

HEAT PUMPS FOR EXISTING HOMES IN THE SOUTHWEST

WHERE THEY MAKE THE MOST SENSE



Air-source heat pumps (ASHPs) operate like air conditioners, transferring heat from inside to outside a building, or vice versa. ASHPs can use ducts, like most home central air conditioning systems, and there are also “ductless mini-split” and “mini-duct” systems (the latter being a hybrid of ductless and ducted systems).

Heat pump technology has improved significantly over the past five years or so, and can now perform well year-round, even in the coldest climate zones. For new homes, heat pumps can be cost-effective in all of the Southwest states, and we highlight this and other benefits in a separate fact sheet.[1] For existing homes, heat pumps can provide several important benefits, including:



Reduced annual heating costs



Reduced air emissions



Improved comfort



Improved safety and reduced risks

Obtaining these benefits depends on choosing the right applications. Air emissions, comfort, and safety will be improved in nearly every retrofit application, but the costs only pencil out today in some situations — at least until costs fall further and rebates and incentives pick up more of the difference.

[1] “Benefits of All-Electric New Homes,” SWEEP, September 2020, <https://swenergy.org/Data/Sites/1/media/aaa-documents-2020/fact-sheet-heat-pumps-for-existing-homes-2020.pdf>

THE BEST APPLICATIONS FOR HEAT PUMPS IN EXISTING HOMES – TODAY



REPLACING ELECTRIC BASEBOARD HEATING

REDUCED HEATING COSTS:

✓ YES, BY 60%

IMPROVED COMFORT:

✓ YES, ADDS COOLING

REDUCED AIR EMISSIONS:

✓ YES, CO₂

For homes with electric resistance heating, a practical, cost-saving solution is to install a ductless heat pump system to provide some or most of the home's heating needs. The heat pump will reduce annual heating costs up to 60%, in addition to reducing or eliminating fire and burn risks and reducing draftiness or inconsistent temperatures.

Ductless heat pumps also make a lot of sense for new additions, rather than installing more electric baseboard heating. In addition, the heat pump will also provide efficient cooling to the existing rooms or the new addition.

REPLACING PROPANE HEATING

REDUCED HEATING COSTS:

✓ YES, BY 35%

IMPROVED COMFORT:

✓ YES, ADDS COOLING

REDUCED AIR EMISSIONS:

✓ YES, CO₂, NO_x

In rural areas of the Southwest, especially in the colder climates of zone 4 and higher, many homes are heated with propane furnaces. Propane is much more expensive than natural gas. Replacing a propane furnace with a heat pump can reduce the home's annual heating costs by 35% or more. The heat pump costs more upfront than a propane furnace, but with utility rebates, the payback period can be reasonable.

For example, the incremental cost of a 3-ton cold-climate heat pump versus a propane furnace is about \$6,000. With a \$1,350 rebate from one of Tri-State Generation's member co-ops, and annual fuel savings of about \$1,250, the payback is 3.7 years. In addition, for homes without air-conditioning, the heat pump will also provide cooling in the summer months — an added benefit.

The incremental cost of replacing a gas furnace with a 3-ton heat pump is about \$6,000, not counting rebates. (It could be higher, depending on the need to replace a few ducts.) Annual heating costs will be slightly higher with the heat pump in most locations in the southwest, especially if no backup furnace is in place for the colder temps. (Cold-climate heat pumps work well at low temps, but their efficiency does decline, which increases the annual heating costs compared to the backup furnace option.) Therefore, this scenario is not currently very cost-effective, unless natural gas prices increase significantly. (An exception to this is the Phoenix area, where heat pumps do result in lower annual heating costs because the natural gas prices are higher.)

WHAT ABOUT REPLACING GAS FURNACES?

REPLACING AN AIR CONDITIONER

REDUCED HEATING COSTS:

~ DEPENDS

IMPROVED COMFORT:

~ SAME

REDUCED AIR EMISSIONS:

✓ YES, CO₂, NO_x

Another practical application for heat pumps is to replace central AC systems, either when installing a new AC system or replacing an existing one. A new heat pump system only costs a bit more than the air conditioner alone, and it provides both cooling and heating. Even if a house already has a decent gas furnace, the heat pump can cost-effectively pick up most of the heating load and all of the summer cooling load. Of course, if the house has electric baseboard heating or propane heating, then the heat pump is a "slam dunk."

For a 3-ton AC system, we estimate that the incremental cost of installing a heat pump rather than replacing the AC is \$1,500-\$2,000. In that range, utility incentives can offset most or all of the incremental cost. For example, Tri-State incentives of \$450 per ton will amount to \$1,350 in incentives for a 3-ton heat pump system.

In this scenario of using the heat pump for all of the home's cooling needs and most of its annual heating needs, and using the existing gas furnace for the coldest temperatures such as below 30 degrees F, the annual heating costs with the heat pump will be about the same or slightly higher (depending on location and fluctuations in natural gas prices).