

Memorandum

To: Bonnie Watson, Bonneville Power Administration
From: Marjorie McRae, Research Into Action; Sarah Widder, Cadeo
Date: December 14, 2018
Subject: TO 018 Residential HVAC Installations Market Research

This memo summarizes findings from research conducted by the Cadeo, Research Into Action and SBW team (the team) on behalf of Bonneville Power Administration (BPA).

The team conducted web surveys with 92 managers of 81 HVAC contracting firms in the four-state Pacific Northwest region that had responsibility for residential HVAC installations. The surveys sought information on the installed equipment and installation context (including home characteristics) for the following types of HVAC equipment:

- Mini-split systems (ductless heat pumps or DHPs),¹
- Air source heat pumps (ASHPs; other than mini-splits),
- Heating equipment (other than mini-splits and air source heat pumps), and
- Air conditioners (ACs; central and room).

The survey asked contacts to describe four recent installations, one of each type of equipment (assuming they had installed all four equipment types).

This memo documents the project, providing project purpose, background, methodology, and key survey findings, supported by appendices.

Project Purpose

BPA is developing momentum savings estimates for several of the region's most important electricity end uses. The Cadeo team is estimating residential HVAC momentum savings from a model of residential HVAC electricity consumption. (Cadeo is conducting this work in Task Order 9 (TO 9).) In research leading up to this study, the Cadeo team developed the modeling approach and identified key data elements for which it needed inputs (or improved inputs). The team needed information on:

- Type of primary HVAC equipment installed, including make and model, from which Cadeo would determine equipment energy use,

¹ The BPA/Cadeo team commonly refers to mini-split systems as ductless heat pumps or DHPs. Mini-split is the more generic and, in fact, accurate term as some DHPs are ducted.

- Additional HVAC equipment installed, including thermostats and additional equipment types, such as installations comprising both a furnace and a central air conditioner,
- Installation context – is the installed equipment replacing or augmenting the equipment that had been serving the space (and if so, what was the approximate age of that existing equipment), or is the space newly constructed or newly conditioned?
- Housing characteristics, including housing type (such as single family detached), an indication of size, and whether the installation was designed to serve the whole house or part of the house.

Background

BPA is taking a staged approach to momentum savings estimation and conducts a series of projects for a given end use that culminates in savings estimation. Task Order 12 (TO 12) developed a two-part methodology for obtaining inputs to the residential HVAC model – survey and field research. The survey TO 12 research methodology described an approach to surveying residential HVAC contractors to obtain information on type of equipment recently installed, installation context, and housing characteristics.

When the research team initiated this project, TO 18, in June 2018, BPA asked the team to revisit the TO 12 plan. BPA asked the TO 9 residential HVAC modeling team to review the model, which had evolved since the TO 12 work was completed, identify the variables most influencing model results, and recommend data to be collected through the TO 18 survey research. The TO 18 team, comprising market researchers, then revisited the TO 12 methodology given of the desired data.

Through these activities, the TO 18 market research team developed a revised methodology (below).

Consistent with previous plans, the market research began with a pilot effort intended to obtain four completed surveys. Pilot experiences and outcomes informed the full-scale data collection. Study planning and pilot activities ran through mid-September 2018 and culminated in a post-mortem memo. The team conducted full-scale data collection for about four weeks from late September to late October 2018.

Methodology

Sample

The market research team obtained from D&B Hoovers a list of 7,653 firms in the region (the total population) in US SIC code 1987, Plumbing, Heating and Air-Conditioning (equivalently, in NAICS 2012 Code 238220, Plumbing, Heating, and Air-Conditioning Contractors). The team identified the location of each firm (East or West of the Cascades). The team created a certainty sample of the largest 20 firms in each region, as indicated by D&B Hoovers reported Revenue.² Subsequent to

² By “certainty sample,” we mean that we selected the 20 the largest firms with 100% certainty; they are all on the list. We discuss completion quota next, which differs from this concept.

establishing this goal for the certainty stratum, the TO 9 team clarified that it is interested in HVAC installations in residences up to four attached units and in manufactured homes. Internet research indicated all but 11 of these largest firms did not serve this residential market; the market research team limited its outreach/solicitation to the 11 firms anticipated serving residential customers. The team pulled a random sample from the remaining 7,613 firms of 432 firms per region (864 firms total), excluding three firms that had recently been surveyed by other energy agencies in the region.

The market research team had a goal of 72 completes (36 per region) for each technology type (mini-split, air source heat pump, and heating).³ This goal included completes from the certainty sample.

Disposition

Eighty-one managers of residential installations among the region’s HVAC contractors completed the survey (Table 1). Contacts from 79 firms responded, with two contacts responding from each of two firms.

Table 1: Disposition Summary

	Count	Percent of Total Sample	Percent of Viable Target Market
Complete	81	9%	27%
Refusal and break-off	107	12%	35%
Not reached	117	13%	38%
Not attempted	0	0%	0%
Bad or wrong number	85	10%	Excluded
Didn't pass screening	484	55%	Excluded
Total Sample	874	100%	100%

The NAICS code for HVAC contractors included commercial/industrial HVAC contractors, HVAC maintenance contractors, sheet metal contractors, plumbing, water, and waste water contractors, refrigeration contractors, fire protection services, other contracting firms, and a few miscoded firms, such as a health clinic. Over half (55%) of the list did not pass the study’s screening criteria. Another 10% of the list had non-working phone numbers.

Of the approximately one-third of the list that was viable, the study obtained data from 27% of the firms, including 6 of the 11 largest firms (certainty sample) that serve residential customers.

³ The TO 9 team determined it had comparatively little uncertainty in its modeling estimates for cooling electricity use; the greater uncertainty was in the other technology types. Thus, the survey quotas apply to mini-split, air source heat pump, and heating installations only.

The team believes the sample provides a representative depiction of regional HVAC sales based on the following:

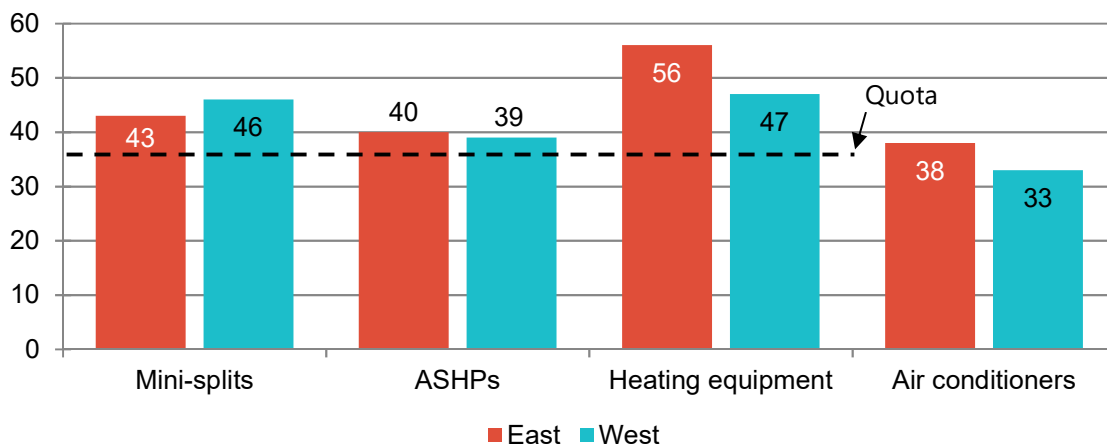
- 43% of firms reached completed the survey; it is reasonable to assume that firms not reached are small.
- Responding firms appear to account for more residential HVAC installations than refusal firms based on reported number of employees.⁴
- The two split-samples (East and West) have the same minimum and maximum number of employees); average number of employees is higher for Western firms, as we would expect based on population patterns.

The study exceeded the quotas of 36 completes per region for the three equipment types with quotas (mini-split, air source heat pump, and heating installations **Error! Reference source not found.**; Table 2 and Figure 1).⁵ Contacts most frequently described heating installations.

Table 2: Counts of Equipment Types by Region

Equipment Types	Target	Completes		
	Per Region	East	West	Total
Mini-splits	36	43	46	89
ASHPs	36	40	39	79
Heating equipment	36	56	47	103
Air conditioners	NA	38	33	71

Figure 1: Equipment Types by Region

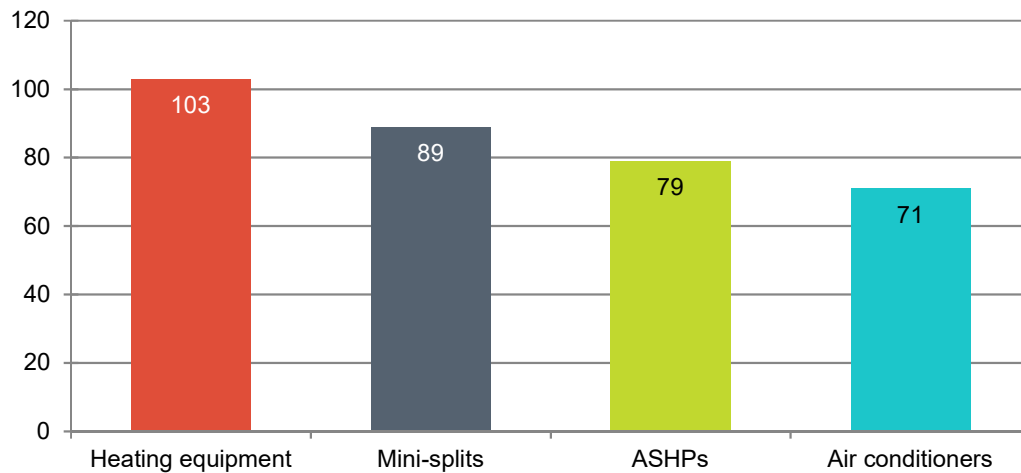


⁴ Responding firms averaged 35 employees (n=60 responses to this question), nonresponding firms queried during the phone solicitation averaged 19 employees (n=57 responses).

⁵ The sampling plan specified no quotas for air conditioners. The modeling team determined the model was most sensitive to assumptions on mini-splits, air source heat pumps, and furnaces and so set quotas for those technologies only.

Figure 2 illustrates the total number of equipment installations reported, by equipment type.

Figure 2: Total Number of Equipment Installations Reported



Survey

The survey comprises five modules:

- Firmographic and screening questions,⁶
- Mini-split systems,⁷
- Air source heat pumps (other than mini-splits),⁸
- Heating equipment (other than mini-splits and air source heat pumps),⁹ and
- Air conditioners (central and room).¹⁰

Each technology module comprises about two dozen questions. Appendix C provides the data collection instruments.

Screening questions determined which of the four equipment types the contact could address. When the contact had 2018 installations of all four types, the contact answered the questions in each module. When the contact had not installed all four equipment types in 2018, then the survey repeated a module of an equipment type for which the contact had an additional installation. The module repetition prioritized mini-split systems, as 2017 sales data indicated

⁶ These questions are included in Part A of the instrument, which also includes the DHP question module, which addresses mini-split systems.

⁷ Referred to as the DHP module and included in Part A of the instrument.

⁸ Referred to as the ASHP module and constitution Part B of the instrument.

⁹ Part C of the instrument.

¹⁰ Part D of the instrument.

fewer mini-split systems sold in the region than other types of systems. Next, the repetition prioritized air source heat pumps, as that was the focus of the TO 12 research plan.

The TO 9 modeling team requested that the survey obtain equipment make and model so that the team could determine the equipment's energy use. The TO 18 market research team added questions to elicit contractor's understanding of the efficiency (standard vs efficient) of the installed equipment. The market research team believes BPA can make a valuable contribution to the efficiency literature by publishing the proportion of false positive and false negative errors among the contractors' reports of efficiency levels.

In consultation with the TO 9 modeling team, the market research team developed, finalized, programmed, and tested the HVAC Installation Survey. The team used trained interviewers to recruit respondents.

Recruitment

This study fielded a web survey, yet the team was not able to directly send emails to managers of HVAC contractor firms for lack of email addresses. Thus, the team recruited by cold-calling the sampled HVAC firms.

The caller briefly described the market research study to the person that answered the phone, mentioned that BPA was offering a \$100 incentive for the completion of a 15-minute web survey, and explored who would be an appropriate person within the firm to complete the survey, which required knowledge of both the equipment installed and the site. Appendix B provides the telephone recruitment script.

These recruitment phone calls resulted in one of several possible outcomes:

- Refusal to participate or to forward the request;
- Agreement to forward a link to the survey to an appropriate contact;
- Agreement to let us reach out directly, via email with a survey link, to an appropriate identified contact; or
- Referral to an appropriate contact, with which the caller spoke, and that contact either:
 - Refused to participate, or
 - Agreed to receive a link to the survey.

The caller followed up when she had agreement by sending an email that briefly restated the study purpose and the incentive for completing a 15-minute survey and provided a unique survey link. Appendix B provides the follow-up email.

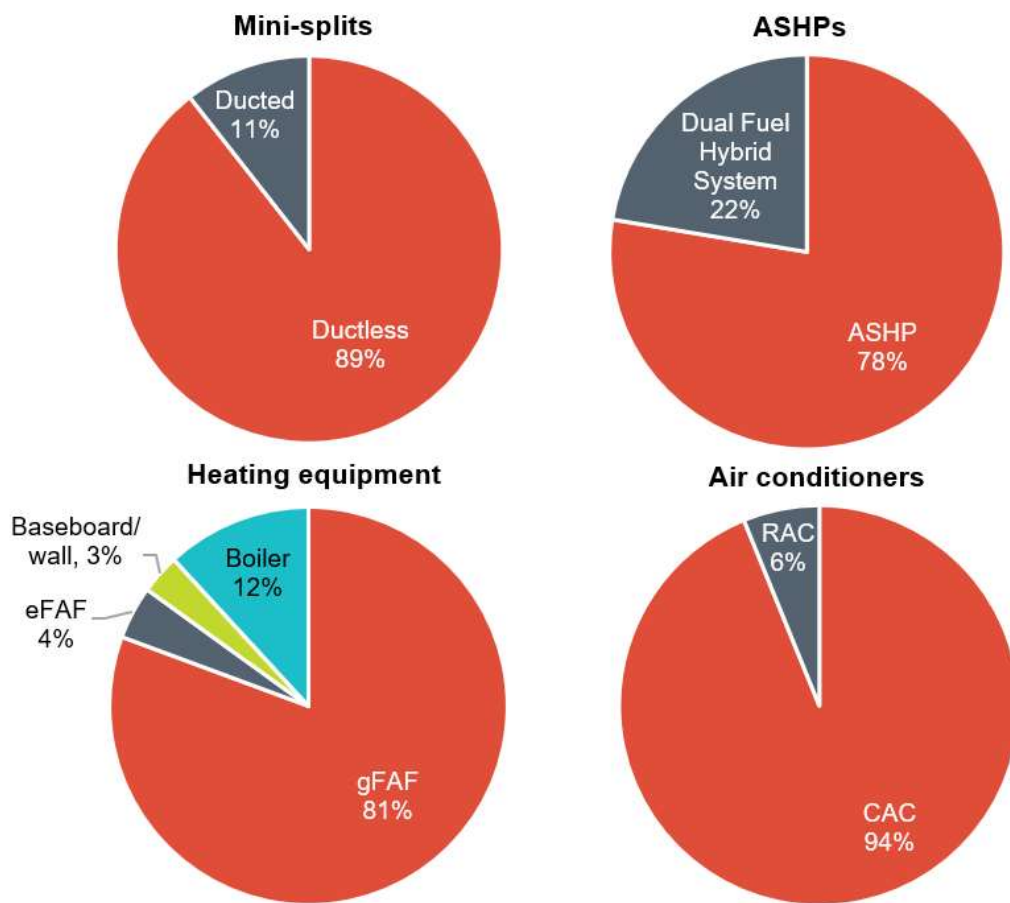
Key Survey Findings

Subtypes of Installed Equipment

- Mini-splits: Nearly 90% of installed mini-splits were ductless (vs ducted) systems. Installations comprised in roughly equal proportions both systems with a single indoor head and those with multiple heads.
- Air-source heat pumps: Nearly 80% of air-source heat pumps were electric forced-air backup; about 20% were dual-fuel hybrid systems with an air source heat pump and a gas forced air furnace (gFAF).
- Heating: Over three-quarters of heating systems were gFAF; 4% were electric forced air furnaces (eFAF). Remaining systems were baseboard or wall heaters and boilers.
- Air conditioners: About 95% of cooling systems contractors reported installing were central air conditioners (CACs) and the remainder were room air conditioners (RACs).

Figure 3 shows the subtypes of equipment installed.

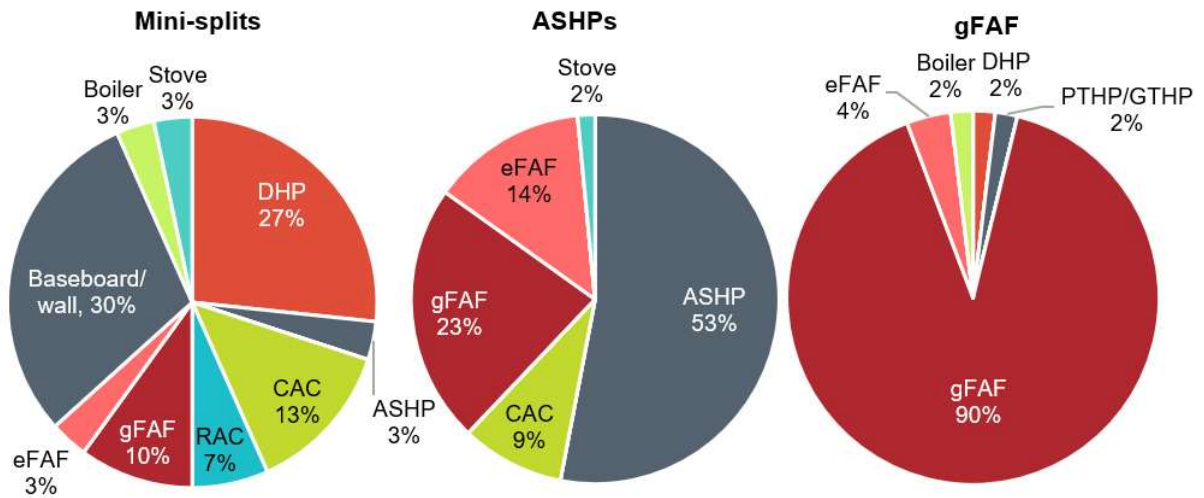
Figure 3: Subtypes of Equipment Installed



Replaced Equipment

Most installed equipment replaced equipment of the same type with the exception of mini-splits, which most frequently replaced baseboard or wall electric resistance heating units (Figure 4). All central air conditioners installed to replace prior equipment replaced central air conditioners.

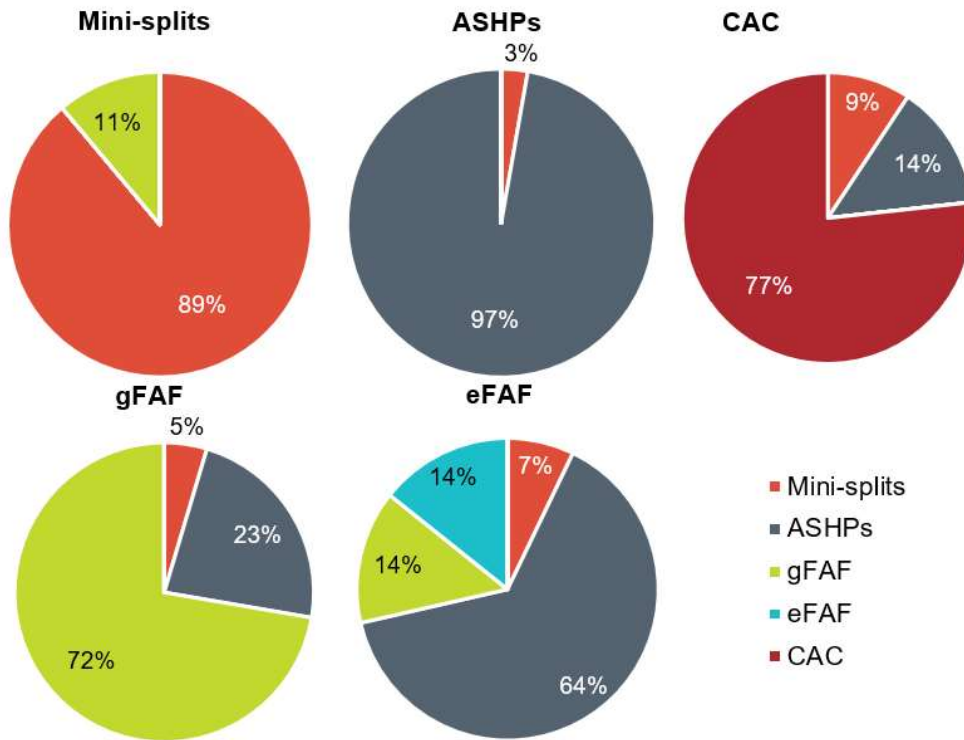
Figure 4: Types of Equipment Replaced, by Type Installed



* PTHP/GTHP = Packaged Terminal Heat Pump/Geothermal Heat Pump

Figure 5 is the converse of Figure 4, showing for each type of equipment replaced the proportion replaced by mini-splits, ASHPs, gFAF, eFAF, and CACs. As above, like-for-like replacement is most common. Not shown in the figure, one electric baseboard/wall heater was replaced by a mini-split, one boiler was replaced by a mini-split and one by a gas forced air furnace, one room air conditioner was replaced by a mini-split, one packaged terminal heat pump/geothermal heat pump was replaced by a gas forced air furnace, and two fireplaces were replaced, one with a mini-split and one with an ASHP.

Figure 5: Types of Equipment Installed, by Type Replaced



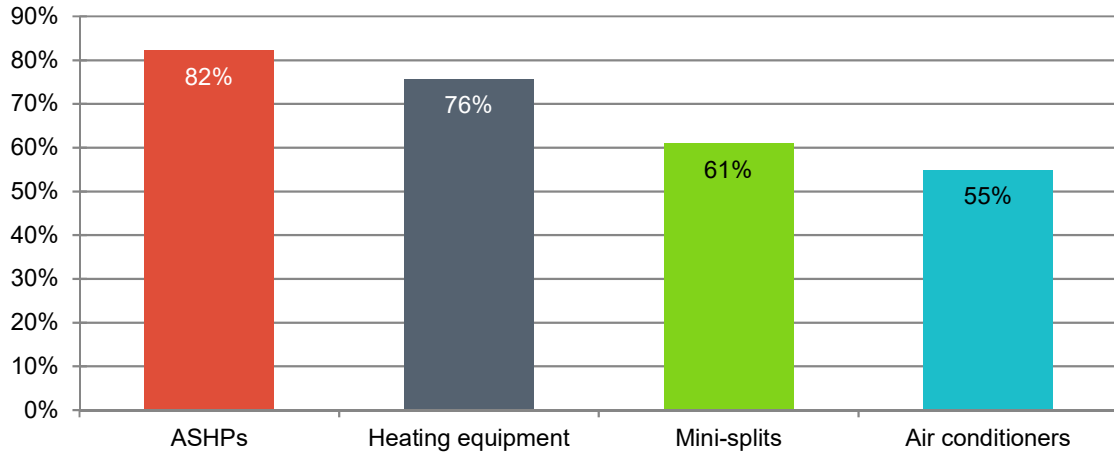
Of the 150 mini-splits, ASHPs, and forced air furnaces installed by contractors called on to replace existing HVAC equipment, 25 (17%) entailed fuel switching:

- Gas to electricity – 19 units (13%) comprised of gFAF replaced by mini-splits (3) and ASHPs (15) and a boiler replaced by a mini-split (1);
- Electricity to gas – 4 units (3%) comprised of a mini-split, a PTHP/GTHP, and two eFAFs; and
- Wood to electricity – 2 units (1%), one mini-split and one ASHP.

Additional HVAC Equipment Installed with “Primary” Unit¹¹

Figure 6 shows the percent of HVAC installations for which the contractor also installed a thermostat, by equipment type.

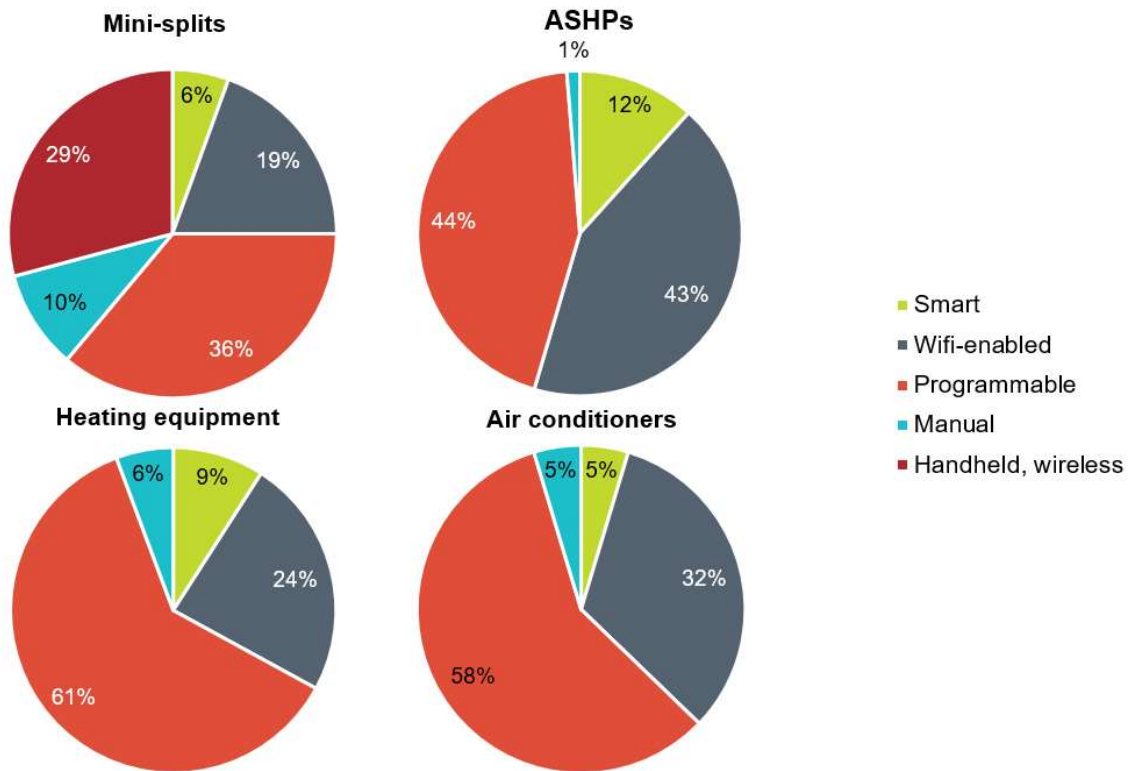
Figure 6: Percent of Installations for which Contractor Also Installed Thermostat



¹¹ The survey did not use the terminology “primary” or “secondary.” Its use here refers to the equipment the respondent chose to report for the module, and “additional equipment” is any other equipment installed at the same time.

Installers described their thermostat installations as “smart” about roughly 5 to 10% of the time (Figure 7). The proportion of programmable thermostats exceeded that of wifi-enabled for all technologies except air source heat pumps, for which the two proportions are equal.

Figure 7: Thermostat Type



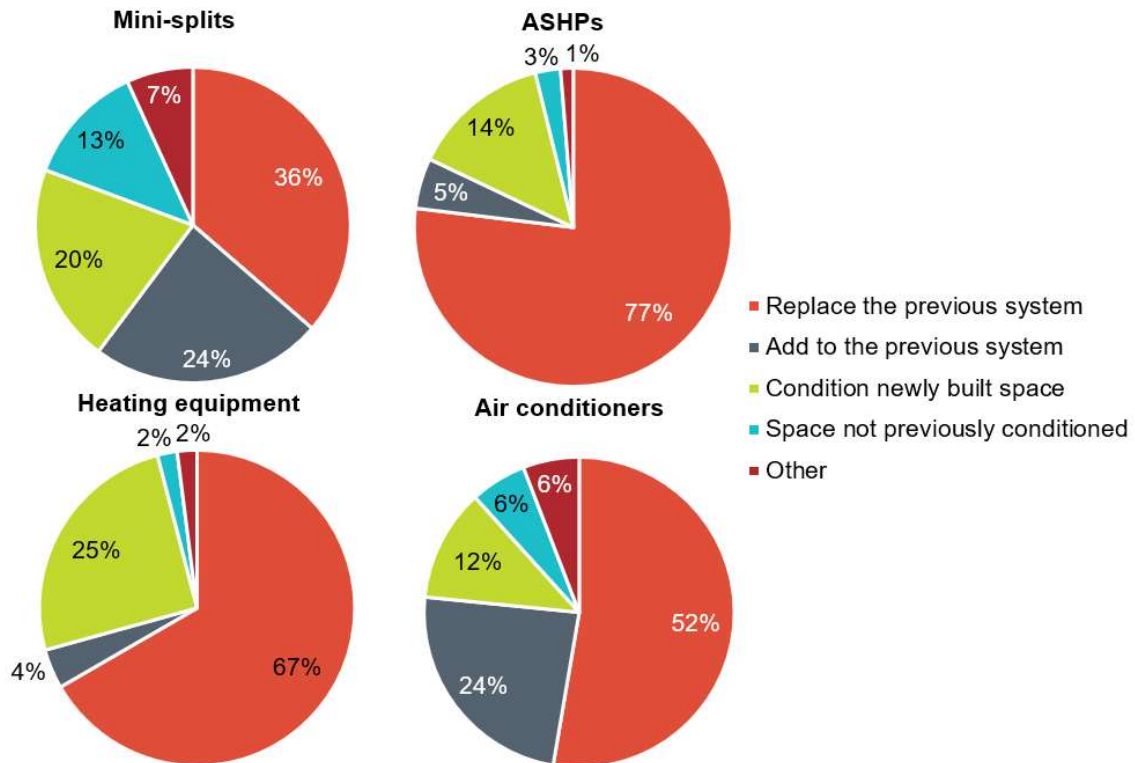
* Multiple responses allowed.

- Mini-splits: About 10% of mini-split installations were accompanied by installations of other pieces of HVAC equipment, with those other pieces about equally comprising second mini-splits, air source heat pumps, and central air conditioners.
- Air-source heat pumps: About 15% of air source heat pump installations were accompanied by installations of other pieces of HVAC equipment, with about half of these being second air source heat pumps.
- Heating: Heating systems were the HVAC type most likely to be accompanied by installations of other pieces of HVAC equipment; over 20% reported additional HVAC installations at sites, and most of those were central air conditioners.
- Air Conditioners: About 5% of air conditioner installations were accompanied by installations of other pieces of HVAC equipment, with about half of these being gas forced air furnaces.

Reasons HVAC Systems Were Installed

Figure 8 illustrates why the new HVAC systems were installed. Air source heat pumps and other heating equipment were most commonly installed to replace the previous system (about two-thirds to three-quarters of systems). About half of air conditioner installations and just over one-third of mini-split installations were replacing previous systems, and about one-quarter of both the air conditioner and mini-split installations were adding to previous systems.

Figure 8: Reasons HVAC Systems Were Installed



Regarding which season principally motivated the installation of heat pumps, per contractor understanding:

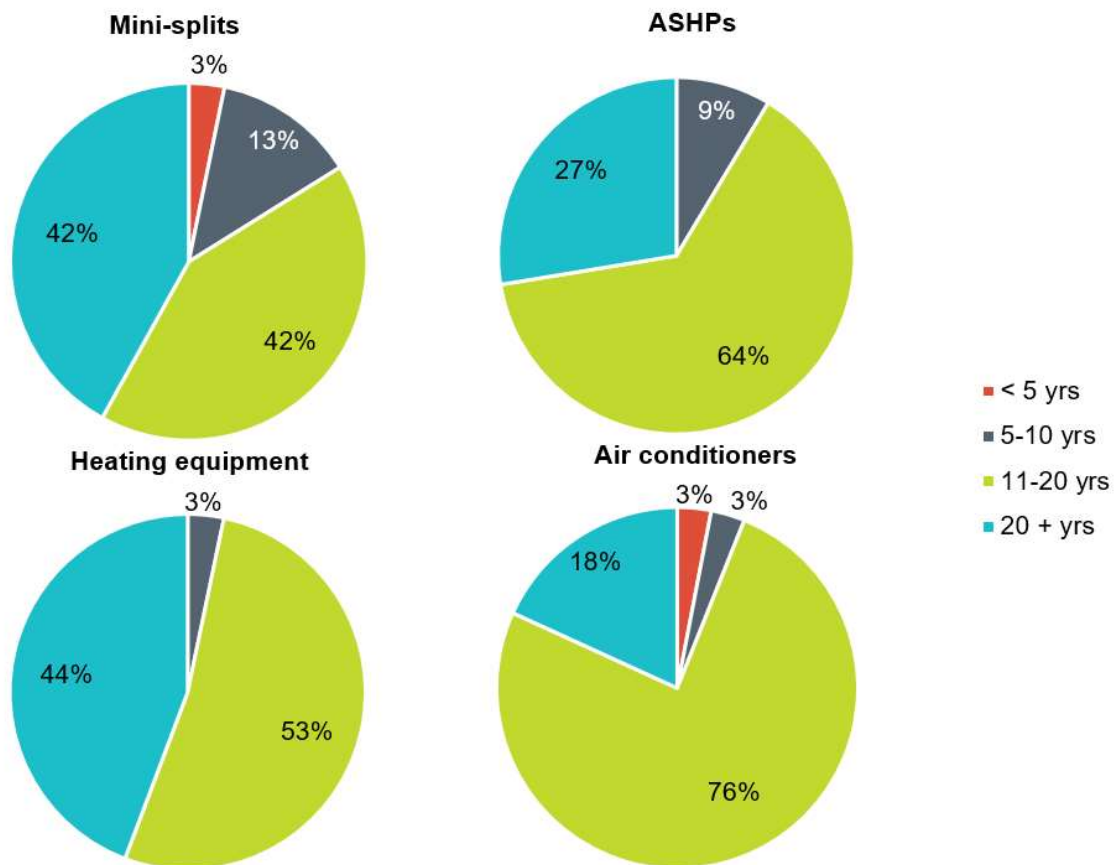
- Mini-splits: About 80% of mini-split installations were motivated by both heating and cooling needs, with another 15% motivated by cooling needs. (Remaining responses were split evenly between heating and "other," which included moisture control and zoning.)
- Air-source heat pumps: About two-thirds of air source heat pump installations were motivated by both heating and cooling needs, with remaining response split roughly evenly between heating, cooling, other, and don't know.

Approximate Age at Which Existing Equipment Was Replaced or Augmented

Across all equipment types, contacts most commonly estimated the age of existing equipment that was either replaced by or augmented by (added onto) the new installation as 11 to 20 years. Next most common were reports of greater than 20 years.

Figure 7 shows similar findings for the age of systems *replaced* (not including those augmented, as discussed above).

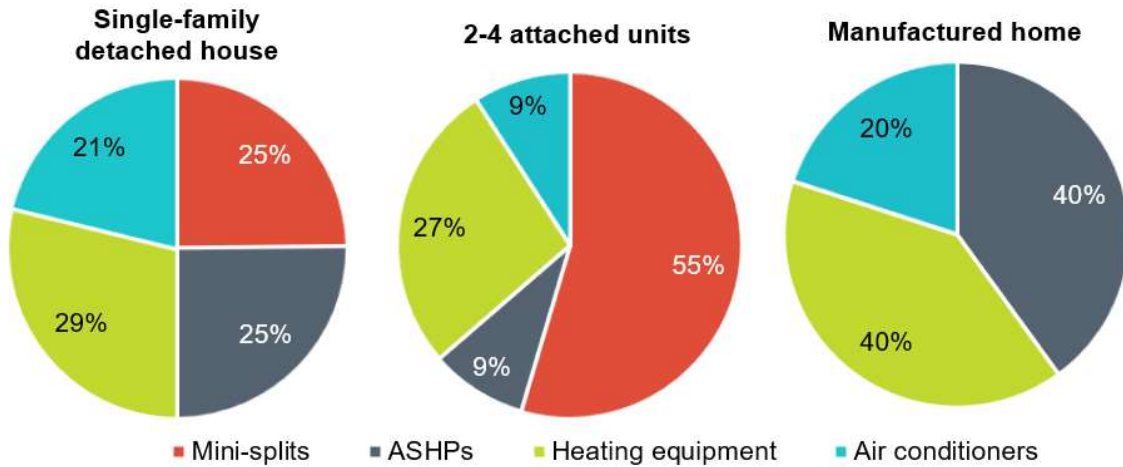
Figure 9: Age of Equipment being Replaced



Dwelling Type Served by Installed Equipment

Single-family detached houses had roughly equal proportions of installations across the four equipment types (Figure 8); they comprised 95% of the installations reported (302). Attached homes in buildings comprising two to four units (11 installations or 3%) most frequently had mini-splits installed, and manufactured homes (5 installations or 2%) most frequently had furnaces installed.

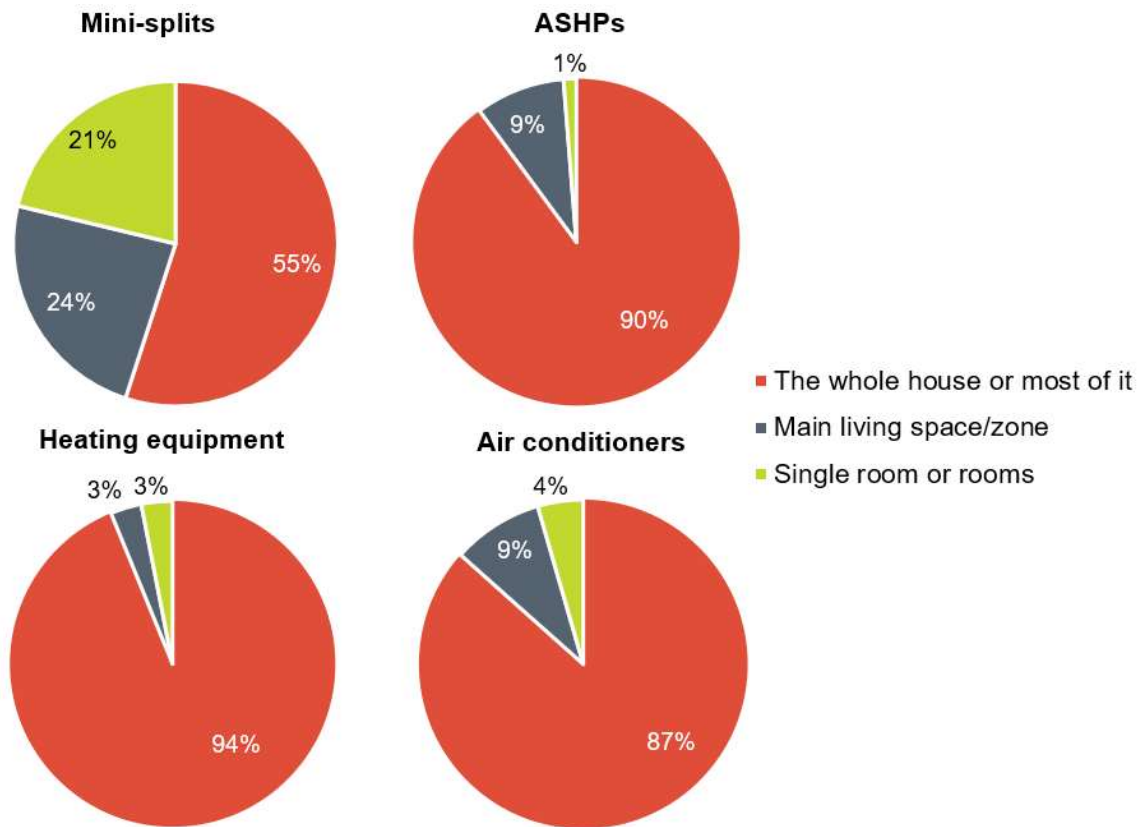
Figure 10: Type of Dwelling Equipment is Installed In



Area Served by Installed Equipment

Figure 11 illustrates the area served by the installed equipment. About 80% to 90% of air source heat pump, heating, and air conditioner (CAC and RAC) installations served the whole house or most of the house, in contrast to mini split installations, for which about half served the whole house.

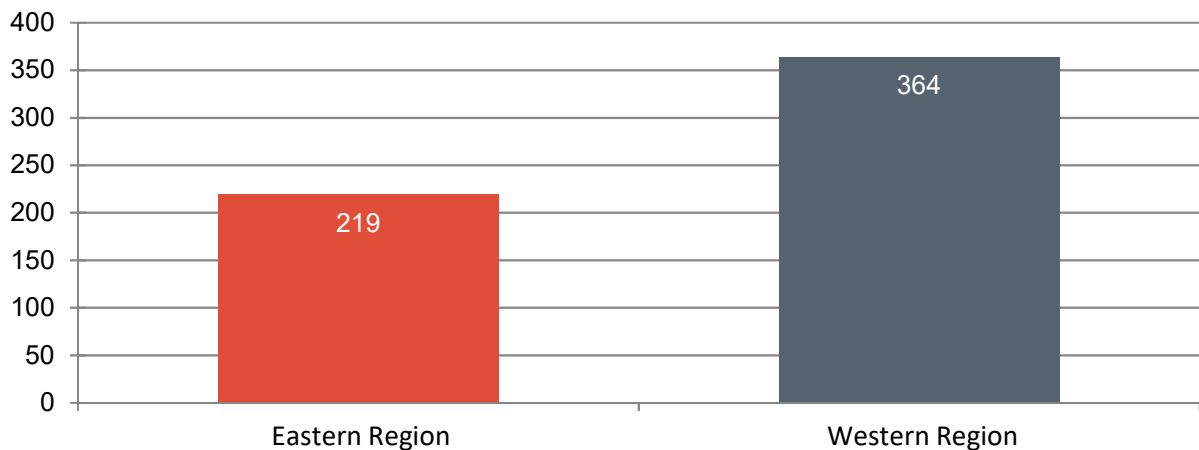
Figure 11: Area Served by Equipment Installed



Firmographic: Firm-Wide Annual Number of Residential HVAC Installations

Firms in both East and West of the Cascades had a comparable spread of residential HVAC activity, ranging from fewer than ten installations annually to about 2,000. Firm-wide averages, however, differed substantially, with firms West of the Cascades doing about two-thirds more installations per year than firms East of the Cascades.

Figure 12: Estimated Residential HVAC Installations Per Year



Firmographic: Types of Equipment Installed by Month

Most reported installations occurred in July, August, September, and mid- to late October when the team fielded the survey asking contractors to describe installations occurring in 2018. Figure 13 presents the data by number of installations and Figure 14 presents the data by percent of installations installed in a given month. Heating systems comprise 30% of the installations reported by contractors. Heating installations roughly equal or exceed 30% in September, October, January, February, March, and April.

Figure 13: Number of Installations per Month

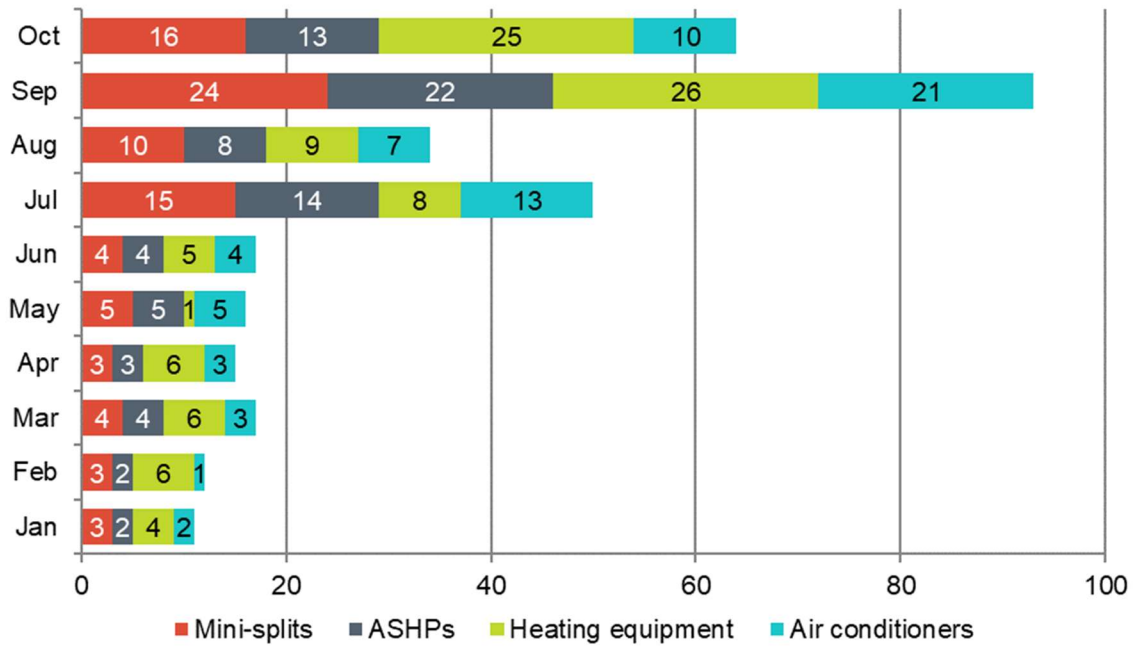
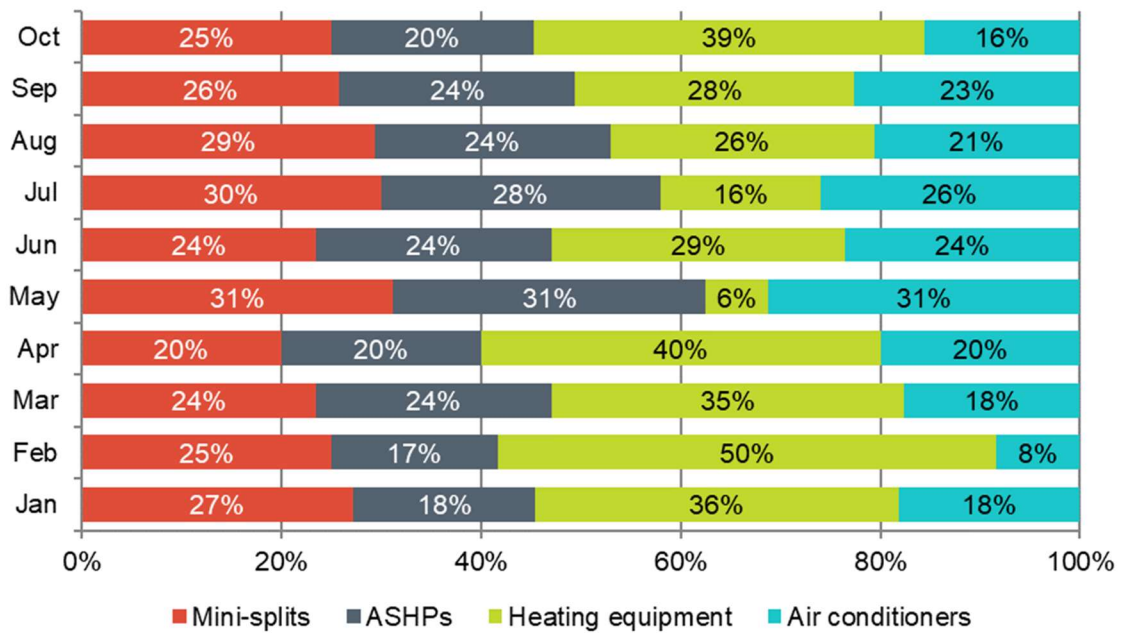


Figure 14: Percent of Monthly Installations by Technology Type



Appendix A. Guidance for TO 9 Modeling Team in Working with the Data

The current study, TO 18, was undertaken to provide the TO 9 modeling team with high quality data. In the transfer of data between teams, the market research team offers the TO 9 modeling team the following guidance.

- The study delivers five datasets:
 - Firmographic and screening questions,¹²
 - Mini split systems,¹³
 - Air source heat pumps (other than mini splits),¹⁴
 - Heating systems (other than mini splits and air source heat pumps),¹⁵ and
 - Air conditioners (central and room).¹⁶
- The firmographic/screening data are by firm whereas the other data in the other files are by reported installation.
 - At each of 11 firms, two individuals completed the survey. These paired individuals both completed the firmographic/screening data for their single firm; thus, these firms appear twice in the firmographic/screening dataset.
 - It was common for an individual to complete a module more than once. This occurred when the individual was not able to report on all four equipment types. These cases of repeated modules generate multiple records for a single respondent; thus, these multiple records for a single module match into a single record in the firmographic/screening dataset.
- The team programmed multiple response questions as a set of binary variables, each indicating whether a given response was selected.
- The team observed that for one record (of the 342 records comprised of the four equipment types) the respondent had checked all possible response options to one of the questions, some of which are mutually exclusive. Thus, the market research team recommends the TO 9 modeling team review the multiple response variables as sets of data and not simply consider each variable independently of the others in the set.

¹² These questions are included in Part A of the instrument, which also includes the DHP question module, which addresses mini-split systems.

¹³ Referred to as the DHP module and included in Part A of the instrument.

¹⁴ Referred to as the ASHP module and constitution Part B of the instrument.

¹⁵ Part C of the instrument.

¹⁶ Part D of the instrument.

- The air source heat pump module explores make and model for any heating system also installed at the time of heat pump installation. The heating module explores make and model for any cooling system also installed at the time of heating system installation.
- These descriptions of additional equipment installed constitute additional equipment installations. As warranted by analytical considerations, the TO 9 modeling team may want to create additional records to capture this information. Thus, equipment counts given in Table 2 would be lower bounds to the number of pieces installed of each equipment type.
- The team programmed each question to be “force response;” that is, the respondent had to check a response to advance through the survey. Every question included a “don’t know” response.
- As commonly occurs with surveys, respondents may provide a don’t know response to key or foundational questions. The market research team recommends the TO 9 modeling team identify key questions for which a don’t know response suggests that responses to related questions should be set to missing. (The TO 18 market research team did not want to presume a hierarchy of importance among the variables and thus only in a few cases did the team program the survey to skip a question based on a prior don’t know response.¹⁷) The modeling team might want to consider date of installation when assessing the implications of don’t know responses.
- Several questions include “Other, specify [open-end]” responses.
- As commonly occurs with surveys, respondents may select the “other” response and provided an open-ended response that maps into one of the closed-ended responses provide. The market research team recommends the TO 9 modeling team review and recode as needed the other responses.

¹⁷ For example, the respondent was not shown the question of equipment model when s/he had replied “don’t know” to the manufacturer. But in general, don’t know responses did not limit subsequent data collection.

Appendix B. Recruitment Scripts

Telephone Recruitment Script

This document has two scripts, one for when you've reached a person and one for leaving a voice mail.

Script When a Person Answers

Options for Contact Name:

- Ask for name of owner or manager if known from internet search or firm name and when reached, launch into short script below.
- If name of owner or field manager is not known, ask to speak with one. Usually the receptionist wants to know why I'm calling so I launch right into the script below.

Script:

"Hello, my name is [Caller] calling on behalf of Bonneville Power, which is hoping your firm will participate in its study of residential HVAC installations. We would simply send you a link to a 15-minute web survey and upon completion we'd send the respondent a \$100 e-gift card. Would your firm be willing to participate?"

If hard refusal, attempt to get number of employees.

Pursuing survey contacts:

- "Can you recommend ...
- "Who would I speak to take the survey, such as ...
- "Can you help me connect with ...
- ... your owner or managers who would be interested in taking the survey (and receiving \$100 for their time) – someone who has visited the sites of recent residential HVAC installations and has access to job records for equipment make and model."
 - Confirm name (first, first and last, initials – all are okay)
 - "And what email address should I send a link to?"
 - We only need 20 more completed surveys, so if you want to participate, it is important to do so soon.
- "Is there anyone else that might be interested in the survey, responsible for different jobs than [Person A]?"
 - Name(s) (first, first and last, initials – all are okay)
 - Email address(es)

- → “Before we go – for tracking purposes for my call – I just need to confirm the number of employees in your company.”

Answers to FAQs:

- Our firm is Research into Action...
- The study will help BPA in its regional energy planning. BPA wants to better understand what types of residential HVAC equipment is being installed in diverse types of sites.
- The survey asks about mini split systems (including ducted and ductless), central air source heat pumps, heating systems and air conditioners...

Voicemail Script

“My name is [Caller], calling on behalf of Bonneville Power, which is hoping your firm will participate in its study of residential HVAC installations. BPA would like to give you a \$100 e-gift card to complete a 15-minute online survey. Would you please give call my [cell, office] at [number] and I will send you a survey link. Thank you! Again, I am [Caller] and my number is [number].”

Follow-Up Email (Providing Web Survey Link)

This document has emails for different situations:

- Emailing the contact that will complete the survey
- Emailing someone who will forward it to a single appropriate contact
- Emailing someone who will forward it to several appropriate contacts
- Follow-up email to contact
- Follow-up email to someone who will forward

Emailing the contact that will complete the survey

Subject Line: Thank you for helping the region plan for HVAC energy use!

Hello **[Name of contact spoken with]**,

Thank you for agreeing to take our 15-minute survey on residential HVAC installations for Bonneville Power Administration. This information is important for regional energy planning.

To confirm, you’ll receive a \$100 e-gift card by completing the survey as soon as possible and no later than next **[eight calendar days from email]**.

You’ll need to have on hand job records to answer make and model of equipment installed.

To begin, click the survey link: **[unique link]**

Answers to FAQs:

- Research Into Action is conducting this survey on behalf of BPA. To verify, contact Bonnie Watson, project manager, bfwatson@bpa.gov, (503) 230-3693.
- If you need to step away from the survey, simply close your browser. Later, again enter the above URL and you can pick up where you left off.
- If you need more time to finish (or if you run into technical difficulties), please email us at: feedback@ResearchIntoAction.com
- We respect your privacy. The data from this survey will be aggregated and your company name removed.

Thank you,

[name]

Research Into Action

Emailing someone who will forward it to a single appropriate contact

Subject Line: Thank you for helping the region plan for HVAC energy use!

Thank you, **[Name of contact spoken with]**, for agreeing to forward this survey request to your **[owner/manager]**!

Thank you,

[name]

Hello **[name of potential respondent]**,

[Name of contact spoken with] thinks you would be willing to take our 15-minute survey on residential HVAC installations for Bonneville Power Administration.

You'll receive a \$100 e-gift card by the survey as soon as possible and no later than **[eight calendar days from date of email]**.

You'll need to have on hand job records to answer make and model of equipment installed.

To begin, click the survey link: **[unique link]**

Answers to FAQs:

- Research Into Action is conducting this survey on behalf of BPA. To verify, contact Bonnie Watson, project manager, bfwatson@bpa.gov, (503) 230-3693.
- If you need to step away from the survey, simply close your browser. Later, again enter the above URL and you can pick up where you left off.
- If you need more time to finish (or if you run into technical difficulties), please email us at: feedback@ResearchIntoAction.com
- We respect your privacy. The data from this survey will be aggregated and your company name removed.

Thank you,

[name]

Research Into Action

Emailing someone who will forward it to several appropriate contacts

Subject Line: Thank you for helping the region plan for HVAC energy use!

Thank you, **[Name of contact spoken with]**, for agreeing to forward this survey request!

Thank you,

[name]

Hello **[names of potential survey respondents]**,

[Name of contact spoken with] thinks you would be willing to take our 15-minute survey on residential HVAC installations for Bonneville Power Administration.

You'll receive a \$100 e-gift card by the survey as soon as possible and no later than **[eight calendar days from date of email]**.

You'll need to have on hand job records to answer make and model of equipment installed.

To begin, click the survey link by your name:

[Name 1]: [unique link]

[Name 2]: [unique link]

[Name 3]: [unique link]

Answers to FAQs:

- Research Into Action is conducting this survey on behalf of BPA. To verify, contact Bonnie Watson, project manager, bfwatson@bpa.gov, (503) 230-3693.
- If you need to step away from the survey, simply close your browser. Later, again enter the above URL and you can pick up where you left off.
- If you need more time to finish (or if you run into technical difficulties), please email us at: feedback@ResearchIntoAction.com
- We respect your privacy. The data from this survey will be aggregated and your company name removed.

Thank you,

[name]

Research Into Action

Follow-up Email to Contact that will Complete the Survey

Forward prior email with new subject line and body preceding the prior email

New subject line: **Help us reach our BPA HVAC survey goal; respondents by [eight calendar days from date of email] get \$100**

Hello,

When we spoke, you were interested in participating in the BPA study.

Please help us reach our survey goal.

You will receive a \$100 e-gift card for completing the survey by **[eight calendar days from date of email]**. Please let me know if you will need more time to complete the survey. We only need 20 more completed surveys, so if you want to participate, it is important to do so soon.

The survey link and simple instructions are below, in the original email that I'm resending.

Thank you for your participation!

Sincerely,

[name]

Research Into Action

Follow-up Email to Someone who will Forward

[Forward prior email with new subject line and body preceding the prior email]

New subject line: **Help us reach our BPA HVAC survey goal; respondents by [eight calendar days from date of email] get \$100**

Hello,

When we spoke, you suggested forwarding our survey request to [name of owner/field manager].

BPA really wants to hear from your firm. Would you mind double-checking with [name of owner/field manager] to see if [he/she] will be able to complete the survey by **[eight calendar days from date of email]** and receive a \$100 e-gift card? If more time is needed to complete the survey, please let me know. We only need 20 more completed surveys, so if they want to participate, it is important to do so soon.

The survey link and simple instructions are below, in the original email that I'm resending.

Thank you for your help!

Sincerely,

[name]

Research Into Action

Appendix C: Residential HVAC Installation Web Survey

HVAC Installation Instrument Part A – Screener/Firmographic and Mini-Split/DHP Systems

Introduction

Thank you for your willingness to complete a 15-minute residential HVAC survey!

Bonneville Power Administration will thank you with a \$100 e-gift.

We'd like to know about some recent HVAC installations for which you visited the home and can describe the site and the equipment, including make and model.

Please think of recent mini-split, air source heat pump, and other heating and cooling installations in: a single-family detached house, an attached house of 4 or fewer units, and a manufactured home.

Answers to FAQs

- Research Into Action is conducting this survey on behalf of BPA. To verify, contact Bonnie Watson, BPA project manager, bfwatson@bpa.gov, (503) 230-3693.
- If you need to step away from the survey, simply close your browser. Later, again enter the URL from the email and you will enter the survey where you left off.
- Email feedback@ResearchIntoAction.com if you have questions.
- The data from this survey will be aggregated (and your company name removed) so that information about residential heating and cooling installations can be used for regional energy planning.

***CREATE QUALTRICS MATH OPERATIONS VARIABLES**

*THIS SECTION CREATES MATH OPERATIONS VARIABLES THAT ARE EMBEDDED, NOT SHOWN TO RESPONDENT

*CREATE AND SET TO MISSING FOUR VARIABLES:

- DHP MODULE
- ASHP MODULE
- COOLING MODULE
- HEATING MODULE

*CREATE AND SET = 0 TWO VARIABLES:

- TOTAL MODULES
- REPEAT MODULE

SCREENING AND FIRMOGRAPHIC

[ASK ALL]

S1. Please tell us the name of your firm and the ZIP code (at the location you work).

[SINGLE RESPONSE; FORCE RESPONSE]

- 96. Your firm's name (1): [OPEN-ENDED RESPONSE]
- 96. ZIP code (2): [OPEN-ENDED RESPONSE]

[ASK ALL]

S3. Which of the following sectors does your firm serve? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Residential existing homes
- 2. Residential new construction
- 3. Commercial/industrial buildings (existing and new)
- 96. Something else; please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know [EXCLUSIVE]

[THANK AND TERMINATE IF S3_1 = 0 (DID NOT CHECK RESIDENTIAL EXISTING) AND S3_2 = 0 (DID NOT CHECK RESIDENTIAL NEW); ELSE CONTINUE]

[ASK ALL]

S4. Which of the following types of services does your firm offer its residential customers?

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Heating and cooling equipment installation
- 2. Repair and maintenance
- 3. On-going service agreements
- 4. Duct testing, cleaning, and/or sealing
- 5. Installation of ventilation equipment
- 6. Water heaters
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know [EXCLUSIVE]

[ASK ALL]

S5. Very roughly, about how many residential heating or cooling equipment installations does your firm do in a year? (Round numbers, such as in multiples of 50 or 100, will be fine)

[SINGLE RESPONSE; FORCE RESPONSE]

- 96. [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL]

S6. Which of the following residential HVAC system installations have you visited the site for in 2018?

[SINGLE RESPONSE; FORCE RESPONSE]

System Type	
S6_1 Mini-split system, including ducted and ductless mini-split or DHPs	[YES/NO/ DON'T KNOW]
S6_2 Central air source heat pump (ASHP), including dual-fuel HP and furnace; not including DHP	[YES/NO/ DON'T KNOW]
S6_3 Packaged terminal (PTHP) or geothermal heat pump	[YES/NO/ DON'T KNOW]
S6_4 Central air conditioning (CAC)	[YES/NO/ DON'T KNOW]
S6_5 Room air conditioning (RAC)	[YES/NO/ DON'T KNOW]
S6_6 Gas forced air furnace (gFAF)	[YES/NO/ DON'T KNOW]
S6_7 Electric forced air furnace (eFAF)	[YES/NO/ DON'T KNOW]
S6_8 Electric baseboard or wall unit	[YES/NO/ DON'T KNOW]
S6_9 Boiler	[YES/NO/ DON'T KNOW]

UPDATE QUALTRICS MATH OPERATIONS VARIABLES

[IF S6_1 (DHP) = 1 (YES), SET DHP MODULE = 0

IF S6_2 (ASHP) = 1, SET ASHP MODULE = 0

IF S6_3 (PTHP/GEO) = 1 OR S6_4 (CAC) = 1 OR S6_5 (RAC) = 1, SET COOLING MODULE = 0

IF S6_6 (gFAF) = 1 OR S6_7 (eFAF) = 1 OR S6_8 (BASEBOARD/WALL) = 1 OR S6_9 (BOILER) = 1, SET HEATING MODULE = 0]

DHP MODULE (Mini-Splits)

[ASK IF DHP MODULE ~= MISSING; ELSE SKIP TO ASHP MODULE]

[DHP MODULE WILL HAVE A VALUE OF 0 OR GREATER IF S6_1 (DHP) = 1]

[DISPLAY TO ALL IN DHP MODULE]

MINI-SPLIT SYSTEM INSTALLATION

Please tell us about a **recent mini-split system installation** for which you visited the site and can answer a few questions about the system installed and the site.

- The mini-split can be a ducted or ductless system.
- Please select an installation for a single-family detached house or an attached house of 4 or fewer units.
- We anticipate you will need to refer to your job records to answer our questions, which include make and model, among other things.

[ASK ALL IN DHP MODULE]

Q1. About what month was the system installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
98. Don't know

[ASK ALL IN DHP MODULE]

Q2. What type of mini-split system did you install?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Ductless
2. Ducted
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN DHP MODULE]

Q3. Did the utility provide an incentive, rebate, or discount for this system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Yes
2. No
98. Don't know

[ASK ALL IN DHP MODULE]

Q4. Which best describes the efficiency of the mini-split system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Standard efficiency (under 12.6 HSPF)
2. High efficiency (12.6 HSPF and over)
98. Don't know

[ASK ALL IN DHP MODULE]

Q5. What is the make of the mini-split system you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Blueridge
2. Daikin
3. Fujitsu
4. Haier
5. Lennox
6. LG
7. Midea
8. Mitsubishi
9. Panasonic
10. Pioneer
11. Sanyo
12. Toshiba Carrier
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF DHP Q5 ~ = 98 (DON'T KNOW); ELSE SKIP TO Q7 (INDOOR UNITS)]

Q6. What is its model?

[SINGLE RESPONSE; FORCE RESPONSE]

1. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN DHP MODULE]

Q7. Does the installation have a single indoor unit, or multiple indoor units?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Single indoor unit
2. Multiple indoor units
98. Don't know

[ASK ALL IN DHP MODULE]

Q8. Which of the following equipment did you also install as part of this job? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Thermostat (wall-mounted or hand-held remote)
2. Other cooling and/or heating equipment
3. Other equipment not listed here
4. No additional equipment [EXCLUSIVE]
98. Don't know [EXCLUSIVE]

[ASK IF DHP Q8 = 2 (COOLING/HEATING) OR Q8 = 3 (OTHER); ELSE SKIP TO Q10 (THERMOSTAT)]

Q9. You checked other equipment. What other equipment did you install? Please check all that apply

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Mini-split system
2. Central air source heat pump (ASHP)
3. Packaged terminal (PTHP) or geothermal heat pump
4. Central air conditioning (CAC)
5. Room air conditioning (RAC)
6. Gas forced air furnace (gFAF)
7. Electric forced air furnace (eFAF)
8. Electric baseboard or wall unit
9. Other heating equipment (boiler, fireplace, other)
10. Wood stove
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK IF DHP Q8 = 1 (THERMOSTAT); ELSE SKIP TO Q13 (REASON)]

Q10. Which of the following describe the thermostat, to the best of your knowledge? Check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Smart / Learning (self-optimizes schedules and temperature based on customer interaction/preferences. Does not require programming)
2. Wi-fi enabled (connected to the internet and remotely programmable)
3. Programmable (enables user to program thermostat settings based on fixed schedule)
4. Manual dial (requires user to manually adjust thermostat to change thermostat settings)
98. Don't know [EXCLUSIVE]

[ASK IF DHP Q8 = 1 (THERMOSTAT); ELSE SKIP TO Q13 (REASON)]

Q11. What is the make of the thermostat installed with the mini-split system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Same make as the mini-split
2. Honeywell

- 3. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF DHP Q8 = 1 (THERMOSTAT) AND (Q11 ~ = 98 (DON'T KNOW); ELSE SKIP TO Q13 (REASON))]

Q12. What is the thermostat model?

[SINGLE RESPONSE; FORCE RESPONSE]

- 96. [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN DHP MODULE]

Q13. What is your understanding of why the owner installed the system? Would you say for ...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Cooling
- 2. Heating
- 3. Both cooling and heating
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN DHP MODULE]

Q14. What best describes the relationship of the equipment you installed to any previously installed space conditioning system? Does it ...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Replace the previous system (previous system was removed from service)
- 2. Supplement or displace the previous system (previous system remains usable)
- 3. Condition newly built space (new home or addition)
- 4. Condition space not previously conditioned (such as a garage, basement, attic)
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF DHP Q14 = 1 (REPLACE) OR IF Q14 = 2 (SUPPLEMENT); ELSE SKIP TO Q17 (HOUSE)]

Q15. What equipment does the system you installed replace/supplement? That is, what was the previous HVAC equipment? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Mini-split system
- 2. Central air source heat pump (ASHP)
- 3. Packaged terminal (PTHP) or geothermal heat pump
- 4. Central air conditioning (CAC)
- 5. Room air conditioning (RAC)
- 6. Gas forced air furnace (gFAF)

7. Electric forced air furnace (eFAF)
8. Electric baseboard or wall unit
9. Boiler
10. Fireplace or wood stove
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK if DHP q14 = 1 (REPLACE) OR IF Q14 = 2 (SUPPLEMENT); ELSE SKIP TO Q17 (HOUSE)]

Q16. Very roughly, what was the approximate age of the space conditioning equipment that was replaced/supplemented? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Less than 5 years old
2. 5 to 10 years old
3. 11 to 20 years old
4. More than 20 years old
98. Don't know

[ASK ALL IN DHP MODULE]

Q17. What best describes the type of house in which you installed the system? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Single-family detached house
2. Two attached units (2-unit townhome, Duplex)
3. Three attached units (3-unit townhome, Triplex)
4. Four attached units (4-unit townhome, Four-plex)
5. Manufactured home
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN DHP MODULE]

Q18. What best describes the house size? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Less than 1,000 square feet (small house)
2. 1,000 to 3,000 square feet (medium house)
3. Over 3,000 square feet (large house)
98. Don't know

[ASK ALL IN DHP MODULE]

Q19. What best describes the portion of the house served by the system you installed? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. The whole house, or most of it
2. Main living space
3. Basement only
4. Single room or rooms, such as bedroom(s)
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN DHP MODULE]

Q20. Is there anything else you think we should know about the equipment or installation?

[SINGLE RESPONSE]

96. [OPEN-ENDED RESPONSE]

[READ TO ALL IN DHP MODULE]

Thank you for describing this mini-split system installation.

UPDATE QUALTRICS MATH OPERATIONS VARIABLES

[SET DHP MODULE = DHP MODULE + 1]

[SET TOTAL MODULES = TOTAL MODULES + 1]

ASHP MODULE [ASK IF ASHP MODULE ~= MISSING; ELSE SKIP TO HEATING MODULE]

[ASHP MODULE WILL HAVE A VALUE OF 0 OR GREATER IF S6_2 (ASHP) = 1]

This is part B of a multi-part HVAC installation Survey, the Air Source Heat Pump (ASHP) Module

ASHP MODULE

[ASK IF ASHP MODULE ~= MISSING; ELSE SKIP TO HEATING MODULE]

[ASHP MODULE WILL HAVE A VALUE OF 0 OR GREATER IF S6_2 (ASHP) = 1]

[DISPLAY TO ALL IN ASHP MODULE]

CENTRAL AIR SOURCE HEAT PUMP INSTALLATION

Please tell us about a recent central air source heat pump installation (including dual-fuel hybrid ASHP with gas furnace, but excluding mini-split) for which you visited the site (single family or 4 units or less or manufactured) and can answer a few questions about the site and the system, including make and model.

[ASK ALL IN ASHP MODULE]

Q1. About what month was the system installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
98. Don't know

[ASK ALL IN ASHP MODULE]

Q2. What type of heat pump system did you install?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Air source heat pump (ASHP)
2. Dual fuel hybrid system (ASHP and gas forced air furnace (gFAF))
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN ASHP MODULE]

Q3. Did the utility provide an incentive, rebate, or discount for this system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Yes
2. No
98. Don't know

[ASK ALL IN ASHP MODULE]

Q4. Which best describes the efficiency of the ASHP?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Standard efficiency (8.5 HSPF and under)
2. High efficiency (between 8.6 HSPF and under 10.0 HSPF)
3. Very high efficiency, variable capacity system (10.0 HSPF and over)
98. Don't know

[ASK ALL IN ASHP MODULE]

Q5. What is the make of the outdoor unit you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Amana
2. Bryant
3. Carrier
4. Coleman
5. Comfort-Aire
6. Daikin
7. GE
8. Goodman
9. Intertherm
10. Lennox
11. Nordyne
12. Payne
13. Rheem
14. Ruud
15. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF ASHP Q5 ~ = 98 (DON'T KNOW); ELSE, SKIP TO Q7 (INDOOR UNIT)]

Q6. What is its model?

[SINGLE RESPONSE; FORCE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF ASHP Q2 = 1 (ASHP); ELSE, SKIP TO Q9 (OTHER EQUIPMENT INSTALLED)]

Q7. What is the make of the indoor unit you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Same as outdoor unit
2. Amana
3. Bryant
4. Carrier
5. Coleman
6. Comfort-Aire
7. Daikin
8. GE
9. Goodman
10. Intertherm
11. Lennox

- 12. Nordyne
- 13. Payne
- 14. Rheem
- 15. Ruud
- 16. Trane
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF ASHP Q7 ~ = 98 (DON'T KNOW); ELSE SKIP TO Q9 (OTHER EQUIPMENT INSTALLED)]

Q8. What is the model of this indoor unit?

[SINGLE RESPONSE; FORCE RESPONSE]

- 96. [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN ASHP MODULE]

Q9. Which of the following equipment did you also install as part of this job? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Thermostat
- 2. Other cooling and/or heating equipment
- 3. Other equipment not listed here
- 4. No additional equipment [EXCLUSIVE]
- 98. Don't know [EXCLUSIVE]

[ASK IF ASHP Q9 = 2 (COOLING/HEATING) OR Q9 = 3 (OTHER); ELSE SKIP TO Q11 (THERMOSTAT)]

Q10. You checked other equipment. What other equipment did you install? Please check all that apply

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Mini-split system
- 2. Air source heat pump (ASHP)
- 3. Packaged terminal (PTHP) or geothermal heat pump
- 4. Central air conditioning (CAC)
- 5. Room air conditioning (RAC)
- 6. Gas forced air furnace (gFAF)
- 7. Electric forced air furnace (eFAF)
- 8. Electric baseboard or wall unit
- 9. Other heating equipment (boiler, fireplace, other)
- 10. Wood stove
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know [EXCLUSIVE]

[ASK IF ASHP Q9 = 1 (THERMOSTAT); ELSE SKIP TO Q14 (GFAF)]

Q11. Which of the following describe the thermostat, to the best of your knowledge? Check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Smart / Learning (self-optimizes schedules and temperature based on customer interaction/preferences. Does not require programming)
2. Wi-fi enabled (connected to the internet and remotely programmable)
3. Programmable (enables user to program thermostat settings based on fixed schedule)
4. Manual dial (requires user to manually adjust thermostat to change thermostat settings)
98. Don't know [EXCLUSIVE]

[ASK IF ASHP Q9 = 1 (THERMOSTAT); ELSE SKIP TO Q14 (GFAF)]

Q12. What is the make of the thermostat installed with the heat pump?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Same make as the heat pump
2. ecobee
3. Honeywell
4. Lux
5. Nest
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF ASHP Q9 = 1 (THERMOSTAT) AND Q12 ~= 98 (DK); ELSE SKIP TO Q14 (GFAF)]

Q13. What is the thermostat model?

[SINGLE RESPONSE; FORCE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2 = 2 (DUAL-FUEL SYSTEM) OR IF Q10 = 6 (gFAF); ELSE SKIP TO Q18 (WHY)]

Q14. You indicated you also installed a gas forced air furnace (gFAF) in this home. Did the utility provide an incentive, rebate, or discount for this furnace?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Yes
2. No
98. Don't know

[ASK IF Q2 = 2 (DUAL-FUEL SYSTEM) OR IF Q10 = 6 (gFAF); ELSE SKIP TO Q18 (WHY)]

Q15. What best describes the type of the gas furnace (efficiency/ venting)?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Standard efficiency (metal venting)
2. Condensing (PVC venting)
98. Don't know

[ASK IF Q2 = 2 (DUAL-FUEL SYSTEM) OR IF Q10 = 6 (gFAF); ELSE SKIP TO Q18 (WHY)]

Q16. What is the make of the furnace you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Amana
2. Bryant
3. Carrier
4. Coleman
5. Comfort-Aire
6. Fujitsu
7. Goodman
8. Intertherm
9. Lennox
10. Nordyne
11. Payne
12. Rheem
13. Ruud
14. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2 = 2 (DUAL-FUEL SYSTEM) OR IF Q10 = 6 (gFAF); ELSE SKIP TO Q18 (WHY)]

Q17. What is its model?

[SINGLE RESPONSE; FORCE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2 = 1 (ASHP); ELSE SKIP TO Q19 (PREVIOUS)]

Q18. What is your understanding of why the owner installed the heat pump system? Would you say for ...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Cooling
2. Heating

- 3. Both cooling and heating
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN ASHP MODULE]

Q19. What best describes the relationship of the equipment you installed to any previously installed space conditioning system? Does it ...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Replace the previous system (previous system was removed from service)
- 2. Supplement or displace the previous system (previous system remains usable)
- 3. Condition newly built space (new home or addition)
- 4. Condition space not previously conditioned (such as a garage, basement, attic)
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF ASHP Q19 = 1 (REPLACE) OR IF Q19 = 2 (SUPPLEMENT); ELSE SKIP TO Q22 (HOUSE)]

Q20. What space conditioning equipment does the system you installed replace/supplement? That is, what was the previous HVAC equipment? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

- 1. Mini-split system
- 2. Air source heat pump (ASHP)
- 3. Packaged terminal (PTHP) or geothermal heat pump
- 4. Central air conditioning (CAC)
- 5. Room air conditioning (RAC)
- 6. Gas forced air furnace (gFAF)
- 7. Electric forced air furnace (eFAF)
- 8. Electric baseboard or wall unit
- 9. Boiler
- 10. Fireplace or wood stove
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know [EXCLUSIVE]

[ASK IF ASHP Q19 = 1 (REPLACE) OR IF Q19 = 2 (SUPPLEMENT); ELSE SKIP TO Q22 (HOUSE)]

Q21. Very roughly, what was the approximate age of the space conditioning equipment that was replaced/supplemented? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Less than 5 years old
- 2. 5 to 10 years old
- 3. 11 to 20 years old
- 4. More than 20 years old
- 98. Don't know

[ASK ALL IN ASHP MODULE]

Q22. What best describes the type of house in which you installed the system? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Single-family detached house
2. Two attached units (2-unit townhome, Duplex)
3. Three attached units (3-unit townhome, Triplex)
4. Four attached units (4-unit townhome, Four-plex)
5. Manufactured home
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN ASHP MODULE]

Q23. What best describes the house size? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Less than 1,000 square feet (small house)
2. 1,000 to 3,000 square feet (medium house)
3. Over 3,000 square feet (large house)
98. Don't know

[ASK ALL IN ASHP MODULE]

Q24. What best describes the portion of the house served by the system you installed? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. The whole house, or most of it
2. Main living space
3. Basement only
4. Single room or rooms, such as bedroom(s)
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN DHP MODULE]

Q25. Is there anything else you think we should know about the equipment or installation?

[SINGLE RESPONSE]

96. [OPEN-ENDED RESPONSE]

[READ TO ALL IN ASHP MODULE]

Thank you for describing this heat pump system installation.

[UPDATE QUALTRICS MATH OPERATIONS VARIABLES]

[SET ASHP MODULE = ASHP MODULE + 1]

[SET TOTAL MODULES = TOTAL MODULES +1]

[IF REPEAT MODULE = 1, GO TO THANK YOU AT CONCLUSION OF PART D]

This is part C of a multi-part HVAC installation Survey, the HEATING Module (includes furnaces)

HEATING MODULE

[ASK IF HEATING MODULE ~= MISSING; ELSE SKIP TO COOLING MODULE]

[HEATING MODULE WILL HAVE A VALUE OF 0 OR GREATER IF S6_6 (gFAF) = 1 OR S6_7 (eFAF) = 1 OR S6_8 = 1 (BASEBOARD/WALL) OR S6_9 = 1 (BOILER, OTHER)]

[DISPLAY TO ALL IN HEATING MODULE]

HEATING SYSTEM INSTALLATION

Please tell us about a recent heating equipment installation (can include a CAC, but please exclude all heat pumps, including hybrid HPs, and any wood stove) for which you visited the site (single family or 4 units or less or manufactured) and can answer a few questions about the site and the system, including make and model.

[ASK ALL IN HEATING MODULE]

Q1. About what month was the system installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
98. Don't know

[ASK ALL IN HEATING MODULE]

Q2. What type of heating system did you install?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Gas forced air furnace (gFAF)

- 2. Electric forced air furnace (eFAF)
- 3. Electric baseboard or wall unit
- 4. Boiler
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF HEATING Q2 = 1 [gFAF] OR Q2 = 2 [eFAF], ELSE SKIP TO Q7 (OTHER EQUIPMENT)]

Q3. Did the utility provide an incentive, rebate, or discount for this system?

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Yes
- 2. No
- 98. Don't know

[ASK IF Q2 = 1 [gFAF], ELSE SKIP TO Q5 (MAKE)]

Q4. What best describes the type of gas furnace you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Standard efficiency (metal venting)
- 2. Condensing (PVC venting)
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF HEATING Q2 = 1 [gFAF] OR Q2 = 2 [eFAF], ELSE SKIP TO Q7 (OTHER EQUIPMENT)]

Q5. What is the make of the system you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Amana
- 2. Bryant
- 3. Carrier
- 4. Coleman
- 5. Comfort-Aire
- 6. Fujitsu
- 7. Goodman
- 8. Intertherm
- 9. Lennox
- 10. Nordyne
- 11. Payne
- 12. Rheem
- 13. Ruud
- 14. Trane
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF (HEATING Q2 = 1 [gFAF] OR Q2 = 2 [eFAF]) AND Q5 != 98 (DON'T KNOW); ELSE SKIP TO Q7 (OTHER EQUIPMENT)]

Q6. What is its model?

[SINGLE RESPONSE; FORCE RESPONSE]

1. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN HEATING MODULE]

Q7. Which of the following equipment did you also install as part of this job? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Thermostat
2. Other cooling and/or heating equipment
3. Other equipment not listed here
4. No additional equipment [EXCLUSIVE]
98. Don't know [EXCLUSIVE]

[ASK IF HEATING Q7 = 2 (COOLING/HEATING) OR Q7 = 3 (OTHER); ELSE SKIP TO Q9 (THERMOSTAT)]

Q8. You checked other equipment. What other equipment did you install? Please check all that apply

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Mini-split system
2. Air source heat pump (ASHP)
3. Packaged terminal (PTHP) or geothermal heat pump
4. Central air conditioning (CAC)
5. Room air conditioning (RAC)
6. Gas forced air furnace (gFAF)
7. Electric forced air furnace (eFAF)
8. Electric baseboard or wall unit
9. Other heating equipment (boiler, fireplace, other)
10. Wood stove
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK IF HEATING Q7 = 1 (THERMOSTAT); ELSE SKIP TO Q12 (PREVIOUS)]

Q9. Which of the following describe the thermostat, to the best of your knowledge? Check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Smart / Learning (self-optimizes schedules and temperature based on customer interaction/preferences. Does not require programming)
2. Wi-fi enabled (connected to the internet and remotely programmable)
3. Programmable (enables user to program thermostat settings based on fixed schedule)
4. Manual dial (requires user to manually adjust thermostat to change thermostat settings)
98. Don't know [EXCLUSIVE]

[ASK IF HEATING Q7 = 1 (THERMOSTAT); ELSE SKIP TO Q12 (CAC)]

Q10. What is the make of the thermostat installed with the heating system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Same make as the heating system
2. ecobee
3. Honeywell
4. Lux
5. Nest
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF HEATING Q7=1 (THERMOSTAT) AND Q10 ~= 98 (DK); ELSE SKIP TO Q12 (CAC)]

Q11. What is the thermostat model?

[SINGLE RESPONSE; FORCE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF HEATING Q8 = 4 (CAC); ELSE SKIP TO Q16 (PREVIOUS)]

Q12. You indicated you also installed a central air conditioner. Did the utility provide an incentive, rebate, or discount for this system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Yes
2. No
98. Don't know

[ASK IF HEATING Q8 = 4 (CAC); ELSE SKIP TO Q16 (PREVIOUS)]

Q13. Which best describes the efficiency of the air conditioner?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Standard efficiency (under SEER 14)
2. Medium efficiency (between SEER 14 under SEER 16)
3. High efficiency (SEER 16 and over)
98. Don't know

[ASK IF HEATING Q8 = 4 (CAC); ELSE SKIP TO Q16 (PREVIOUS)]

Q14. What is the make of the air conditioner you installed?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Amana
2. Bryant
3. Carrier
4. Coleman
5. GE
6. Goodman
7. Intertherm
8. Lennox
9. Nordyne
10. Payne
11. Rheem
12. Ruud
13. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF HEATING Q8 = 4 (CAC) AND Q14 ~ = 98 (DK); ELSE SKIP TO Q16 (PREVIOUS)]

Q15. What is its model?

[SINGLE RESPONSE; FORCE RESPONSE]

1. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN HEATING MODULE]

Q16. What best describes the relationship of the equipment you installed to any previously installed space conditioning system? Does it ...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Replace the previous system (previous system was removed from service)
2. Supplement or displace the previous system (previous system remains usable)

3. Condition newly built space (new home or addition)
4. Condition space not previously conditioned (such as a garage, basement, attic)
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF HEATING Q16 = 1 (REPLACE) OR IF Q16 = 2 (SUPPLEMENT); ELSE SKIP TO Q19 (HOUSE)]

Q17. What space conditioning equipment does the system you installed replace/supplement? That is, what was the previous HVAC equipment, if any? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Mini-split system
2. Air source heat pump (ASHP)
3. Packaged terminal (PTHP) or geothermal heat pump
4. Central air conditioning (CAC)
5. Room air conditioning (RAC)
6. Gas forced air furnace (gFAF)
7. Electric forced air furnace (eFAF)
8. Electric baseboard or wall unit
9. Boiler
10. Fireplace or wood stove
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK IF HEATING Q16 = 1 (REPLACE) OR IF Q16 = 2 (SUPPLEMENT); ELSE SKIP TO Q19 (HOUSE)]

Q18. Very roughly, what was the approximate age of the space conditioning equipment that was replaced/supplemented? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Less than 5 years old
2. 5 to 10 years old
3. 11 to 20 years old
4. More than 20 years old
998. Don't know

[ASK ALL IN HEATING MODULE]

Q19. What best describes the type of house in which you installed the system? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Single-family detached house
2. Two attached units (2-unit townhome, Duplex)
3. Three attached units (3-unit townhome, Triplex)
4. Four attached units (4-unit townhome, Four-plex)
5. Manufactured home

- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN HEATING MODULE]

Q20. What best describes the house size? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. Less than 1,000 square feet (small house)
- 2. 1,000 to 3,000 square feet (medium house)
- 3. Over 3,000 square feet (large house)
- 98. Don't know

[ASK ALL IN HEATING MODULE]

Q21. What best describes the portion of the house served by the system you installed? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

- 1. The whole house, or most of it
- 2. Main living space
- 3. Basement only
- 4. Single room or rooms, such as bedroom(s)
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN HEATING MODULE]

Q22. Is there anything else you think we should know about the equipment or installation?

[SINGLE RESPONSE]

- 96. [OPEN-ENDED RESPONSE]

[READ TO ALL IN HEATING MODULE]

Thank you for describing this heating system installation.

[UPDATE QUALTRICS MATH OPERATIONS VARIABLES]

[SET HEATING MODULE = HEATING MODULE + 1]

[SET TOTAL MODULES = TOTAL MODULES + 1]

This is part D of a multi-part HVAC installation Survey, the COOLING Module (that is, air conditioning)

COOLING MODULE (Air Conditioning)

[ASK IF COOLING MODULE ~= MISSING; ELSE SKIP TO MODULE COUNT]

[COOLING MODULE WILL HAVE A VALUE OF 0 OR GREATER IF S6_4B (CAC) = 1 OR S6_5B (RAC) = 1]

[DISPLAY TO ALL IN COOLING MODULE]

COOLING SYSTEM INSTALLATION

Please tell us about a recent air conditioner installation (excluding heat pumps) for which you visited the site (single family or 4 units or less or manufactured) and can answer a few questions about the site and the system, including make and model.

[ASK ALL IN COOLING MODULE]

Q1. About what month was the system installed?

[SINGLE RESPONSE]

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
98. Don't know

[ASK ALL IN COOLING MODULE]

Q2. What type of cooling system did you install?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Central air conditioner (CAC)
2. Room air conditioner
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN COOLING MODULE]

Q3. Did the utility provide an incentive, rebate, or discount for this system?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Yes
2. No

98. Don't know

[ASK IF Q2 = 1 (CAC); ELSE, SKIP TO Q9 (RAC MAKE)]

Q4. Which best describes the efficiency of the air conditioner?

[SINGLE RESPONSE; FORCE RESPONSE]

1. Standard efficiency (under SEER 14)
2. Medium efficiency (between SEER 14 under SEER 16)
3. High efficiency (SEER 16 and over)
98. Don't know

[ASK IF Q2 = 1 (CAC); ELSE SKIP TO Q9 (RAC MAKE)]

Q5. What is the make of the outdoor unit you installed?

[SINGLE RESPONSE]

1. Amana
2. Bryant
3. Carrier
4. Coleman
5. GE
6. Goodman
7. Intertherm
8. Lennox
9. Nordyne
10. Payne
11. Rheem
12. Ruud
13. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2 = 1 (CAC) AND Q5 ~= 98 (DON'T KNOW); ELSE, SKIP TO Q7 (INDOOR UNIT)]

Q6. What is its model?

1. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2 = 1 (CAC); ELSE SKIP TO Q9 (RAC MAKE)]

Q7. What is the make of the indoor unit you installed?

[SINGLE RESPONSE]

1. Did not install an indoor unit
2. Same as outdoor unit
3. Amana

4. Bryant
5. Carrier
6. Coleman
7. GE
8. Goodman
9. Intertherm
10. Lennox
11. Nordyne
12. Payne
13. Rheem
14. Ruud
15. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF Q2=1 (CAC) AND (COOLING Q7 ~= 1 (NO INDOOR UNIT) OR Q7 ~= 98 (DON'T KNOW)); ELSE SKIP TO Q11 (OTHER EQUIPMENT INSTALLED)]

Q8. What is the model of this indoor unit?

[SINGLE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF COOLING Q2 = 2 (RAC); ELSE SKIP TO Q11 (OTHER EQUIPMENT INSTALLED)]

Q9. What is the make of the room air conditioner you installed?

[SINGLE RESPONSE]

1. Amana
2. Bryant
3. Carrier
4. Coleman
5. GE
6. Goodman
7. Intertherm
8. Lennox
9. Nordyne
10. Payne
11. Rheem
12. Ruud
13. Trane
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF COOLING Q2 = 2 (RAC) AND COOLING Q9 ~= 98 (DON'T KNOW); ELSE SKIP TO Q11 (OTHER EQUIPMENT INSTALLED)]

Q10. What is the model of this room air conditioner?

[SINGLE RESPONSE]

- 96. [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK ALL IN COOLING MODULE]

Q11. Which of the following equipment did you also install as part of this job? Please check all that apply.

[MULTIPLE RESPONSE]

- 1. Thermostat
- 2. Other cooling and/or heating equipment
- 3. Other equipment not listed here
- 4. No additional equipment [EXCLUSIVE]
- 98. Don't know [EXCLUSIVE]

[ASK IF COOLING Q11.2 = 1 (COOLING/HEATING) OR Q11.3 = 1 (OTHER); ELSE SKIP TO Q13 (THERMOSTAT)]

Q12. You checked other equipment. What other equipment did you install? Please check all that apply

[MULTIPLE RESPONSE]

- 1. Mini-split system
- 2. Air source heat pump (ASHP)
- 3. Packaged terminal (PTHP) or geothermal heat pump
- 4. Central air conditioning (CAC)
- 5. Room air conditioning (RAC)
- 6. Gas forced air furnace (gFAF)
- 7. Electric forced air furnace (eFAF)
- 8. Electric baseboard or wall unit
- 9. Other heating equipment (boiler, fireplace, other)
- 10. Wood stove
- 96. Other, please specify: [OPEN-ENDED RESPONSE]
- 98. Don't know

[ASK IF COOLING Q11 = 1 (THERMOSTAT); ELSE SKIP TO Q16 (PREVIOUS)]

Q13. Which of the following describe the thermostat, to the best of your knowledge? Check all that apply.

[MULTIPLE RESPONSE]

1. Smart / Learning (self-optimizes schedules and temperature based on customer interaction/preferences. Does not require programming)
2. Wi-fi enabled (connected to the internet and remotely programmable)
3. Programmable (enables user to program thermostat settings based on fixed schedule)
4. Manual dial (requires user to manually adjust thermostat to change thermostat settings)
98. Don't know [EXCLUSIVE]

[ASK IF COOLING Q11 = 1 (THERMOSTAT); ELSE SKIP TO Q16 (PREVIOUS)]

Q14. What is the make of the thermostat installed with the air conditioner?

[SINGLE RESPONSE]

1. Same make as the air conditioner
2. ecobee
3. Honeywell
4. Lux
5. Nest
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK IF COOLING Q11 = 1 (THERMOSTAT); ELSE SKIP TO Q16 (PREVIOUS)]

Q15. What is the thermostat model?

[SINGLE RESPONSE]

96. [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN COOLING MODULE]

Q16. What best describes the relationship of the equipment you installed to any previously installed space conditioning system? Does it ...

[SINGLE RESPONSE; FORCE RESPONSE]

1. Replace the previous system (previous system was removed from service)
2. Supplement or displace the previous system (previous system remains usable)
3. Condition newly built space (new home or addition)
4. Condition space not previously conditioned (such as a garage, basement, attic)
96. Other, please specify: [OPEN-ENDED RESPONSE]

98. Don't know

[ASK IF COOLING Q16 = 1 (REPLACE) OR IF Q16 = 2 (SUPPLEMENT); ELSE SKIP TO Q19 (HOUSE)]

Q17. What space conditioning equipment does the system you installed replace/supplement?
That is, what was the previous HVAC equipment, if any? Please check all that apply.

[MULTIPLE RESPONSE; FORCE RESPONSE]

1. Mini-split system
2. Air source heat pump (ASHP)
3. Packaged terminal (PTHP) or geothermal heat pump
4. Central air conditioning (CAC)
5. Room air conditioning (RAC)
6. Gas forced air furnace (gFAF)
7. Electric forced air furnace (eFAF)
8. Electric baseboard or wall unit
9. Boiler
10. Fireplace or wood stove
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know [EXCLUSIVE]

[ASK IF COOLING Q16 = 1 (REPLACE) OR IF Q16 = 2 (SUPPLEMENT); ELSE SKIP TO Q19 (HOUSE)]

Q18. Very roughly, what was the approximate age of the space conditioning equipment that was replaced/supplemented? Would you say...

[SINGLE RESPONSE]

1. Less than 5 years old
2. 5 to 10 years old
3. 11 to 20 years old
4. More than 20 years old
98. Don't know

[ASK ALL IN COOLING MODULE]

Q19. What best describes the type of house in which you installed the system? Would you say...

[SINGLE RESPONSE]

1. Single-family detached house
2. Two attached units (2-unit townhome, Duplex)
3. Three attached units (3-unit townhome, Triplex)
4. Four attached units (4-unit townhome, Four-plex)
5. Manufactured home
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN COOLING MODULE]

Q20. What best describes the size of the house served by the installed system? Would you say...

[SINGLE RESPONSE]

1. Less than 1,000 square feet (small house)
2. 1,000 to 3,000 square feet (medium house)
3. Over 3,000 square feet (large house)
98. Don't know

[ASK ALL IN COOLING MODULE]

Q21. What best describes the portion of the house served by the system you installed? Would you say...

[SINGLE RESPONSE; FORCE RESPONSE]

1. The whole house, or most of it
2. Main living space
3. Basement only
4. Single room or rooms, such as bedroom(s)
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know

[ASK ALL IN COOLING MODULE]

Q22. Is there anything else you think we should know about the equipment or installation?

[SINGLE RESPONSE]

96. [OPEN-ENDED RESPONSE]

[READ TO ALL IN COOLING MODULE]

Thank you for describing this cooling system installation.

[UPDATE QUALTRICS MATH OPERATIONS VARIABLES]

[SET COOLING MODULE = COOLING MODULE + 1]

[BLANK, SET TOTAL MODULES = TOTAL MODULES + 1]

[IF MODULE COUNT LESS THAN 4]

[IF TOTAL MODULES \approx 4, SET REPEAT MODULE = 1]

[IF REPEAT MODULE = 1, ASK ASHP MODULE]

THANK YOU

[SHOW ALL]

Thank you for participating in this survey. Please provide your email address and a \$25 e-gift card will arrive in your inbox today!

Be assured that your email address will be held in confidence and used only to send you a gift card.

[ASK ALL]

Q23. Please enter your email address:

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q24. Please re-enter your email address to ensure accuracy:

1. [OPEN-ENDED RESPONSE]

[SHOW ALL]

That's it! Thank you for helping your utility, Bonneville Power Administration, and the region in its energy-use planning.

If you have any questions, please email us at feedback@researchintoaction.com.

[LOGIC TO CONFIRM COOLING Q22 = Q23(EMAIL ADDRESSES ARE IDENTICAL). IF NOT, ASK AGAIN]

[LOGIC TO LINK EMAIL ADDRESS TO E-GIFT CARD ISSUANCE]