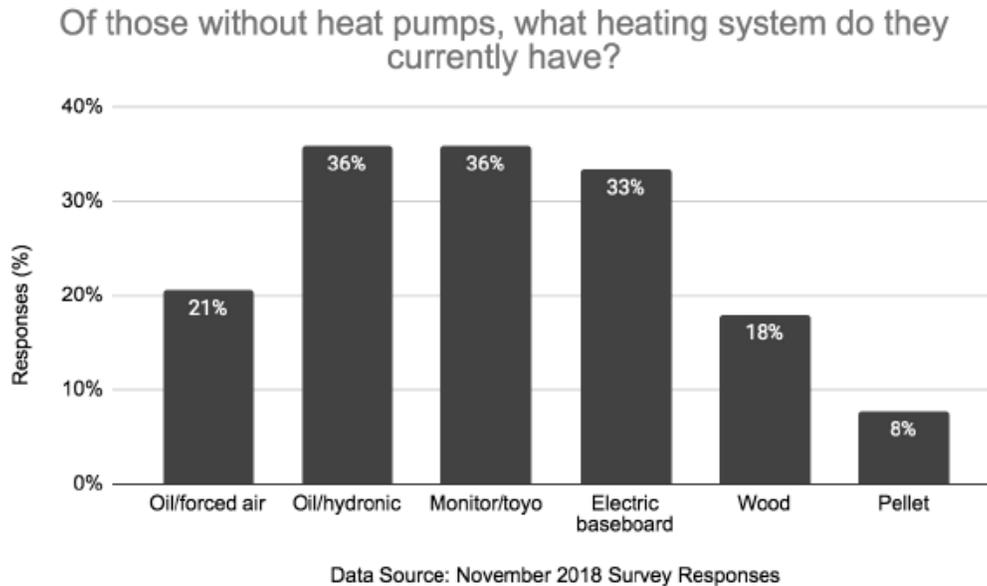


Figure 15: Current heating systems in use

### 2. Do you have an air source heat pump?

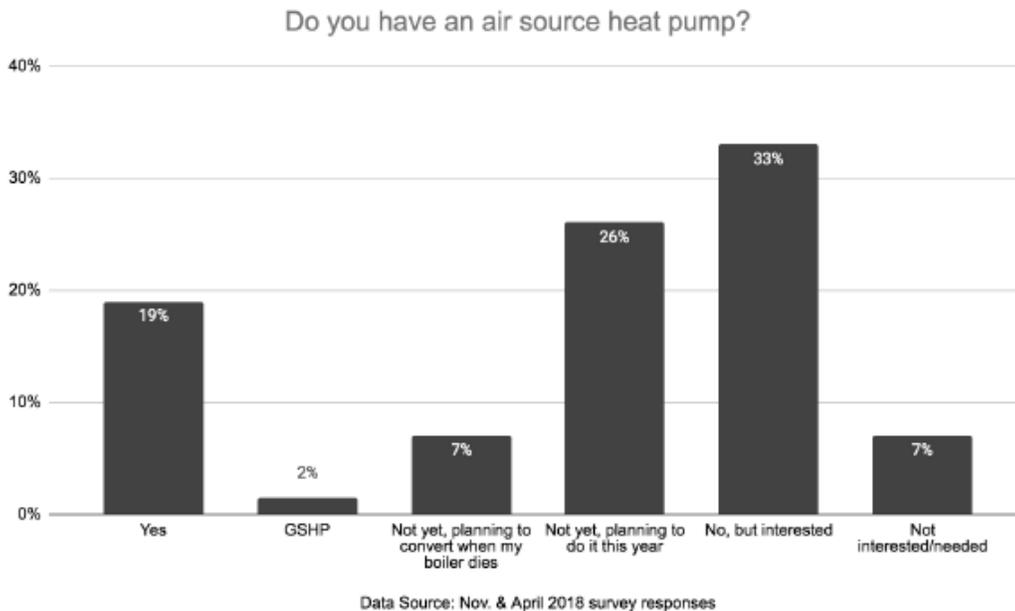


Figure 16: Heat pump ownership

3. Are you satisfied with the ductless heat pump?

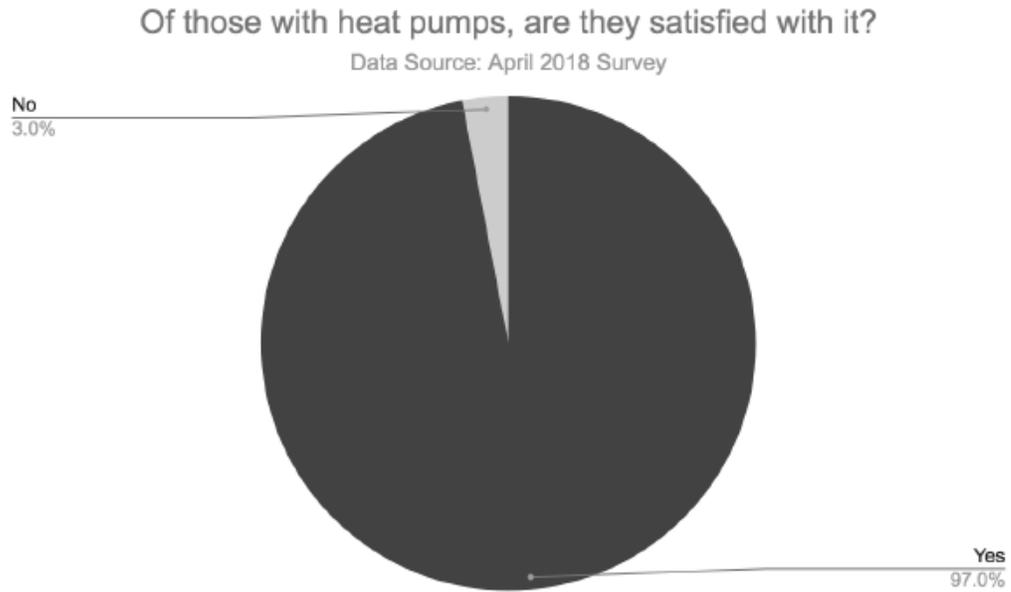


Figure 17: Satisfaction with heat pump

4. Of those who have ductless heat pump(s), what other heating system do they have? (Multiple selections allowed/respondents did not rank primary and secondary systems.)

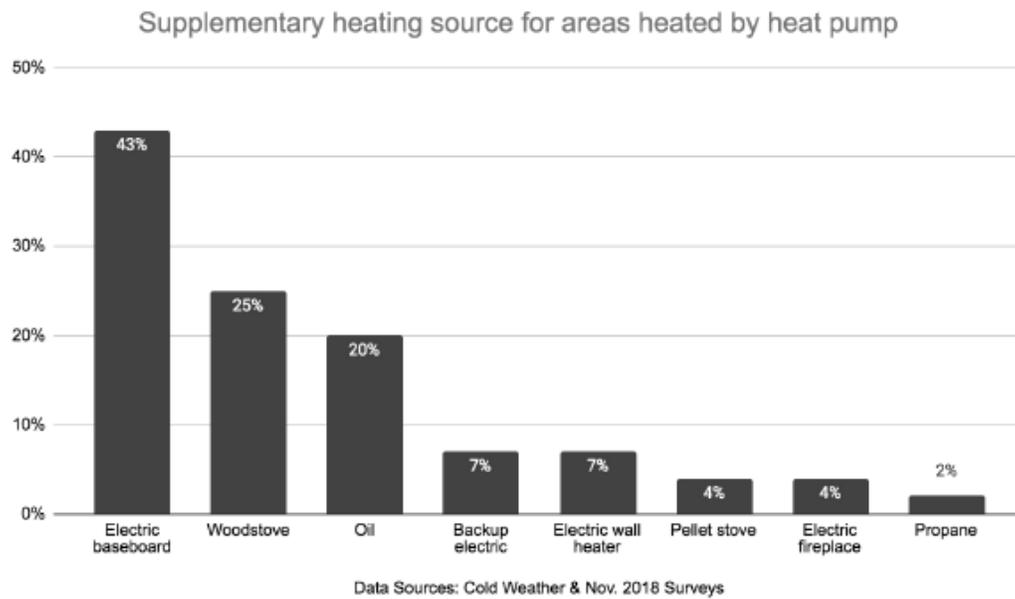


Figure 18: Supplementary heating sources used in conjunction with heat pump

5. Are you planning to convert your heating system to a heat pump within the next year?

Are those without heat pumps planning to convert their system within the next year?

Data Source: Nov. & April 2018 survey responses

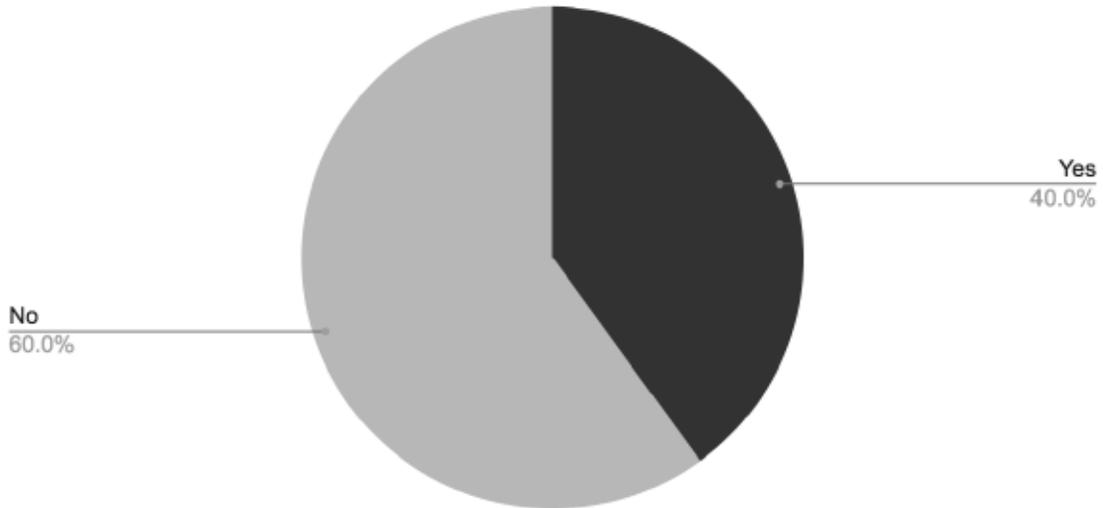
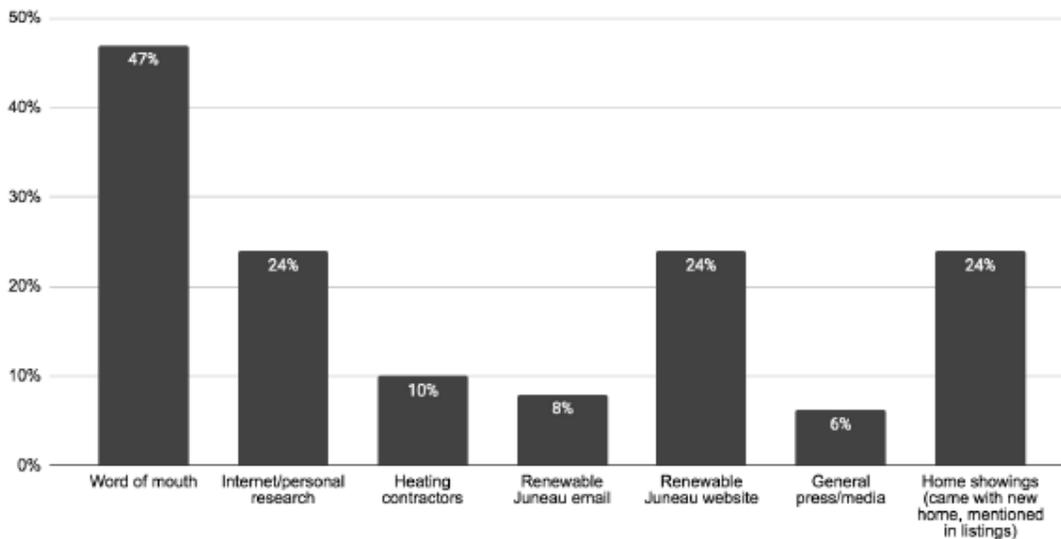


Figure 19: DHP installation plans

6. How have you learned about heat pumps? /How did you hear about heat pumps? (Multiple selections allowed/respondents did not rank primary and secondary systems.)

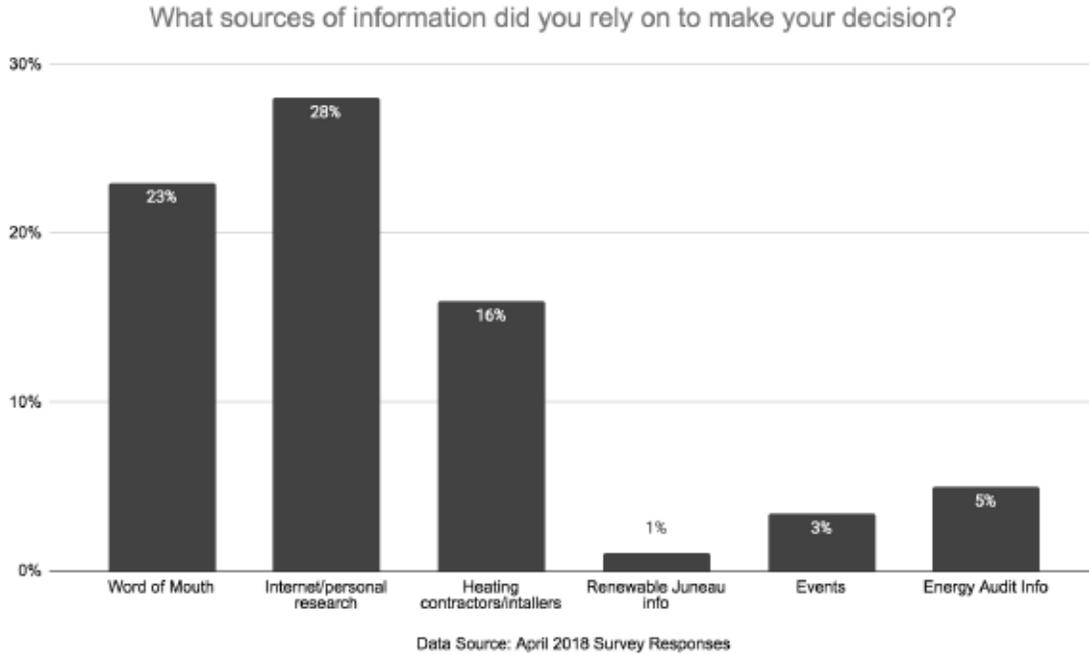
How have people learned about heat pumps?



Data Source: Nov. & April 2018 Survey Responses

Figure 20: Source of initial DHP information

7. What sources of information did you rely on to make your decision?/What information do you wish you had in hindsight?



**Figure 21:** Information sources used in decision-making process

Notable Free Response Comments—Information respondents wish they had in hindsight

- Information on heat pump energy efficiency compared to other types of electric heat.
- Overview of brands available in Juneau, including their performance and maintenance history.
- Information for the general public on how to understand performance ratings and operating cost.
- More information on other types of heat pumps like air-water/ground source, rather than just air-air.
- Square footage heatable with a heat pump.
- That supplemental heat would be needed in very cold weather.
- The ability to receive and compare multiple estimates.

8. What has been your most important source of information about heat pumps?

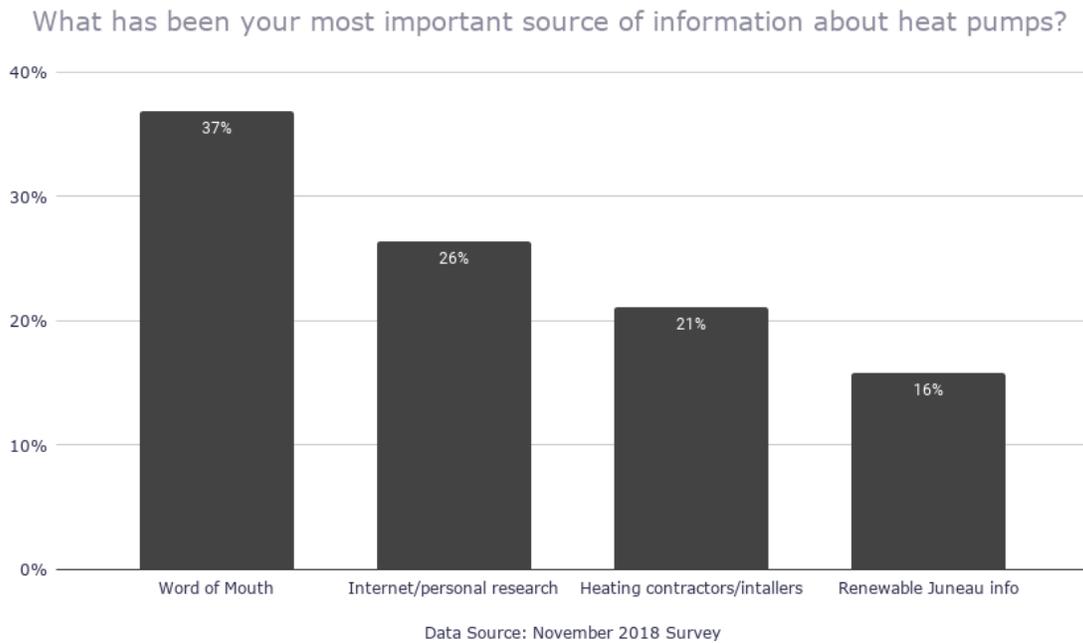


Figure 22: Most useful sources of DHP information

9. What do you see as the main barriers to you installing a heat pump? (Multiple selections allowed.)

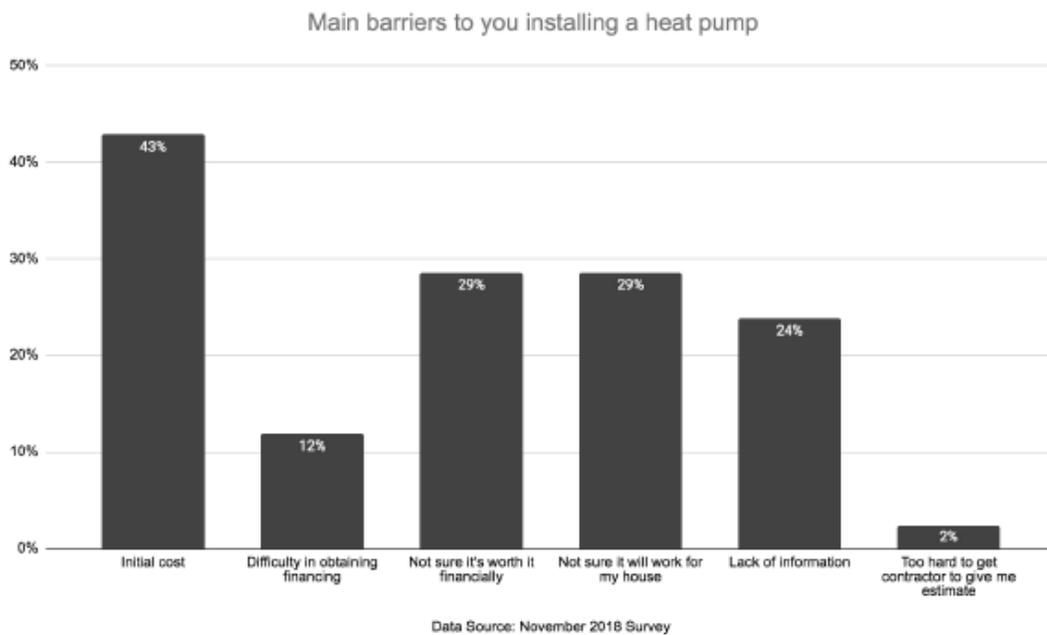
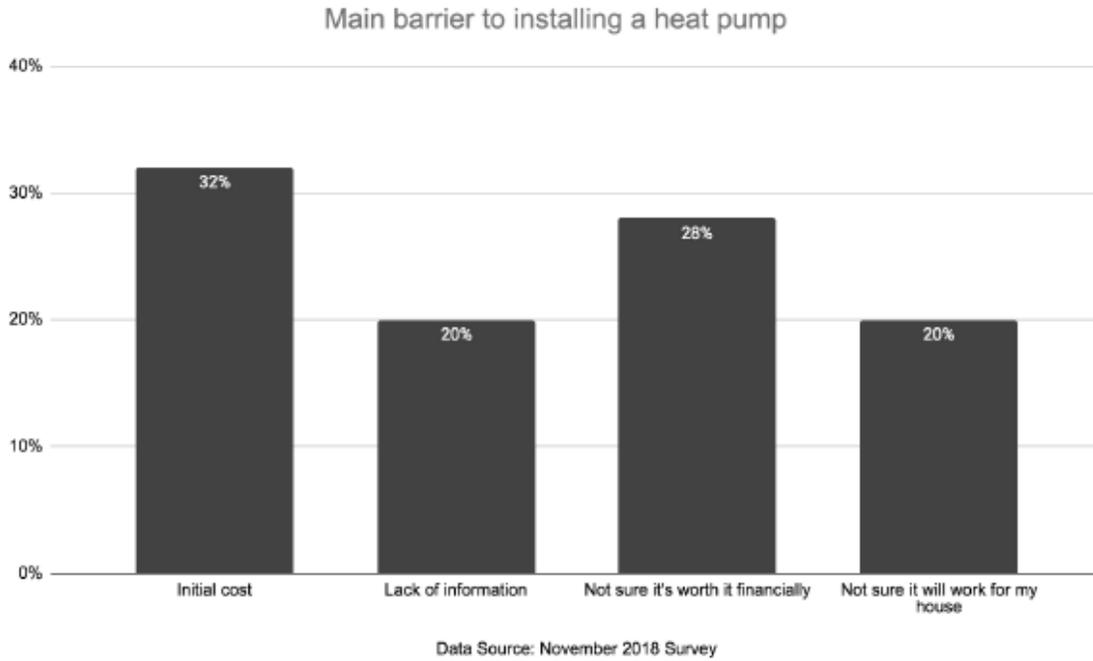


Figure 23: Barriers to DHP installation

10. Which is the biggest barrier to you installing a heat pump?

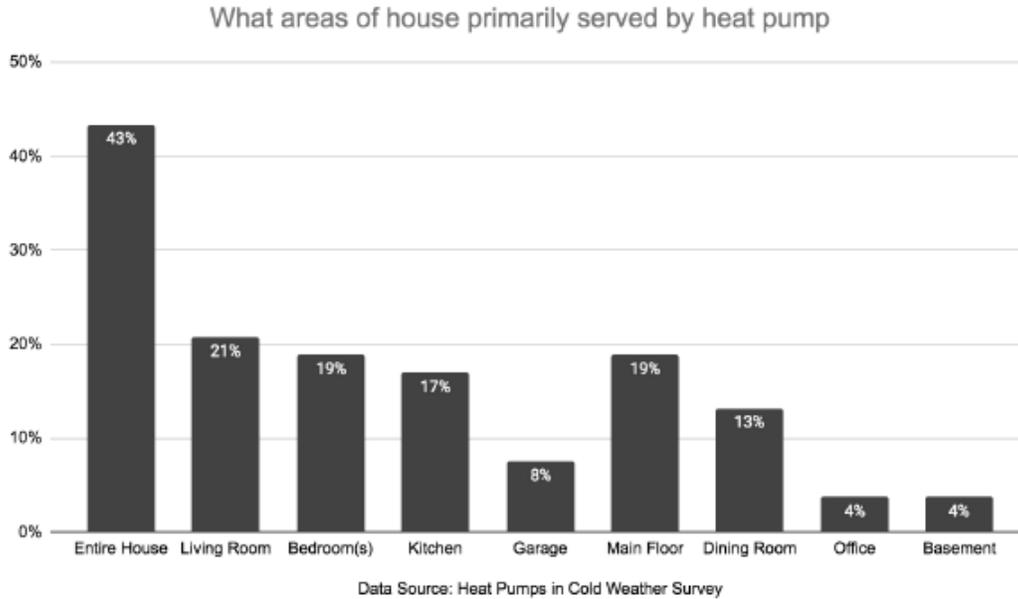


**Figure 24:** Main barrier to DHP installation

## Appendix B – Cold Snap Survey

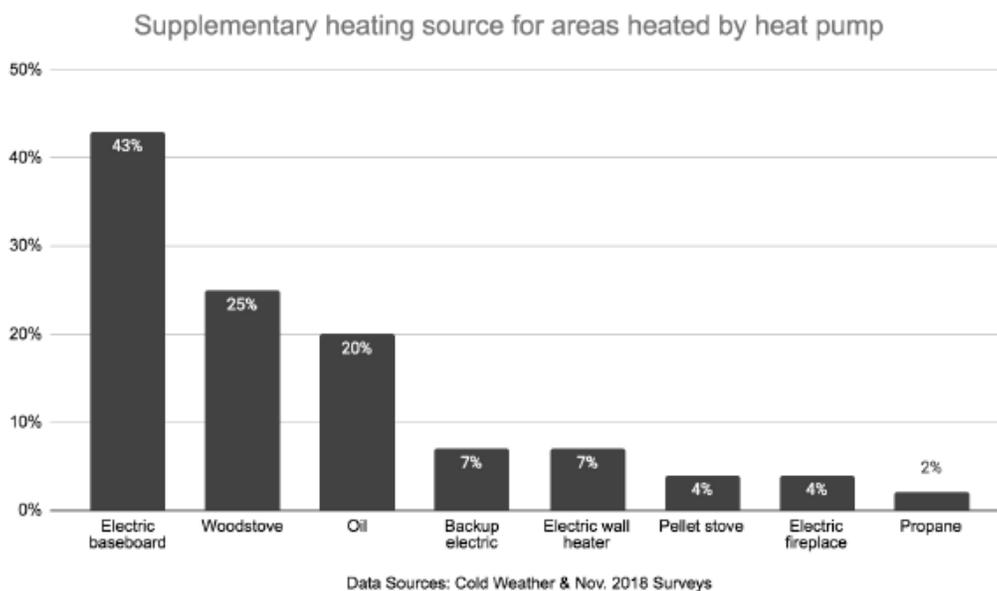
In January 2020, Juneau experienced a cold snap, with temperature dipping below freezing for an extended period of time. Alaska Heat Smart investigated DHP owners' experiences during the cold snap by creating a survey using online survey software and sending it to the Alaska Heat Smart heat pump owner contact list. In total, 53 individuals completed the survey.

1. *What areas of your house are primarily served by your ductless heat pump (living room, bedrooms, office...)? (Respondents selected all that applied.)*



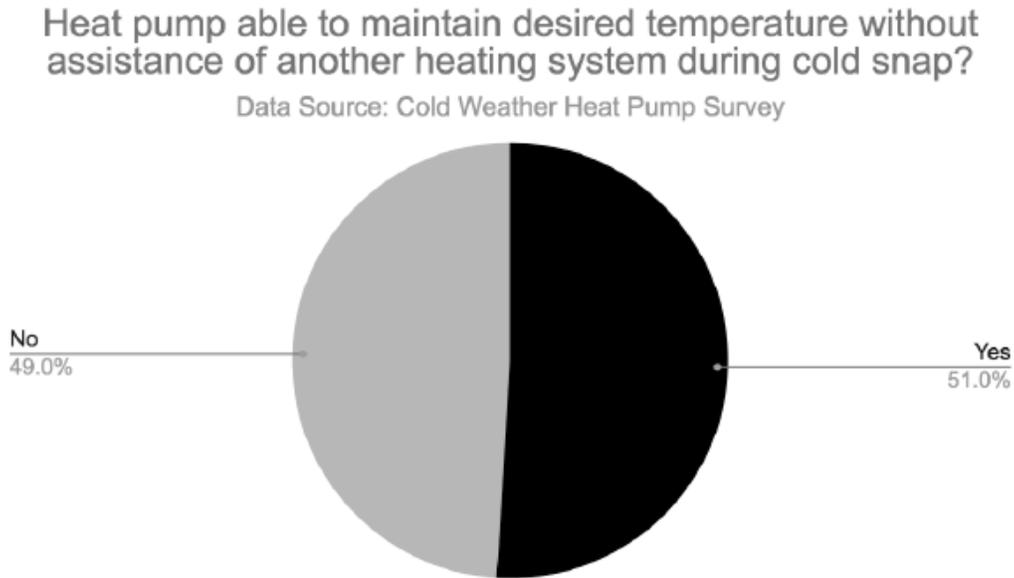
**Figure 25:** Area of home primarily served by heat pump

2. *Do you have another source of supplementary heating for areas heated by your ductless heat pump? If so, what type? (oil, electric baseboard, wood, etc.) (Multiple selections allowed.)*



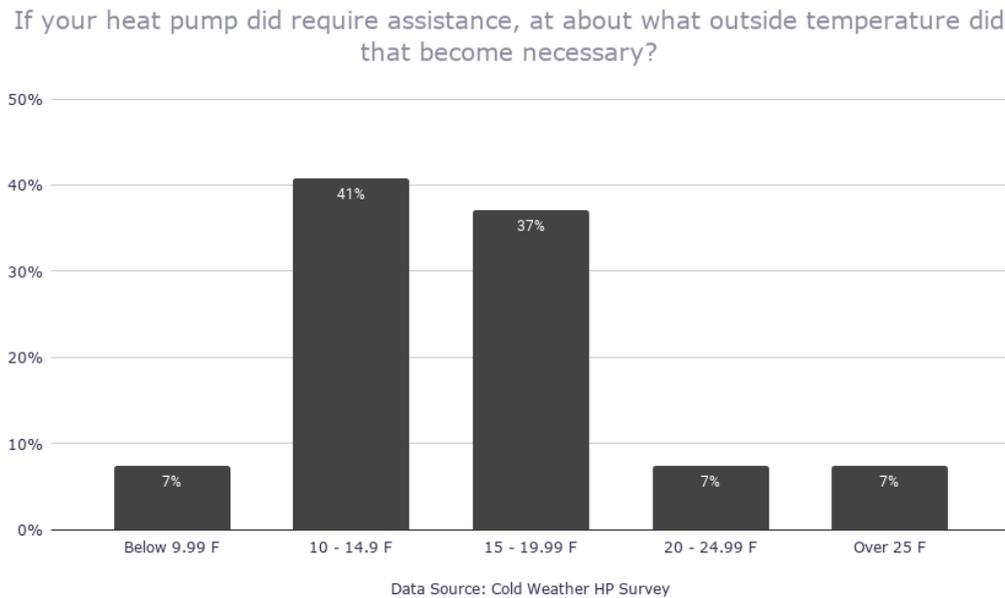
**Figure 26:** Supplementary heat source used to heat areas primarily served by heat pump

3. *During this recent cold snap has your ductless heat pump been able to maintain your desired temperature without the assistance of another heating system?*



**Figure 27:** Effectiveness of heat pump in providing heat during cold snaps

4. *If your ductless heat pump did require assistance, at about what outside temperature did that become necessary?*



**Figure 28:** Temperature at which supplemental heat was required

5. *Do you have any other observations regarding the performance of your ductless heat pump that you'd like to share?*

Free response comments by theme:

- Positive experience with secondary source in cold temps (17)
- Positive experience in general (11)
- Concerns about ice buildup on outside unit/confusion about maintenance needs (8)
- Need to program higher temperature in cold (often past desired room temp) (5)
- Trouble with maintenance/programming (5)
- Manageable temperature dips with sole DHP (e.g. "little cooler than we'd prefer, but we just wear sweaters", "DHP good heat on main floor") (4)
- Negative experience/problem functioning (3)
- Heating comparable to old non-renewable system (2)

## **Appendix C –Alaska Heat Smart Contacts-to-Date**

Before publicly initiating the Thermalize Juneau campaign in early December 2020, Alaska Heat Smart’s primary service was to provide DHP assessments for Juneau homeowners. The assessments provide homeowners with a stronger understanding of their building’s heating requirements and help them consider the energy use patterns of building inhabitants. The assessments conclude with recommendations on possible retrofit options that can be implemented to achieve the applicant’s goals, and Alaska Heat Smart staff explain the technical and economic differences between the options available to the applicant. This information is provided in a report, and staff are available to help the applicant solicit a contractor to complete a DHP retrofit.

Since its inception in 2019, 104 Juneau residents have requested advice from Alaska Heat Smart. Of those, 87 residents have applied for a home assessment, and 46 have received a final report.

The key bottleneck in this process has been collecting accurate fuel oil usage. Of the 87 home assessment applicants, slightly more than half have submitted oil data to Alaska Heat Smart. While it is straightforward for Alaska Heat Smart staff to obtain electric use data from the local utility with a permission form, many oil providers require that the customer manually request their data. This additional step has proven to be a key threshold between homeowners committed to an assessment and those only casually interested.