**Building Science Education Solution Center – Heat Pump Business Development**

Proficiency Level 2: Understand

**Learning Objective 2.1*:***

* Understand how to communicate the benefits of ASHP’s to customers

**Lecture Notes 2*.1*:**

**Customer Benefits of ASHP**In order to increase sales of ASHPs a business should be able to relay the benefits of ASHPs as best as possible to customers. These benefits, while numerous, need to be relayed to the customers in order to finalize a larger number of sales. Heat pumps can be a helpful addition for homeowners or other building occupants. Due to their high efficiency, they can be more cost-effective than conventional fossil fuel systems. Customers can add new or additional cooling capacity using a heat pump, since they provide both heating and cooling. Smaller supplemental heat pumps, such as mini-splits, can be installed in specific areas where the existing heating or cooling systems are inadequate. Lastly, switching from fossil fuel equipment to all-electric air source heat pumps allows customers to avoid the risks of carbon monoxide or other potential pollutants from fossil fuel systems.

**Learning Objective 2.2*:***

* Understand the market trends for heat pumps and the benefits of switching to heat pumps in existing homes

**Lecture Notes 2.2:**

References:

DOE*: Energy Data Facts. n.d. 2023. <* <https://rpsc.energy.gov/energy-data-> facts#:~:text=Of%20the%20energy%20used%20in,remaining%2045%25%20of%20total %20consumption.>

**Market trends**

Don’t be left behind in the trends towards electrification and heat pumps.

Electrification
An important driver behind the installation of heat pumps in new homes is the nationwide trend toward electrification of buildings and fuel switching from fossil fuels to electricity. In general, fuel switching is the process of replacing fossil-fuel fired end uses in buildings (e.g. heating, water heating, cooking and laundry drying to electric end uses) For this lesson, fuel switching (or electrification) more specifically refers to the installation of an electric heat pump to replace or supplement an existing gas, oil, propane, or coal furnace or boiler.

A primary motivation behind fuel switching is the mitigation of climate change. Fossil fuels inherently are carbon-intense to create and release 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.

Increased Efficiency[[1]](#footnote-2)
Often the motivation to install an ASHP is to increase efficiency and reliability by replacing an aging, inefficient system. About 30% of households that use heating and about 16% of households that use air conditioning have equipment that is 15 years old, or older – meaning that 16.5 to 33.7 million households use space conditioning equipment that is at or nearing 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 on homes with outdated, broken, or improperly sized equipment. Installation practices can majorly influence efficiency and cost effectiveness.

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 2-5. In many cases heat pumps can also reduce operating costs of a home’s heating system since they are so much more efficient than fossil-fuel or electric resistance systems. However, there are climate, home location, and current system considerations that will impact the efficiency, effectivity, and feasibility of installing a heat pump, especially in retrofit situations.

Improved Comfort
Sometimes homeowners want to add air-conditioning to a house that doesn’t have cooling, and choose to install a heat pump rather than to add an air-conditioner to their existing furnace or boiler system. Heat pumps are a common choice when choosing a system for an addition or retrofit – They are available in small capacities well suited to additions, and the ductless versions are excellent for areas with space constraints as is often the case with retrofits (it can be difficult to find space for duct work if a space wasn’t originally designed for it).

New Availability for Cold Climates
One factor in the increase in heat pump installations is the fact that heat pumps appropriate for use in very cold areas are now available. Historically heat pumps had only been able to provide sufficient heating when it was moderately cold outside, so heat pumps were only installed in warm to moderate climates. However, the availability of new cold climate heat pumps makes it possible and attractive for homeowners in colder areas to install a heat pump as well.

Heat pumps can also reduce safety and health concerns associated with fossil-fuel leakage including reducing or eliminating the potentially deadly byproducts of fuel combustion such as carbon monoxide.

**Problem Set 2.2:**

1. Explain three benefits of air source heat pumps compared to fossil fuel heating systems

**Learning Objective 2.3:**

* Understand the business case for ASHP installation services

**Lecture Notes 2.3:**

Improve your profits and grow your business by highlighting the use of heat pumps.

Business Benefits of ASHP Installation services
As national trends toward electrification drive increased demand for ASHPs, businesses are expanding into offering ASHPs instead of just fossil fuel furnaces. This expanded offering can provide additional business opportunities maintaining and installing both heating and cooling systems. Additionally, existing customers have several potential reasons to install a heat pump before the typical end of life of their existing equipment. Customers wishing to install additional heating or cooling capacity, or to replace their existing system with lower cost or lower carbon heat pumps, will bring in more sales and maintenance.

As part of this expansion, some utilities are offering incentives in the form of rebates for their residential and/or commercial customers to install energy efficient ASHPs. This can involve changing their location’s heating system from fossil fuel furnaces to ASHPs or making an upgrade by changing out an existing ASHP unit to a more efficient model. Existing heating equipment that is replaced by a new ASHP usually needs to be removed from a building in order to qualify for the incentive.

1. https://rpsc.energy.gov/energy-data-facts#:~:text=Of%20the%20energy%20used%20in,remaining%2045%25%20of%20total%20consumption. [↑](#footnote-ref-2)