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HVAC Market Update

Residential Gas Furnaces
Air-Source, Ducted, Split-System Heat Pumps
Ductless Heat Pumps

Presented to

Energy Trust of Oregon

Final Report
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1 Executive Summary

The HVAC market update project covers three residential HVAC technologies: gas furnaces, air-source, ducted, split-system heat pumps (referred to as split-system heat pumps throughout the report), and ductless heat pumps. The objectives of the project included investigating the penetration of efficient gas furnaces and split-system heat pumps, exploring the market penetration of ductless heat pumps, and understanding the types of motors used in gas furnaces.

This study used both primary and secondary research to investigate market penetration of each technology. The Team identified multiple secondary data sources that provided information at a national and a regional level. The Department of Energy and the Air Conditioning, Heating, and Refrigeration Institute provided high-level shipment information, while the Energy Trust trade ally survey reports and the Northwest Ductless Heat Pump Project data provided some insights into the Oregon market. In addition to the secondary data, the team completed market actor interviews with six distributors in Oregon. These interviews were necessary in order to estimate sales and efficiency levels in the Oregon market.

Key findings for each of the three technologies highlighted below:

Gas Furnaces

- The market share of efficient gas furnaces (90% AFUE and higher) in 2009, 2010 and 2011 tracked the forecast, with minor differences.
- The market share of 95% AFUE and higher gas furnaces has ranged between 59% and 67% over the three year study period.

Split-System Heat Pumps

- Although the overall sales of split-system heat pumps appears to be in decline, there is a steady trend of increased efficiency (9.0 HSPF and higher) split-system heat pumps over the three year study period.

Ductless Heat Pumps (DHPs)

- The market for DHPs in Oregon has grown from 2009 to 2011.
- There appears to be some market confusion about the various incentives offered for the installation of a ductless heat pump in Oregon.

The Team's research and analysis led to two high-level recommendations. The Team recommends that the Energy Trust consider conducting similar research, on an annual basis, in the future in order to track the market for HVAC technologies in Oregon. In addition, the Team recommends that the Energy Trust continue to work with market actors to clearly advertise the ductless heat pump program offerings and requirements, due to some apparent confusion in the market.

2 Introduction

This report provides a market update on residential HVAC equipment including gas furnaces, split-system heat pumps and ductless heat pumps (DHPs). The market update is focused on the 2009 through 2011 time period. Navigant/Summit Blue Consulting completed the Gas Furnace Market Transformation Model and Market Research in June 2009 and the Air Source Heat Pump Market Transformation Model and Market Research in December 2009. This research provides a market update to those reports as well as a look into the market for ductless heat pumps.

2.1 Research Objectives

The primary research questions addressed were the following:

- What percentage of gas furnace sales are standard efficiency compared to high efficiency levels?
- What percentage of heat pump sales are standard efficiency compared to high efficiency levels?
- What is the market penetration rate and size of the ductless heat pump market?
- What are the types and prevalence of fixed torque motors used in furnaces of various efficiency levels?

2.2 Report Structure

The report is organized in four sections with detailed supporting information located in appendices.

- Section 3 outlines the methodology used during the study.
- Section 4 details the findings and results from the study.
- Section 5 presents conclusions and recommendations from the study.

3 Methods

Navigant used both primary and secondary research methods to gather data for the market update. The details of each are described below.

3.1 Secondary Data Review

The Team identified and reviewed publicly available data from various sources to understand the available market for residential HVAC equipment in Oregon. The following sources contained relevant information and are referenced in this report. Each source is listed along with a description of the source and its use.

- *Energy Trust Trade Ally Surveys*[1] – The trade ally survey reports are available on Energy Trust's website and contained efficiency level percentages from 2009 through 2011 for gas furnaces and heat pumps. Energy Trust's trade allies are a network of contractors who work with Energy Trust to promote energy efficient products.

- *Department of Energy (DOE) Technical Support Document for Central Air Conditioners and Heat Pumps*[2] – This data was prepared by the DOE to support the federal standard for central air conditioning and heat pump equipment. The Team used this documentation to better understand sales of heat pumps. However, the support document includes data on a national level rather than a state level.

- *Northwest Ductless Heat Pump Pilot Project Market Progress Evaluation Report #1*[3] – This report contains background information on ductless heat pumps in the region and provided initial figures to represent total ductless heat pumps installed in the Northwest region.

- *Northwest Energy Efficiency Alliance (NEEA)*[4] – Staff at NEEA provided Navigant with ductless heat pump program data specific to Oregon indicating quantities of ductless heat pump units that received rebates in the years 2008 through 2011.

- *Air-Conditioning, Heating and Refrigeration Institute (AHRI)*[5] – AHRI historical data is available on their website. This data tracks U.S. manufactured historical shipments of heating and cooling equipment and was used for national sales of both gas furnaces and heat pumps.

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[1] Energy Trust Trade Ally Surveys completed in 2009, 2010, and 2011. Available at http://energytrust.org/About/policy-and-reports/Reports.aspx.

[2] Department of Energy. "Technical Support Document: Energy Efficiency Program for Consumer Products: Residential Central Air Conditioners, Heat Pumps, and Furnaces." June 2011. Available at http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_central_ac_hp_direct_final_rule_tsd.html

[3] Research Into Action, Inc. "Northwest Ductless Heat Pump Pilot Project, Market Progress Evaluation Report #1." Report ETO #E10-215. March 17, 2010.

[4] Direct communication with Anu Teja. Northwest Energy Efficiency Alliance. December 2011.

[5] Air-Conditioning, Heating, and Refrigeration Institute. Available at http://www.ahrinet.org/statistics.aspx.

3.2 Primary Data Collection

Navigant conducted market actor interviews with a total of six distributors in Oregon. Navigant first developed an interview guide based on the key research objectives. Additional questions were added based on areas of interest that arose through meetings with Energy Trust staff. Energy Trust reviewed and approved the interview guides before the Team fielded the interviews. The interview guide consists of a mix of quantitative and qualitative questions to gain a full snapshot of the residential HVAC market in Oregon. Appendix D: Lists of Interviewees and Interview Guides contains the final interview guide.

Energy Trust provided Navigant with a list of five distributors in the state that would represent the key market actors. This initial list was supplemented with one additional distributor that was identified during the interview process. It should be noted that not all distributors sold all types of equipment covered in the interview. For example, one distributor focused on ductless heat pumps only. The contact person at each organization held various roles within the organization including managers, presidents, and owners. All respondents had significant understanding of the region's sales. The distributors that the Team contacted for the interview are the following:

- Geary Pacific
- Mar-Hy Distributors
- Johnstone Supply
- Gensco
- General Pacific
- Thermal Supply

Interviews were conducted over the course of approximately one month. Due to the sensitivity of some data requested in the interview and effort involved for some contacts to obtain it, several follow-up efforts were required during this period.

Results of the quantitative information collected from these interviews were weighted by technology according to market share using the total number of units sold by each distributor. In cases where a distributor did not provide information the weighting was adjusted.

4 Findings and Results

This section presents the findings for the key research questions. This section is divided into three sub-sections by technology: Residential Gas Furnaces, Residential Split-System Heat Pumps, and Residential Ductless Heat Pumps. The findings for each technology are discussed in detail to answer the research questions and follow the outline of the interview guide.

In addition to the discussion, the Team created a dashboard for each technology. The dashboards allow multiple pieces of information to be viewed at one time. The dashboards provide an overview of the findings that are detailed in the section. The data compiled on each dashboard is from the Team's interviews with distributors in the Oregon market and from secondary sources.

The data is focused on single family existing homes. The responses are also weighted by distributor size in the market, specifically sales data for each technology. The Team estimates that the results encompass at least 75% of the residential HVAC market in Oregon. Detailed data tables are provided in Appendix A, Appendix B, and Appendix C.

4.1 Residential Gas Furnaces

Residential Gas Furnace Sales

Interviews with distributors indicate that overall sales of residential gas furnaces in Oregon peaked in 2010 for the 3-year period researched (7,630 units in 2009; 7,900 units in 2010; 5,320 units in 2011), as shown in the dashboard. This trend is consistent with the national trend for that period. It also aligns well with responses from distributors who indicated that sales dropped off as a result of rebates (state and federal) that ended in 2010. The dashboard also shows the estimated number of efficient units (90% AFUE or higher) sold in Oregon. These values are estimated to cover about 75% of the Oregon market.

At the individual distributor level, the year over year changes varied significantly. While only three of the five distributors experienced increases in 2010, all distributors saw a significant decrease in sales between 2010 and 2011 ranging from 25% to over 200% drops. This may indicate that there is more than a single cause for the peak in 2010.

The United States Department of Energy (DOE) reports historic shipment data for three types of furnaces dating back to 1972 and provides data on a national level. The DOE data indicates that shipments of non-weatherized gas furnaces grew steadily until 2005 when they started to decline. The DOE analysis indicates this trend mirrors the increase and subsequent decrease of housing starts, and suggests that the furnace market is driven by residential new construction. While classes of equipment are reported, the DOE did not report the data by levels of efficiency or state. It should be noted that the DOE shipment data cites the air-conditioning, heating, and refrigeration institute (AHRI) historical data.

Residential Gas Furnace Efficiency Levels

The dashboard shows the gas furnace efficiency levels sold in Oregon from the interviews with distributors. High efficiency furnaces rated at 95% AFUE and higher represent the greatest share of the market in all three years (60% in 2009, 67% in 2010, and 59% in 2011); however, the overall year-over-year changes between 2009 and 2011 are minimal and inconsistent in their direction. When looking at the individual distributor data, the two distributors with the most significant increases in 2010 also reported that 85% or more of their sales were rated 95% and higher AFUE. This trend may indicate that the incentives and federal and state tax credits offered were impactful in selling more high efficiency units.

One distributor noted that they are starting to see a shift [in 2012] to units in the 80% - 89% AFUE range because it is harder to show the payback without financial incentives.

Between 2010 and 2011, two distributors had noticeable drops in the overall percent of high efficiency gas furnaces sold. Another distributor, who had indicated no sales of standard efficiency units over the 3-year period, indicated that the market in 2012 is shifting to units in the 80%-89% AFUE range because it is harder to show the payback without financial incentives.

As a comparison point, Energy Trust conducts a survey of its trade allies on an annual basis. The results of the surveys showed that between 2008 and 2009, the percentage of high efficiency (95% AFUE or higher) gas furnaces nearly tripled in existing homes, from 33% in 2008 to 80% in 2009. The results from the trade ally surveys and the distributor interviews vary for 2009. As would be expected, the trade allies report a higher percent of units sold with a 95% AFUE or higher than the distributors for existing homes (80% compared to 60%, respectively).

Data reported on gas furnaces in the trade ally surveys suggests that the sales of high efficiency gas furnaces in 2010 are similar to those in 2009. Most of the respondents reported that 90% of the gas furnaces installed had an efficiency level of 95% AFUE or higher in 2010. In addition, all but one trade ally reported that at least 70% of gas furnaces installed met or exceeded the 95% level.

Residential Gas Furnace Motors

The dashboard also shows that two-thirds of all high-efficiency gas furnaces use fixed-torque motors, defined by Energy Trust as variable speed motors similar to electrically commutated motors (ECMs) that are set to operate at fixed speeds. Fixed torque motors are less common in 80-89% AFUE furnaces and 90-94% AFUE furnaces, existing in only 6% of each.

In addition, distributors were asked which motors are most common in efficient furnaces (90% AFUE or higher) and standard furnaces (89% AFUE or lower). The question was open ended and multiple responses were allowed. Five distributors indicated that ECMs are the most common type of motor in furnaces rated at 90% AFUE or higher. In addition, other motors were listed as common in efficient furnaces: two distributors mentioned PSC (permanent split capacitor) motors, one distributor mentioned conventional motors, and one distributor mentioned a fixed torque motor. For standard efficiency furnaces (89% AFUE or lower), three distributors stated that PSC (permanent split capacitor) motors, which run at a single speed, were most common.

Comparison to the 2009 Reports on Residential Gas Furnaces

In 2009, the Team completed a Gas Furnace Market Transformation Model Development and Market Research Report.[6] The Team forecasted sales of high efficiency gas furnaces as part of the market transformation model. This 2009 forecast indicated that the high efficiency market would increase between 2009 and 2010, which followed the actual trend. Overall, the market for residential gas furnaces has trended between four and eight percent higher than the 2009 forecast. The forecast did not account for a drop in sales following 2010. The dashboard compares the data for the 2009 forecast and the actual values based on the interviews with distributors (shown as the 2011 Actual on the dashboard).

Residential Gas Furnace Incentives and Tax Credits

Table 4-1 provides a high level summary of the Energy Trust of Oregon incentives, federal tax credits, and Oregon tax credits available to consumers of residential gas furnaces. This table provides market context for gas furnace sales in Oregon. Disaggregating the incentives available to consumers can be challenging. It should be noted that not all ENERY STAR products qualify for the federal tax credits. This information is not meant to be fully inclusive. Anyone interested in purchasing energy efficient equipment should consult the organization for details on incentives and requirements.

[6] Summit Blue Consulting. "Gas Furnace Market Transformation Model Development and Market Research." August 5, 2009.

Table 4-1. Incentives and tax credits for residential gas furnaces in Oregon

	2009	2010	2011
Energy Trust Incentives	$150, through April 30, 2009 $100, beginning May 1, 2009 Requirements: • AFUE of 90% or higher	$100 through April 30, 2010 when combined with tankless gas water heater purchase No incentive beginning May 1 Requirements: • AFUE of 90% or higher	No incentive
Federal Tax Credit	30% of cost, up to $1,500 Requirements: • AFUE of 95% or higher	30% of cost, up to $1,500 Requirements: • AFUE of 95% or higher	$150 Requirements: • AFUE of 95% or higher
Oregon Tax Credit	Up to $350 Requirements: • AFUE of 92% • Electrically efficient blower (GAMA "e" rating) • Ducted combustion air	Up to $350 Requirements: • AFUE of 92% • Electrically efficient blower (GAMA "e" rating) • Ducted combustion air	Up to $350 Requirements: • AFUE of 94% • Electrically efficient blower (GAMA "e" rating) • Ducted combustion air

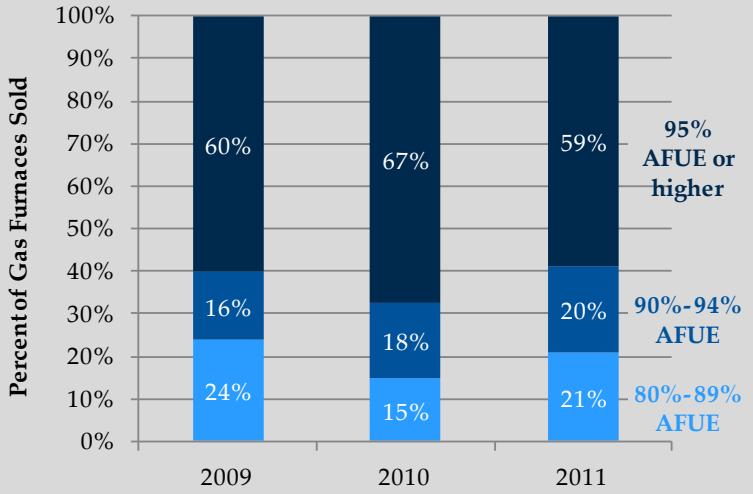
Sources: [Oregon Tax Credit] Oregon Department of Energy. "2009 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Oregon Department of Energy. "2010 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Advantage Heating & Air Conditioning, LLC. "Energy Tax Credits extension for Oregon homes and businesses." Available at www.advantageheatingllc.com/SpecialOffers/TaxesandRebates.aspx (accessed on March 20, 2011).; Oregon Department of Energy. "2009 Tax Credit Listed Company Training, Heat Pump/AC & Duct." July 28, 2009.

[Federal Tax Credit] U.S. Department of Energy. "Energy Savers: Energy Efficiency Tax Credits Available Through 2010." Available at www.energysavers.gov/financial/70015.html (accessed on March 20, 2011).; U.S. Department of Energy. "Energy Savers: Tax Credits for Energy Efficiency." Available at www.energysavers.gov/financial/70010.html (accessed on March 20, 2011).

Appendix A contains supporting data for the Residential Gas Furnaces section. Refer to the following tables for detailed data: Table A- 1 through Table A- 7.

OREGON RESIDENTIAL GAS FURNACE MARKET DASHBOARD

Gas Furnace Efficiency Levels Sold in Oregon



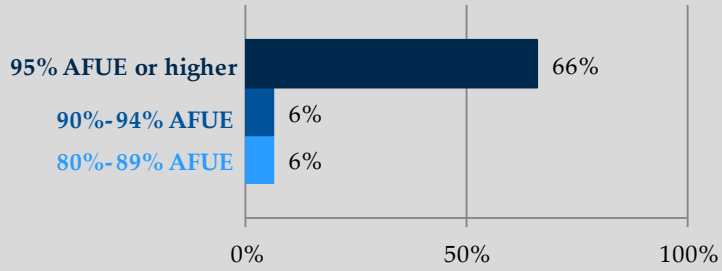
Gas Furnace Sales

Year	National (# of units)	Oregon † (# of units)
2009	2,175,000	7,630
2010	2,453,000	7,900
2011	2,216,000	5,320

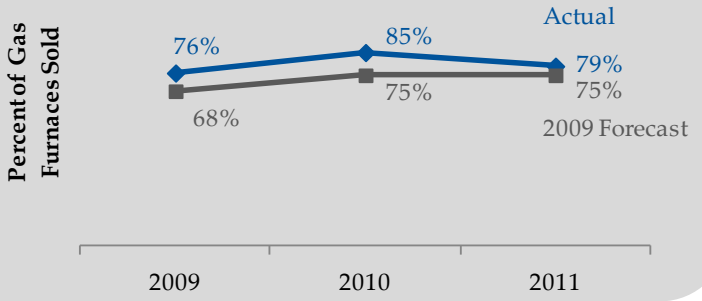
Oregon residential sales comprise about 0.4% of national sales.

†Values for at least 75% of the market. Focused on sales to single-family existing homes.

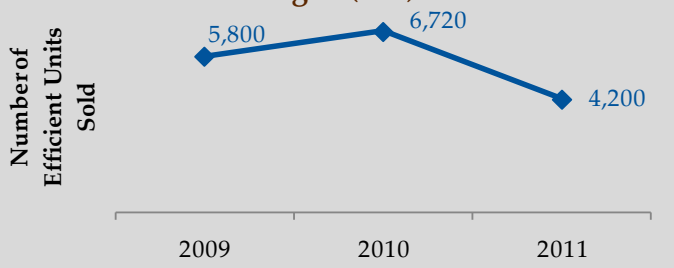
Percent of Gas Furnaces Sold with Fixed Torque Motors (by Efficiency Level)



Efficient (90% AFUE +) Units and Comparison to 2009 Forecast



Number of Efficient (90% AFUE +) Units Sold in Oregon (Est.)



SOURCES: NAVIGANT INTERVIEWS WITH DISTRIBUTORS IN OREGON; AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE; 2009 GAS FURNACE MARKET TRANSFORMATION MODEL DEVELOPMENT AND MARKET RESEARCH REPORT. ALL PERCENTAGES ARE WEIGHTED BY SALES.

4.2 *Residential Split-System Heat Pumps*

Residential Split-System Heat Pump Sales

Data provided by distributors indicates a steady downward trend in the *overall* sales of heat pumps from 2009 through 2011, as can be seen on the dashboard in this section. When looking at individual distributor data however, the trend is inconsistent. Two distributors saw significant spikes in 2010 followed by greater drops in 2011, while two saw decreases in both years and a final distributor reported sales that remained fairly constant. The overall downward trend in Oregon is inconsistent with the national trend in those same years, which saw an increase of 7% in sales over the three-year period.

On a national level, the US DOE and AHRI report historical shipments of heat pumps. The US DOE reporting suggests that 93% of all shipments are intended for residential use, although exact breakouts between residential and commercial are not provided. The dashboard shows the number of national units shipped in 2009, 2010, and 2011. Looking back into previous years, shipments of split-system heat pumps grew steadily and peaked in 2005, following the same trend seen by gas furnaces.

Residential Split-System Heat Pump Efficiency Levels

The dashboard shows that only a small percentage of heat pumps sold in Oregon are 9.5 HSPF or higher (2% in 2009, 4% in 2010, and 2% in 2011). However, the percentage of efficient units (9.0 HSPF and higher) has grown between 2009 and 2011. In 2009, about 46% of units were sold with a 9.0 HSPF or higher and in 2011 about 58% of units were sold with a 9.0 HSPF or higher. The efficiency data combined with the sales data shows a downward trend of efficient (9.0 HSPF or higher) furnace sales in Oregon. Consistent with the trade ally survey, there is a downward trend for units with efficiency less than 9.0 HSPF. These units appear to be getting replaced by higher efficiency units. Similar to gas furnaces, there is a high degree of variance between distributors when considering sales by efficiency level.

One distributor noted that the incentives and education pieces about heat pumps have been very helpful.

In comparison, the Energy Trust Trade Ally Surveys provide data on heat pump efficiencies over time. The trade ally surveys also show an increase in the percentage of units sold with an efficiency of 9.0 HSPF or higher between 2009 and 2010 (60% in 2009 to 78% in 2010). This increase is contrasted by a significant decrease in lower efficiency units (8.9 HSPF or lower) over the same time period (37% in 2009 to 21% in 2010). Interestingly, by 2010, the highest efficiency level (HSPF 9.5 or better) had a greater percent of sales (27%) than all standard efficiency combined.

Residential Split-System Heat Pump Incentives and Tax Credits

Table 4-2 provides a high level summary of the Energy Trust of Oregon incentives, federal tax credits, and Oregon tax credits available to consumers of residential split-system heat pumps. This table provides market context for split-system heat pump sales in Oregon. Disaggregating the incentives available to consumers can be challenging. It should be noted that not all ENERY STAR products qualify for the federal tax credits. This information is not meant to be fully inclusive. Anyone interested in purchasing energy efficient equipment should consult the organization for details on incentives and requirements.

Table 4-2. Incentives and tax credits for split-system heat pumps in Oregon

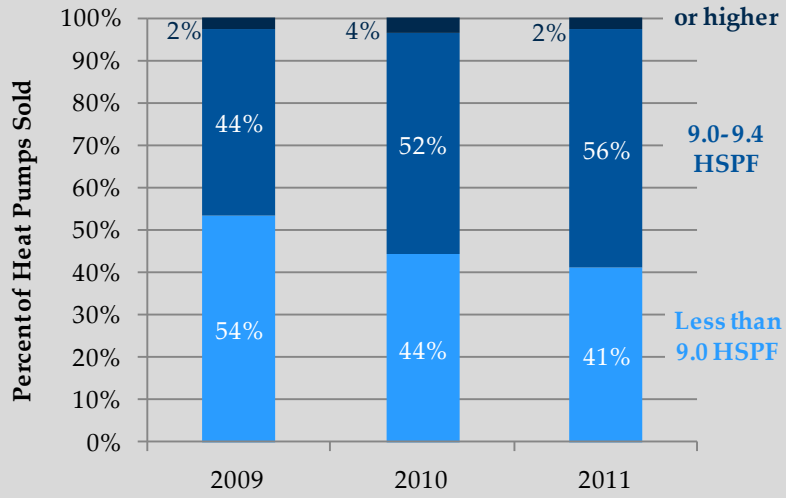
	2009	2010	2011
Energy Trust Incentives	$450 for replacing electric resistance heating $250 for an upgrade from an old heat pump or replacing non-electric heat Requirements: • HSPF 9.0, or greater	$450 for replacing electric resistance heating $250 for an upgrade from an old heat pump or replacing non-electric heat Requirements: • HSPF 9.0, or greater	$450 for replacing electric resistance heating $250 for an upgrade from an old heat pump or replacing non-electric heat Requirements: • HSPF 9.0, or greater
Federal Tax Credit	30% of cost, up to $1,500 Requirements (all must apply): • HSPF of 8.5 or higher • EER of 12.5 or higher • SEER of 15 or higher	30% of cost, up to $1,500 Requirements (all must apply): • HSPF of 8.5 or higher • EER of 12.5 or higher • SEER of 15 or higher	$300 Requirements (all must apply): • HSPF of 8.5 or higher • EER of 12.5 or higher • SEER of 15 or higher
Oregon Tax Credit	Up to $300-$430 depending on efficiency Requirements: • HSPF 9+ • EER 12+ • Must be installed with certified technician	Up to $300-$430 depending on efficiency Requirements: • HSPF 9+ • EER 12+ • Must be verified by certified technician	Up to $300-$430 depending on efficiency Requirements: • HSPF 9+ • EER 12+ • Must be verified by certified technician

Sources: [Oregon Tax Credit] Oregon Department of Energy. "2009 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Oregon Department of Energy. "2010 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Advantage Heating & Air Conditioning, LLC. "Energy Tax Credits extension for Oregon homes and businesses." Available at www.advantageheatingllc.com/SpecialOffers/TaxesandRebates.aspx (accessed on March 20, 2011).; Oregon Department of Energy. "2009 Tax Credit Listed Company Training, Heat Pump/AC & Duct." July 28, 2009. [Federal Tax Credit] U.S. Department of Energy. "Energy Savers: Energy Efficiency Tax Credits Available Through 2010." Available at www.energysavers.gov/financial/70015.html (accessed on March 20, 2011).; U.S. Department of Energy. "Energy Savers: Tax Credits for Energy Efficiency." Available at www.energysavers.gov/financial/70010.html (accessed on March 20, 2011).

Appendix B contains supporting data for the Residential Split-System Heat Pump section. Refer to the following tables for detailed data: Table B- 1 through Table B- 5.

OREGON RESIDENTIAL SPLIT-SYSTEM HEAT PUMP MARKET DASHBOARD

Split-System Heat Pump Efficiency Levels Sold in Oregon



SOURCES: NAVIGANT INTERVIEWS WITH DISTRIBUTORS IN OREGON; AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE; 2009 AIR SOURCE HEAT PUMP MARKET TRANSFORMATION MODEL DEVELOPMENT AND MARKET RESEARCH REPORT. ALL PERCENTAGES ARE WEIGHTED BY SALES

Split-System Heat Pump Sales

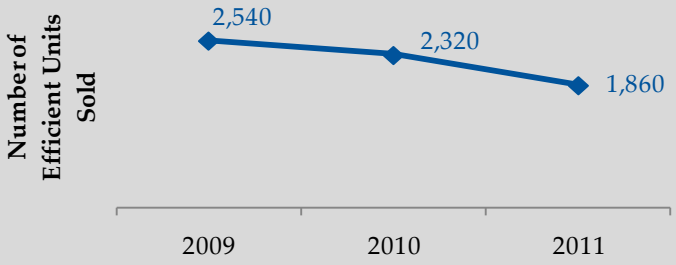
Year	National (# of units)	Oregon† (# of units)
2009	1,642,000	5,520
2010	1,748,000	4,150
2011	1,765,000	3,200

Oregon residential sales comprise about 0.4% of national sales.

† Values for at least 75% of the market. Focused on sales to single-family existing homes.

Efficient (9.0 HSPF+) Units and Comparison to 2009 Study

Number of Efficient (9.0 HSPF+) Units Sold in Oregon (Est.)



4.3 Residential Ductless Heat Pumps

Residential Ductless Heat Pump Sales

Data provided by distributors indicate an *overall* steady increase in the sales of ductless heat pumps from 2009 through 2011, as shown in the dashboard. The Oregon ductless heat pump market grew 17% from 2009 to 2010 and 14% from 2010 to 2011. Similar to the other technologies, when looking at specific distributors, the trend was not consistent across the board. In fact, two of the six distributors experienced a decrease over the three-year period of greater than 20%. One distributor cited the reduction of the federal tax credit at the end of 2010 for their sharp decrease. On the other hand, the distributors that experienced increases had dramatic increases. Two distributors experienced an overall increase of more than 50% in the three years. One distributor described the rapid growth of ductless heat pumps noting that sales of the ductless heat pumps are growing faster than any other specific HVAC product during his time in the business.

The evaluation report of the Northwest Ductless Heat Pump (DHP) Pilot Project indicates that 3,899 ductless heat pumps were installed across NEEA's operating region[7] between October of 2008 and December of 2009 as part of a pilot project. The study cites 2008 research, indicating that DHPs represented only one percent of the US commercial and residential market for HVAC equipment at that time.

One distributor described the rapid growth of ductless heat pumps noting that sales of the ductless heat pumps are growing faster than any other specific HVAC product during his time in the business.

In addition to the information from the pilot project evaluation report, NEEA provided installation quantities in Oregon for the period of 2008 – 2011. After 2008, there was a sharp increase in DHP incentives received in Oregon through the Northwest Ductless Heat Pump Project, from 78 incented units in 2008 to 1,568 incented units in 2009. In addition, the Northwest Ductless Heat Pump Project incented 1,756 units in 2010 and 1,355 units in 2011.[8] According to the data from distributors, about 43% of units sold in 2010 and about 29% of units sold in 2011 received Northwest Ductless Heat Pump Project incentives. It is important to note that other programs, including municipal and public utility programs that operate separately from Energy Trust programs, existed simultaneously and likely had their own influence on the sales of ductless heat pumps during this period.

Residential Ductless Heat Pump Types

Although DHP models can vary in their efficiency levels, SEER and HSPF levels do not accurately identify their levels of efficiency and are therefore not considered in DHP programs in the Pacific Northwest.[9] Instead, the number of "heads" (indoor air handling units used to distribute air in different rooms) is used as a proxy for understanding how efficiently a DHP will run. For the period of 2009 – 2011, distributors indicated that 69% of all DHPs were sold with only one indoor head.

When asked about anticipated trends for the number of heads that will be most typical in 2012, responses varied. Four distributors expected their sales to stay the same, one expected an increase in single head

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[7] NEEA's operating region goes beyond Oregon and also includes Washington, Montana and Idaho.

[8] While the total number of units in 2011 was lower than in 2010, the number of incented units is still high in 2011. Data from 2012 would provide additional insight into the ductless heat pump market trends in Oregon.

[9] NEEA Memo. April 3, 2011. *Issues with Using DOE-prescribed HSPF and SEER ratings for Ductless Heat Pumps in the Pacific Northwest*.

units, and another expected an increase in multi-head units. Among those expecting the trend to stay the same or increase in single heads, several distributors mentioned a change to the incentive rules, promoting the single port units.[10] However, other distributors noted that one of the main advantages to DHPs is their versatility due to having the option of multiple heads which may affect consumer's decision in the number of heads that they install. In addition, one respondent indicated that his brand is a leader in multi-head units, and thus his sales' focus is on ductless heat pumps with multiple heads.

Residential Ductless Heat Pump for Cold Climates

Definitions and awareness of cold climate DHP units varied among the distributors. One indicated that the term was not relevant because they do not sell in a cold climate. Other distributors noted that the definition is based on the outside air temperature at which the ductless heat pump operates, citing more effective operation down to five degrees and below zero degrees. Other distributors enquired about the term and then indicated some familiarity with them. In addition, some distributors were stocking what they considered to be ductless heat pumps specifically for cold climates while others did not stock the products and noted that their manufacturers did not carry the units.

Four distributors referenced the Mitsubishi Hyper Heat specifically at some point in the conversation about cold-climate DHPs, with one distributor indicating that the majority of his company's sales of DHPs were of that model. At least one other distributor implied that this is the only model made for cold climates.

Residential Ductless Heat Pump Incentives and Tax Credits

Table 4-3 provides a high level summary of the Energy Trust of Oregon incentives, federal tax credits, Oregon tax credits, and Northwest Ductless Heat Pump Project incentives available to consumers of residential ductless heat pumps. This table provides market context for ductless heat pump sales in Oregon. Disaggregating the incentives available to consumers can be challenging. It should be noted that not all ENERY STAR products qualify for the federal tax credits. This information is not meant to be fully inclusive. Anyone interested in purchasing energy efficient equipment should consult the organization for details on incentives and requirements.

[10] From the Team's discussions with Energy Trust, the ductless heat pump program from April 1, 2008 to December 31, 2011 had no restrictions on the number of indoor heads. As of January 1, 2012, the program currently offers incentives for a maximum of two indoor heads per outdoor unit, with a maximum of two outdoor units. However, the Northwest Ductless Heat Pump Project only offers incentives for one indoor head. Contractors may install more than one indoor head, but they will only receive incentives for the first one.

Table 4-3. Incentives and tax credits for ductless heat pumps in Oregon

	2009	2010	2011
Energy Trust Incentives	$400 for replacing electric resistance heating Requirements: • Variable speed compressor "inverter technology"	$600 for replacing electric resistance heating Requirements: • Variable speed compressor "inverter technology"	$600 for replacing electric resistance heating Requirements: • Variable speed compressor "inverter technology"
Federal Tax Credit	30% of cost, up to $1,500 Requirements (all must apply): • HSPF of 8.5 or higher • EER of 12.5 or higher • SEER of 15 or higher	30% of cost, up to $1,500 Requirements (all must apply): • HSPF of 8.5 or higher • EER of 12.5 or higher • SEER of 15 or higher	*Unknown. ENERGY STAR did not receive clarification from the IRS about ductless heat pump credits in 2011.
Oregon Tax Credit	$50 per half ton up to $400 Requirements: • Variable speed compressor "inverter technology" • Must be installed by a factory-trained technician	$50 per half ton up to $400 Requirements: • Variable speed compressor "inverter technology" • Must be installed by a factory-trained technician	$50 per half ton up to $400 Requirements: • Variable speed compressor "inverter technology" • Must be installed by a factory-trained technician • Listed in the ARI directory and provide at least 50% of rated capacity efficient operation when outside air is 17°F
Northwest Ductless Heat Pump Project[1]	$1500 (amount can vary) for one outdoor and the first indoor head Requirements: • Primary heating source must be zonal electric resistance heat	$1500 (amount can vary) for one outdoor and the first indoor head Requirements: Primary heating source must be zonal electric resistance heat	$1500 (amount can vary) for one outdoor and the first indoor head Requirements: Primary heating source must be zonal electric resistance heat

Sources: [Oregon Tax Credit] Oregon Department of Energy. "2009 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Oregon Department of Energy. "2010 Oregon Residential Energy Tax Credits, HVAC & Water Heating Systems." October 2009.; Advantage Heating & Air Conditioning, LLC. "Energy Tax Credits extension for Oregon homes and businesses." Available at www.advantageheatingllc.com/SpecialOffers/TaxesandRebates.aspx (accessed on March 20, 2011).; Oregon Department of Energy. "2009 Tax Credit Listed Company Training, Heat Pump/AC & Duct." July 28, 2009.
[Federal Tax Credit] Call to the ENERGY STAR Hotline on March 21, 2011.
[Ductless Heat Pump Projects]
Bonneville Power Administration. "Residential Sector Update Transitioning Ductless Heat Pump Program." January 25, 2012; Ductless Heat Pump Project. Available at http://goingductless.com (accessed March 30, 2012); Snohomish County Public Utility District No. 1. "Ductless Heat Pump Program Guidelines" Available at www.snopud.com/?p=1605 (accessed March 23, 2012); Discussions with staff at NEEA.
Seattle City Light. "Ductless Heat Pump Rebate."Available at www.seattle.gov/light/conserve/dhp/ (accessed March 23, 2012).
[1] The residential ductless heat pump program is currently in transition. The regional actors in the program include the regional technical forum (RTF), the Northwest Energy Efficiency Alliance (NEEA), Bonneville Power Administration (BPA), and the utilities.

Appendix C contains supporting data for the Residential Ductless Heat Pump section. Refer to the following tables for detailed data: Table C- 1 through Table C- 2.

OREGON
RESIDENTIAL DUCTLESS HEAT PUMP MARKET DASHBOARD

Indoor Air Handling Units

Of all the ductless heat pumps sold in 2009, 2010 and 2011, about 69% had only one indoor air handling unit. Comments revealed that the market's understanding of the incentive programs have had an impact on the high percentage of ductless heat pumps with only one indoor head.

Projections for the number of units with only one indoor air handling unit in 2012 varied. Some distributors noted that it will probably be the same as last year, while others expected to sell more multi-heads because ductless heat pumps are going toward a more whole-home solution application. For one distributor, over 80% of ductless heat pumps with multiple indoor units have two indoor heads.

Residential Ductless Heat Pump Sales

Year	Oregon† (# of units)
2009	3,470
2010	4,060
2011	4,620

The Oregon ductless heat pump market has grown 17% from 2009 to 2010 and 14% from 2010 to 2011.

† Values for at least 75% of the market. Focused on sales to single-family existing homes.

Markets for Ductless Heat Pumps

- **Single-family existing (this report's focus)**
- **New construction residential**
- **Multi-family buildings**
- **Light commercial**
- **Restaurants**
- **Hair salons**
- **Garages**
- **Community centers**
- **Retirement homes**

One distributor noted approximately 15% of the residential ductless heat pumps end up on commercial projects.

SOURCES: NAVIGANT INTERVIEWS WITH DISTRIBUTORS IN OREGON

5 Summary and Recommendations

The Team's research and analysis during the course of this effort led to the following key findings and recommendations:

Overarching Findings

» The secondary data review indicates that data on the sales volume of gas furnaces and heat pumps is available on a national level, but not on a state level. The efficiency level of the units sold by trade allies is available on a state level from the Energy Trust Trade Ally Surveys. For ductless heat pumps, the number of incented units was available from the Northwest Ductless Heat Pump Pilot Project/NEEA. Therefore, the interviews with distributors in Oregon were necessary to provide the Team with state-specific insights into the market for these technologies.

Findings on Residential Gas Furnaces

» The Oregon data and the national data show an increase in sales of gas furnaces between 2009 and 2010 and a decrease in the sales volume between 2010 and 2011. In addition, the percent of furnaces that were sold with a 90% AFUE or higher in 2011 decreased from 2010. Therefore, both the number of units sold and the number of units that are high efficiency decreased from 2010 to 2011.

» The majority of gas furnaces in the 95% AFUE or higher category are sold with fixed torque motors (about 66%). The percentage of units with 94% AFUE or less sold with fixed torque motors is much lower. About 6% of these units are sold with fixed torque motors.

» The 2009 forecast for the percentage of total gas furnaces that were efficient (90% AFUE or higher) is somewhat different than the actual sales, based on the interviews with distributors. According to the data, a higher percentage of efficient units were sold than was forecast, showing that the forecast was a conservative estimate. The increase in the percentage of high efficiency units sold is as follows: 8% more in 2009 than forecasted, 10% more in 2010, and 4% more in 2011.

Findings on Residential Split-System Heat Pumps

» The percentage of efficient (9.0 HSPF and higher) residential split-system heat pumps gradually increased from 2009 through 2010. Of the total sales, the following percentage of units was efficient: 46% of sales in 2009, 56% of sales in 2010, and 58% of sales in 2011. In addition, the number of units sold in Oregon between 2009 and 2011 has decreased by about 42%. Therefore, the total number of sales is decreasing, but the percentage of those sales that are efficient is increasing.

Findings on Residential Ductless Heat Pumps

» The market for ductless heat pumps in Oregon has grown between 2009 and 2010, with sales in 2009 estimated at 3,470 units and sales in 2011 estimated at 4,620 units.

» The market appears to have the perception that incentives are available for units that have only one indoor head (one air handling unit). From the Team's discussions with Energy Trust, the heat pump program from April 1, 2008 to December 31, 2011 had no restrictions on the number of indoor heads. As of January 1, 2012, the program currently offers incentives for a maximum of two indoor heads per outdoor unit, with a maximum of two outdoor units. However, the Northwest Ductless Heat Pump Pilot Project does only offer incentives for one indoor head.

Contractors may install more than one indoor head, but they will only receive incentives for the first one.

» Overall, as sales of ductless heat pumps increased, the sales of split system heat pumps decreased. While there is not enough information to conclude that the ductless heat pump's growing popularity is causing the decrease in the sales of split-system heat pumps, it is possible that there is some relationship between the two types in the larger view of the heat pump market. Table 5-1 shows this comparison.

Table 5-1: Ductless Heat Pumps Compared to Air Source Heat Pumps

	Total Sales Volume (# of units)			Percentage of All Heat Pump Sales		
	2009	2010	2011	2009	2010	2011
Residential Split-System Heat Pumps	5,520	4,150	3,200	61%	51%	41%
Residential Ductless Heat Pumps	3,470	4,060	4,620	39%	49%	59%
Total for split system and ductless	8,990	8,210	7,820	100%	100%	100%

Source: Navigant distributor interviews.

Recommendations

» Energy Trust should consider conducting similar research in the future in order to track the market for HVAC technologies in Oregon. Interviews with distributors in Oregon provide insights into the demand for these technologies as well as the efficiency levels that are being sold in Oregon. If Energy Trust plans to conduct similar research in the future, the Team suggests sending distributors the data forms on an annual basis in the first quarter of each year so that the amount of data collected at once is minimized and the data is likely more easily accessible on an annual basis.

» Energy Trust should continue to work with market actors to clearly advertise the ductless heat pump program requirements, due to some apparent confusion in the market. Because the Energy Trust's program requirements vary from other regional program requirements, this targeted marketing would help the market better understand the incentives available for ductless heat pump products.

6 Appendix A: Supporting Data for Residential Gas Furnaces

National Data

A- 1. DOE Historical Shipments[11] of Residential Furnaces Nationally (in thousands)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Non-weatherized Gas Furnaces	2,940	2,915	3,060	3,134	3,388	3,378	3,071	2,665	2,169	2,073

Source: US DOE, Energy Efficiency and Renewable Energy, Appliances and Commercial Equipment.

A- 2. AHRI Historical Shipments[11] of Residential Furnaces Nationally (in thousands)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Gas Warm Air Furnaces	3,104	3,063	3,202	3,266	3,519	3,512	3,197	2,782	2,280	2,175	2,453	2,216

Source: AHRI website. Available at http://www.ahrinet.org/historical+data.aspx.

Navigant Interviews with Distributors

A- 3. Total Sales of Residential Gas Furnaces in Oregon[12] (# of units)

	2009	2010	2011
Residential Gas Furnaces	7,630	7,900	5,320

Source: Navigant distributor interviews.

A- 4. Efficiency Levels of Gas Furnaces Sold in Oregon

Efficiency (weighted)	2009	2010	2011
95% AFUE or higher	60%	67%	59%
90-94% AFUE	16%	18%	20%
80-89% AFUE	24%	15%	21%

Source: Navigant distributor interviews.
Note: Values are weighted by number of units sold to single family existing homes.

[11] Standards, Residential Furnaces and Central Air Conditioners and Heat Pumps Direct Final Rule Technical Support Document, Chapter 9: Shipments Analysis, available at http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_central_ac_hp_direct_final_rule_tsd.html (accessed December 12, 2011).

[12] Based on data collected from survey participants. Adjusted to account for sales in Single Family Existing homes in Oregon.

A- 5. Survey Respondent Estimates of Percent of Residential Gas Furnaces Sold with Fixed Torque Motors, Weighted by Number of Units Sold

Efficiency Level	% Fixed Torque Motors
95% AFUE or higher	66%
90 - 94% AFUE	6%
80-89% AFUE	6%

Source: Navigant distributor interviews.

A- 6. Comparison of 2009 Forecast to 2012 actual sales of high efficiency gas furnaces

Gas Furnaces	2009	2010	2011
2009 Forecast	68%	75%	75%
2012 Study	76%	85%	79%

Source: Navigant distributor interviews and 2009 study.

Energy Trust Trade Ally Surveys

A- 7. Percentage of Total Gas Furnace Sales for New and Existing Homes by Efficiency and Year (weighted by firm size)

	2008		2009	
EFFICIENCY	Existing Homes	New Homes	Existing Homes	New Homes
95% or more efficient	33%	22%	80%	60%
90%-94% efficient	28%	29%	12%	25%
80%-89% efficient	39%	47%	10%	14%

Source: Energy Trust Trade Ally Surveys, 2009 and 2010.
Note: Data from the 2011 survey is not included because the gas furnace data was not in the same format as previous years.

7 Appendix B: Supporting Data for Residential Split-System Heat Pumps

National Data

B- 1. DOE Historical Shipments[11] of Heat Pumps Nationally (in thousands)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Split HP	1,073	1,180	1,229	1,350	1,584	1,810	1,807	1,570	1,566	1,389
Single Package HP	159	165	165	174	190	213	190	199	189	162

Source: US DOE, Energy Efficiency and Renewable Energy, Appliances and Commercial Equipment Standards, Residential Furnaces and Central Air Conditioners and Heat Pumps Direct Final Rule Technical Support Document, Chapter 9: Shipments Analysis, available at http://www1.eere.energy.gov/buildings/appliance_standards/residential/residential_furnaces_central_ac_hp_direct_final_rule_tsd.html (accessed December 12, 2011).

B- 2. AHRI Historical Shipments[11] of Heat Pumps Nationally (in thousands)

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Air Source Heat Pump Sales	1,339	1,442	1,484	1,626	1,886	2,137	2,118	1,899	1,865	1,642	1,748	1,765

Source: AHRI website. http://www.ahrinet.org/historical+data.aspx.

Navigant Interviews with Distributors

B- 3. Total Sales of Air Source Heat Pumps in Oregon [12] Volume (# of units)

	2009	2010	2011
Residential Split-System Heat Pumps	5,520	4,150	3,200

Source: Navigant distributor interviews.

B- 4. Efficiency Levels of Split System Heat Pumps Sold in Oregon, Weighted by Number of Units Sold

Efficiency (weighted)	2009	2010	2011
9.5 HSPF or higher	2%	4%	2%
9.0 - 9.4 HSPF	44%	52%	56%
Less than 9.0 HSPF	54%	44%	41%

Source: Navigant distributor interviews.

Energy Trust Trade Ally Surveys

B- 5. Mean Percentage of Residential Heat Pump Sales by Efficiency and Year and Weighted by Firm Size

EFFICIENCY	2008	2009	2010
HSPF 9.5 or better	9%	17%	27%
HSPF 9.0 to 9.4	27%	43%	51%
HSPF 8.5 to 8.9	25%	26%	15%
HSPF 8.2 to 8.4	19%	7%	2%
Code HSPF	19%	4%	4%

Note: Because of missing responses, percentages do not sum to 100%.
Source: Energy Trust Trade Ally Surveys, 2009, 2010 & 2011.

8 Appendix C: Supporting Data for Residential Ductless Heat Pumps

Northwest Ductless Heat Pump Project Data

C- 1. Ductless Heat Pumps Incented Oregon Through the Northwest Ductless Heat Pump Project

	2008	2009	2010	2011
Total Incented DHP Units	78	1,568	1,756	1,355

Source: Anu Teja of NEEA. Provided via program implementer in email. December, 2011.

Navigant Interviews with Distributors

C- 2. Total Sales of Ductless Heat Pumps in Oregon[12] (# of units)

	2009	2010	2011
Residential Ductless Heat Pumps	3,470	4,060	4,620

Source: Navigant distributor interviews.

9 Appendix D: Lists of Interviewees and Interview Guides

Energy Trust and the Market Transformation Model Development and Market Research Team would like to give recognition to each of the individuals and organizations listed below, and acknowledge their valuable time and input to this report.

Distributor Interviewees

- Geary Pacific
- Mar-Hy Distributors
- Johnstone Supply
- Gensco
- General Pacific
- Thermal Supply

Energy Trust of Oregon Market Update

Gas Furnaces, Air Source Heat Pumps, Ductless Heat Pumps

Interview Guide For Distributors

Contact Name:	
Company Name:	
Company Phone:	
Company Address:	
Today's Date & Time:	
Scheduled Date & Time:	
Interviewer:	
Notes:	

INTRODUCTION

[*WHEN CALLING THE COMPANY PHONE NUMBER]*

Hello, I'm with Navigant calling on behalf of Energy Trust of Oregon. We are an independent program evaluator conducting a study to find out about sales of high efficiency gas furnaces, air source heat pumps, and ductless heat pumps in Oregon. Who would be the best person to speak with that knows about the sales and efficiency levels of this equipment over the past several years?

[*ONCE THE OTHER APPROPRIATE CONTACT IS ON THE LINE]*

Hello, my name is [INSERT NAME] with Navigant and I am calling you on behalf of Energy Trust of Oregon. We are an independent program evaluator conducting a study to find out about sales and efficiency levels of gas furnaces, air source heat pumps, and ductless heat pumps in Oregon. Would you be the best person to speak to regarding this?

I'd like to ask you some questions about your sales of gas furnaces and heat pumps in Oregon. **All information that you provide will be aggregated for statistical purposes and your comments will remain anonymous.** Your response would help our efforts tremendously. Navigant will compensate you $50 gift card for a completed interview for your time and consideration. The questions should take15-20 minutes –with possible follow up by email or fax– is this a good time to speak, or would you rather schedule an appointment?

- [*If an appointment, record the date/time of scheduled appointment in the box above, and thank the respondent]*
- [*If now, skip down to Screening questions]*
- *[If no, attempt to convert the person into a respondent. If they will not participate in the phone survey, thank the participant and terminate the phone call. Briefly describe why they wouldn't participate below]*

_____

_____

SCREENING

1. What is your name and position within your company?

_____

2. This survey is focused on gas furnaces; air source, ducted, split system heat pumps; and ductless heat pumps for residential applications. Does your firm sell this type of equipment in Oregon?

    a. Yes [*continue with survey]*

    b. No [*thank and terminate the survey]*

    If yes, please indicate which systems the firm sells (circle all that apply):

    a. Gas furnaces
    b. Air source, ducted, split system heat pumps
    c. Ductless heat pumps

3. What is the size of your company in terms of number of employees? _____

4. What percentage of your company sales are from (ask only those circled in Question 2 above):

    a. Gas furnaces _____
    b. Air source, ducted, split system heat pumps _____
    c. Ductless heat pumps _____

MAIN INTERVIEW QUESTIONS [These questions will likely need to be emailed or faxed to the respondents because of the large number of tables.]

We are looking to obtain data on the sales and efficiency levels of (1) gas furnaces, (2) air source, ducted, split system heat pumps, and (3) ductless heat pumps focusing on the single family, existing building market. Would you prefer to answer those questions now or complete a set of tables sent via email or fax?

[If prefer to answer now, proceed to all questions]

[If prefer to complete the tables, ask for the email or fax number _____ and proceed to question #8-10 and 16-19]

[ENCOURAGE THEM TO ESTIMATE IF THEY DO NOT HAVE EXACT NUMBERS]

THE FOLLOWING TABLES PERTAIN TO RESIDENTIAL GAS FURNACES (Ask only if "gas furnaces" was circled in question 4)

5. Approximately how many total **residential gas furnaces** did your company sell in 2009-2011 **in Oregon?** (Please complete the table below.) [note: remind them the data will only be reported in aggregate – no one but the evaluation team will see their specific data]

	2009	2010	2011
Total residential gas furnace sales (#)			
Percent of these sales to single family, existing homes (%), if known			

6. What percentage of **residential gas furnaces** sold were in each efficiency category in **2009? 2010? 2011?** Please answer for **single family, existing homes ONLY**. If data on existing home sales are unavailable, please complete for all systems and home types. (Please complete the table below.)

Efficiency Category	2009	2010	2011
95% AFUE or higher			
90 to 94% AFUE			
80 to 89% AFUE			

7. Is the table above for single family, existing homes? _____

    a. If NO, please describe what type of homes the table above covers_____

    b. If NO, do you think the efficiency levels sold vary by building type (single family, multifamily, manufactured home) and construction (existing vs. new)? How?
    _____

8. What percent of gas furnaces in each efficiency category are sold with fixed torque motors? (Energy Trust defines these as: variable speed motors similar to electrically commutated motors (ECMs) only they are set to operate at fixed speeds. These may also be known as constant torque motors. They are more efficient than conventional split core motors (PSCs.) **[Note to interviewer: There is some explanation of "fixed torque" because the language may not be standard across brands; some manufacturers may describe a similar motor under a different name. You will need to try to figure out if they mean the same thing. That's why the explanation is crucial.]**

Efficiency Category	Percent of gas furnaces sold with fixed torque motors
95% AFUE or higher	
90 to 94% AFUE	
80 to 89% AFUE	

9. What motors are most common in standard efficiency furnaces (89% AFUE or lower)?

10. What motors are most common in high efficiency furnaces (90% AFUE or higher)?

THE FOLLOWING TABLES PERTAIN TO DUCTED SPLIT SYSTEM RESIDENTIAL HEAT PUMPS (Ask only if "air source, ducted, split system heat pumps" was circled in question 4)

11. Approximately how many total **ducted split system residential heat pumps** did your company sell in 2009-2011 **in Oregon**? (Please complete the table below.)

	2009	2010	2011
Total residential heat pump sales (#)			
Percent of total heat pump sales to single family, existing homes (%), if known			

12. What percentage of **ducted split system residential heat pumps** were sold were in each efficiency category in **2009? 2010? 2011?** Please answer for single family, existing homes ONLY. If this data is unavailable, please complete for all systems and home types. (Please complete the table below.)

Efficiency Category	2009	2010	2011
HSPF 9.5 or higher:			
HSPF 9.0 to 9.4:			
Less than HSPF 9.0:			

13. Is the table above for single family, existing homes? _____

    a. If NO, please describe what type of homes the table above covers_____

    b. If NO, do you think the efficiency levels sold vary by building type (single family, multifamily, manufactured home) and construction (existing vs. new)? How?
    _____

THE FOLLOWING TABLES PERTAIN TO RESIDENTIAL DUCTLESS HEAT PUMPS (Ask only if "ductless heat pumps" was circled in question 4)

14. Approximately how many total **residential ductless heat pumps** did your company sell in 2009-2011 **in Oregon**? (Please complete the table below.)

	2009	2010	2011
Total residential ductless heat pump sales (#)			
Percent of total to single family, existing homes(%), if known**			

15. **If the response to "Percent of total to single family, existing homes (%), if known" is less than 100%, then ask the following: In what applications are the other ductless heat pumps being installed?

16. Of all the ductless heat pumps you've sold, what percentage of sales was for units with only one indoor head (also known as an air handling-unit), in the following years if possible?

    a. 2009 _____

    b. 2010 _____

    c. 2011 _____

    d. If the respondent does not know by year, then an approximation for the 2009-2011 period _____

17. In 2012, do you expect to sell more or fewer units with only one indoor head? Why? How many indoor heads are common in units today?

18. Of the ductless heat pumps you're selling, what percentage of those is designed specifically for cold climates? _____

    a. What makes these units designed for cold climates?

19. Do you know if many sales of ductless heat pumps are occurring outside of Energy Trust and utility rebate programs? If so, under what circumstances?

Interviewer: "Please provide your contact information so that we can mail you the $50 gift card for your time and input in this survey." [If they have provided enough complete information]

INCENTIVE/COMPENSATION INFORMATION

Name_____

Street Address_____

City/State_____

Zip Code_____

Email Address_____

Thank you for your time and have a wonderful day!