

KUNI Radio Series “Unplugged”  
Show #12: Heat Pump Water Heaters

From the Center for Energy & Environmental Education at the University of Northern Iowa, this is Pat Higby with a series of programs on KUNI to help you save energy.

Replacing your old water heater can save you energy and money because water heaters are often the second largest energy user in your home. Storage or demand water heaters are most common, but another possibility is a heat pump water heater. A heat pump can be retrofitted to work with a conventional storage water heater, purchased as a stand-alone water heating system, or combined with a heating and space conditioning system.

Heat pump water heaters are two to three times more efficient than electric resistance models because the electricity is used to move heat from one place to another instead of generating heat directly. Where a refrigerator uses a heat pump to pull heat from inside a box and dumps it into the kitchen, a heat pump water heater pulls heat from the air or ground, and dumps it into a hot water tank. Heat pump water heaters can be either air-source or geothermal.

Air-source heat pumps are usually installed in a space with excess heat. In fact, they cool and dehumidify the spaces they are in. This is a benefit during the cooling season but a drawback during the heating season. **Air-source** heat pumps are most efficient in warm climates.

In Iowa **ground-source** or geothermal heat pumps are energy efficient systems for heating and cooling homes. Some geothermal systems have integrated water-heating capabilities. Another option is a de-superheater, a small, auxiliary heat exchanger that uses superheated gases from the heat pump’s compressor to heat water. In the summer, when the heat pump is cooling your house, the de-superheater uses the excess heat that would otherwise be expelled to the ground to heat your water. During the fall, winter, and spring a supplemental water heater is needed.

A de-superheater can also be integrated with a standard air conditioning system. The de-superheater will actually improve the efficiency of the air conditioner while heating water at no direct cost.

Heat pump water heater systems typically cost more than conventional storage water heaters, but their lower operating costs offset the higher purchase and installation prices where large, steady amounts of hot water are needed.

I’m Pat Higby, Energy Educator at the Center for Energy and Environmental Education at the University of Northern Iowa.