

Low-Cost Heat Pump Water Heater

Disclosure Number

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Technology Summary

Experience has shown that a residential heat pump water heater (HPWH) uses about half the energy of an electric resistance water heater. However, at a cost premium of \$1000+, the energy cost savings are too high to justify the installed cost. The subject invention is a low-cost HPWH based around the use of a conventional insulated electric water heater that is everywhere available, produced in the millions in the U.S. and at low costs. The subject invention uses a unique method of installing the extended surface submerged condenser (a heated probe) through one of the small fittings at the top of a conventional tank, incorporates the expansion device (a component of any vapor compression machine) into the condenser rod thereby eliminating the need and cost for an expansion valve, and incorporates the controls of the conventional electric water heater into the controls needed for the HPWH. With these technologies, a conventional electric water heater (or gas water heater for that matter) can be converted at very low cost and with little effort into an HPWH. The invention is therefore a stand-alone, single package, air-source HPWH suited for production by a major tank manufacturer.

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