Heat-Pump Water Heater as a Replacement: A No-Brainer

If your water heater fails, and is located in a non-heated area, the argument for replacing it with a new heat-pump unit, rather than another standard heater is compelling.

Let's start with your cost (based on Home Depot® prices for stock items). A Rheem® 80-gallon heat-pump unit with a 10-year warranty lists for $1299 ($1409 w/tax), but is eligible for a $500 rebate from Clallam County PUD (or any of several other local utilities), bringing your net cost down to $909. By comparison, a standard electric heater with a 50-gallon tank and a 9-year warranty lists for $504 ($547 w/tax), so the net price difference after rebate and sales tax is $362.

The heat-pump water heater has a Uniform Energy Factor (UEF) of 3.7, meaning that for every kilowatt-hour (kWh) of energy it consumes, it adds 3.7 kWh of heat to the water in the tank (it does this by transferring heat from the surrounding air to the water), while the standard water heater has a UEF of only 0.93, meaning that for every kWh of energy it consumes, it adds only 0.93 kWh of heat to the water.

Because of the difference in efficiency, Rheem estimates that the yearly energy cost for the heat pump unit is only $161, while the standard unit will cost $419 to operate, a difference of $258. However, those estimates are based on electricity costing twelve cents per kWh, while we only pay about seven cents in Clallam County (it varies a little from area to area). So the savings in operating cost is reduced to about $150.

Given that savings, even with our relatively inexpensive electricity the heat pump unit will pay for its higher cost in 2 years, 5 months, with another 7 years, 7 months of warranty still to run. That makes it a very good investment.

If the new heat pump water heater is in a heated area of the house, but can be ducted to the outside, the same operational savings will apply, but you will have some extra initial cost for the ducts.

If, on the other hand, your existing water heater is located within the heated part of your home and you can't easily duct the heat pump to the outside of the house, then your savings will be reduced by the cost of re-heating the air cooled by the heat pump -- about $69 per year if you heat your house with a heat pump[1] -- which reduces the net savings to $81. With this added expense, the payback time increases to 4 years, 6 months – still a good choice as it is less than half of the warranted life of the unit.

If you are electrically heating your house without a heat pump (regardless of whether it is baseboard, forced air, or whatever) and the water heater is located in a heated area, using a heat pump water heater will not be a good choice.

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[1] Based on the manufacturer's estimates, the standard water heater's operating cost is $419/year at $0.12/kWh, and thus its power consumption is 3492 kWh/y of which 93% (3248 kWh) actually heats the water. At 3.41 kBTU/kWh, that is equivalent to 11,074 kBTU/y. A heat pump water heater will thus remove that much heat energy from the room and transfer it to the water. With an assumed HSPF of 11.5 the house heat pump will then use 989 kWh adding that much energy back to the air. At a rate of $0.07/kWh, that will cost $69/year.