**Building Science Education Solution Center -** **The Business Case for Heat Pumps**

**Proficiency Level 3:** Apply

## Learning Objective 3.1:

* Convey the efficiency and environmental benefits of heat pumps to customers

## Lecture Notes 3.1:

***Customer Motivations for Upgrading to Heat Pumps***Often, the motivation to install an air-source heat pump (ASHP) is to increase efficiency and reliability by replacing an aging, inefficient system. About 30% of households have equipment that is 15 years old or older, meaning that 33.7 million households use space conditioning equipment that is at or near the end of its life expectancy.

Heating and cooling needs account for 50% or more of a household’s energy use, on average. Depending on the current equipment, efficiency upgrades can reduce energy use by 20% or more. This reduction will be the largest in homes with outdated, broken, or improperly sized equipment. Installation practices can play a large role in influencing efficiency and cost-effectiveness.

***Efficiency Breakthroughs of Heat Pumps***  
ASHPs are three to four times more efficient than traditional fossil fuel equipment: typical gas furnaces have a COP of 0.8, while typical heat pumps have a COP of 2.0-5.0. Since heat pumps are so much more efficient than fossil-fuel or electric resistance systems, they can often reduce a home's heating system's operating costs. However, climate, home location, and current system configuration will impact the efficiency, effectiveness, and feasibility of installing a heat pump, especially in retrofit situations.

Being able to explain the benefits of heat pumps to customers is key to the sales of heat pumps. The myths surrounding heat pumps have already been covered within the prior module, however it is important to understand that these myths pertain to the heat pumps of 30 years ago and not today's higher-performance systems. Explaining the steps that your company will take to ensure that their heat pump is sized and installed correctly will help communicate to the homeowner that they can expect year-round comfort.

***Simplifying Heat Pump Technology for Customers***  
Explaining how heat pumps work is complicated. It is best not to take a deep dive into the refrigeration cycle with a customer, and we advise instead to point out that they already have different types of heat pumps in their homes, such as refrigerators and air conditioners. Simply put, heat pumps move energy from one place to another. Heat pumps, unlike air conditioners, can move heat from outside to inside as well as from inside to outside. Because they are moving heat and not generating heat, they can do so at rates that are 3 times higher than fossil fuel systems. This operation results in greater energy efficiency, which is crucial for reducing long-term costs and environmental impact. If the customer is interested in environmental benefits, point out that this higher efficiency usually results in reduced carbon emissions, and that with the electrical grid becoming cleaner every year these carbon reductions are likely to increase.

***The Growing Market for Heat Pumps***  
In recent years, the unit sales of heat pumps have overtaken the sale of gas furnaces. In 2023, there were 3.6 million heat pump units sold in the United States. This growth is the result of many factors, including advancements in heat pump technology, utilities and local governments offering incentives, federal and state tax credits, and electrification efforts. In addition, many consumers are making the personal decision to lower their carbon footprint, similar to how consumers are increasingly purchasing electric vehicles.

A primary motivation behind fuel switching is the mitigation of climate change. Fossil fuels are inherently carbon-intense, creating and releasing carbon dioxide and other harmful byproducts into the atmosphere. Moving forward, the electric grid continues to create less and less carbon dioxide and harmful byproducts due to renewable technologies (e.g., solar and wind generation) and nuclear power plants. Therefore, the more end uses that can be converted to electricity, the more likely our buildings will be able to operate in a carbon-neutral environment in the future.

**Problem Set 3.1:**

1. In the U.S. heating equipment sales market, did gas furnaces or heat pumps have a greater number of units shipped in 2023?
2. List three reasons a customer may want to purchase a heat pump.

## Learning Objective 3.2:

* Demonstrate the economic advantages of heat pumps

## Lecture Notes 3.2:

***Economic Advantages of Heat Pumps***

Present the economic benefits of heat pumps. If the customers are interested, provide a detailed economic analysis, including life-cycle costs and potential savings over time that show how heat pumps are a quality investment. Discuss how incentives, rebates, and tax credits can further enhance the economic appeal of heat pumps. An effective method of convincing customers to purchase higher end, well installed equipment is a side-by-side comparison of less efficient equipment to more efficient equipment detailing the lower operating costs and the various incentives for the higher efficiency equipment. Listing the benefits of an ASHP might not be enough for some building owners. For example, if the owner is focused on financials and how the system will save money, then the technician could present an economic analysis of their return on investment (ROI). The ROI calculation looks at the decision to install a heat pump as an investment, similar to that of savings account. It considers the original cost as well as the savings over time.

***Impact on Home Resale Value***   
Homeowners have many reasons for undertaking a home improvement project. One of those reasons is to increase the resale value of the house. A simple way of expressing this impact is by identifying what percent of the cost of the upgrade will be recouped in the resale value of the house. This percentage can range from zero to over 100%. The Journal of Light Construction (JLC) conducts an annual survey to determine what percentage of the upgrade is recouped. For instance, window replacements offer a recouped percentage of 68%, a composite deck addition has a recouped percentage of 40%. Leading in the recouped percentage is the conversion of HVAC to a heat pump, with a rating of 103.5%.

**Problem Set 3.2:**

1. Compared to other residential remodel projects (such as window replacements), do heat pumps add to the resale value at a higher or lower rate than other projects?
2. Why is the ROI approach a good method of convincing the cost-conscious or analytically minded customers to purchase high efficiency, well-installed equipment?

## Learning Objective 3.3:

* Optimize customer communication and expectations for heat pump installation

## Lecture Notes 3.3:

***Setting Customer Expectations and Minimizing Callbacks***

Customer education and setting expectations are important steps in creating high levels of customer satisfaction. In addition to the basics, such as how to change the filter and how to operate the thermostat, it is important to explain how best to operate the system and what to expect. Offer thorough guides that include maintenance tips to help customers understand and manage their heat pump systems effectively. Utilize visual aids and simple diagrams to explain how heat pumps work, demystifying the technology while highlighting its efficiency and environmental benefits.

Imagine the first time a customer sees “steam” rising out of the outdoor unit. If they don't understand the defrost cycle, they might be alarmed and request a service call. While customers may enjoy low night temperatures, point out that heat pumps take longer to recover from deep nighttime setbacks and that setbacks of not more than three degrees are best practice.

***Sales Approaches***The upfront cost of heat pumps will be more than standard systems. These higher upfront costs can be offset by incentives, tax credits and lower operating costs. It is critical to ensure that your bid clearly details these financial benefits, making it easier for the customer to see the full value of their investment. Most importantly, your entire team -- from the receptionist to the service technician – must be able to confidently speak to the benefits of heat pumps.

In recognizing the diverse needs of potential customers, including those in the low to moderate income bracket, it's essential to adapt your pitch to align with specific customer motivations and concerns. To effectively communicate these benefits, consider incorporating the following points into your sales approach:

* **Comfort benefits -** Modern heat pumps make it easier to provide what most customers want: year-round comfort. ASHPs can provide increased comfort through a) adding new or additional cooling capacity since they provide both heating and cooling, and b) greater air mixing within zones and the whole house, due to longer run cycles than fossil fuel systems, and c) targeted heating and cooling with ASHP mini-splits in specific areas where the existing heating or cooling systems are inadequate. Additionally, emphasize the ability of heat pumps to maintain consistent indoor temperatures, avoiding the highs and lows typical of traditional systems.
* **Environmental benefits** - Contractors should present environmentally focused customers with clear, data-backed information on the sustainability and reduced carbon footprint of ASHPs. Fossil fuels are inherently carbon-intense to create and release carbon dioxide and other harmful byproducts into the atmosphere. Research shows that ASHPs powered by the electric grid produce less greenhouse gas emissions than fossil fuel appliances in every state. These benefits will only increase as the electric grid integrates more renewable technologies (e.g., solar and wind) and nuclear power plants. Since ASHP emission benefits vary significantly based on local grid carbon intensity and ASHP efficiency, it is recommended to use a model like RMI’s Green Upgrade Calculator ([greenup.rmi.org](http://greenup.rmi.org/)) to estimate environmental benefits.
* **Health benefits -** Switching from fossil fuel equipment to all-electric air source heat pumps can significantly improve indoor air quality by eliminating sources of carbon monoxide and other combustion-related pollutants generated by fossil fuel systems.
* **Lower operational costs** – Some installation scenarios will result in significantly lower operational costs. These include switch-outs from propane, oil and electric resistance heating sources. When converting from natural gas heating, operational savings will depend on the relative local costs of electricity and natural gas. Again, the use of a reliable calculator or cost estimator can give homeowners more transparency regarding operational savings.
* **Incentives and financial assistance -** Ensure customers are fully aware of available financial programs, such as utility rebates, government tax credits, and local incentives. Tailor the discussion to show how these offerings can reduce upfront costs, making heat pumps more accessible to homeowners of all income levels.
* **Quick turnaround time** - Assure customers of your team's ability to execute efficient installations with minimal disruption. Commit to fast installation times, which ensure that the transition to a new heat pump is seamless and hassle-free, especially for customers who cannot afford long waiting periods.

***Customer Communication Strategies***

Let’s briefly cover some of these types of customer communication strategies that can be helpful when conveying the benefits of heat pumps, addressing common objections, and setting realistic expectations:

* **Clear Explanation of Benefits** - When discussing heat pumps with customers, it's crucial to simplify the benefits. Emphasize that heat pumps are 2-4 times more efficient than traditional heating systems, which translates to significant energy savings. Highlight how this efficiency may lead to lower energy bills over time, potentially making the initial investment worthwhile. Additionally, inform customers about available tax credits and rebates that can reduce the upfront cost, making the switch to heat pumps more financially accessible.
* **Addressing Objections** - Be prepared to handle common objections such as the higher upfront cost and unfamiliar technology of heat pumps Counter these concerns by explaining the long-term savings and reliability of heat pumps. Stress the environmental benefits, such as reduced carbon emissions, which are increasingly important to many consumers. Use real-world examples and testimonials to build credibility and show how other customers have benefited from making the switch.
* **Highlight Key Selling Points** - Focus on the key selling points of heat pumps: Highlight the comfort benefits of heat pumps and emphasize the environmental benefits, including reduced carbon emissions, which contribute to a greener home.
* **Use of Visual Aids** - Leverage visual aids to help customers understand the benefits and features of heat pumps. Show them brochures and visual materials that clearly illustrate these points.
* **Personalized Recommendations** - Make personalized recommendations based on the customer's specific needs, household size, and energy usage patterns. Ask questions to understand their situation better and suggest the most suitable heat pump model and size for their home. Tailoring your advice to their unique circumstances will help build trust and show that you have their best interests in mind.
* **Setting Expectations** - It's important to set clear expectations regarding the installation, maintenance, and operational differences of heat pumps compared to standard heating systems. Explain that the installation may require additional space and electrical modifications, and that proper condensate management is essential. Inform customers about the routine maintenance required, such as filter cleaning and periodic checks to ensure optimal performance.

***Staff Training on Heat Pumps***  
In addition to educating your customers, educating your entire staff is also very important. Imagine a customer calling in about the possibility of a heat pump installation due to their local utility promoting and incentivizing them, only to find that the receptionist is unaware of the product and ends up sending them elsewhere. Topics of particular importance are:

* The ability to explain in simple terms how a heat pump operates efficiently, such as:
  + Heat pumps are 2-4 times as efficient than standard gas and electric heating sources
  + Available tax credits and other incentives lower the cost
* The importance of filter maintenance
* Environmental benefits (e.g. reduced carbon emissions)

***Incorporating “After Sales Service”***  
All heat pumps require some maintenance in order to ensure they achieve rated life spans and to maintain peak efficiency. One method of doing this is to sell annual maintenance contracts that cover the heat pump and include an inspection of other appliances. These contracts offer peace of mind, greater customer satisfaction, and provide your company a steady revenue stream.

## *Incorporating ASHPs Into Your Business Offerings*

Choosing to offer and install ASHPs is similar to choosing to install any new product. ASHPs appeal to a wide variety of customers, from the environmentally minded to those wanting lower monthly operating costs. In many cases, offering ASHPs will help your company to increase its customer base.

The important steps to a successful incorporation of ASHP offerings include:

* Organize for technical and manufacturer training
* Know your pricing
* Educate your entire staff on ASHPs
* Identify how to select the best model for the job, including optimal sizing.
* Understand and be willing to aid customers in receiving any incentives or tax credits
* Pre-educate your customers as to what to expect from their ASHP
* Consider offering annual maintenance agreements

Remember: If you don't bid it, nobody will buy it!

**Problem Set 3.3:**

1. Name at least three steps to increase the sales of heat pumps in your organization.
2. Name three important customer education points: