

Heat pump water heaters (HPWH)

Heat pump water heaters are basically a refrigerator that works backwards. The compressed heated refrigerant runs through a coil in a tank transferring its heat to the water that surrounds it. It works well in warm climates by using heat from the surrounding room. A standard electric water heater can cost approximately 500 dollars to operate annually where as a HPWH can operate at a cost of approximately 200 dollars a year (estimate is for a residential installation and assumes a family of 2.6 occupants). There could also be some extra installation costs due to reconfiguring the piping. They must be installed in areas where the temperature is 40- 90 degrees and have at least 1000 cubic feet of room volume around the water heater.

http://apps1.eere.energy.gov/buildings/publications/pdfs/commercial_initiative/electric_storage_water_heaters.pdf

Tankless water heaters

Most tankless water heaters are natural gas or propane. The burner only fires when a faucet is turned on which eliminates the need for a storage tank that maintains a large volume of water at a set temperature. Energy is wasted in maintaining a large volume of hot water for hours and sometime days with no use. Some reports claim \$175.00 a year in savings for a family of four and a 30% savings for commercial applications. A tankless water heater operates on a flow switch that detects movement of water into the water heater and activates a high output burner. The burner heats the water quickly and shuts off just as suddenly when the flow of water stops. Exchanging a storage tank type water heater with a tankless style water heater will reduce the amount of fuel needed to provide hot water. Because these two types of water heaters are so different, changes to the piping, specifically the gas and venting, will be necessary. Planning for the required amounts of hot water is important when selecting a tankless water heater. In some cases it may be necessary to install more than one to provide adequate hot water. Another attraction of the tankless water heater is its size. In some cases they

are the size of a small suitcase which frees up valuable space for other uses.

<http://energy.gov/energysaver/articles/selecting-new-water-heater>

Drain water heat recovery (DHB)

This is the process of reclaiming heat from waste water by using the heat in the drain water to temper or preheat domestic or cold water before it enters the water heater. This would be an especially cost effective investment in a building/business where a lot of hot water is used such as a hotel or a restaurant. After the initial installation, it is a system of great simplicity in design and function. Some D.H.R. systems use a storage tank to save tempered water till needed. Drain water flows through a double walled heat exchanger within the storage tank causing the tank water to warm. The cold water supply to the water heater is circulated through a coil inside the storage tank preheating it before it enters the water heater creating energy savings. The average temperature of the water delivered from the preheated water supply is 50 -60 degrees. Un-tempered cold water supply temperatures vary greatly from northern climates averaging 40-45 degrees to southern climates averaging 65-75 degrees varying the savings and pay back from different regions of the country. Some systems claim they can preheat the cold water 35 degrees before entering the water heater with a 39% savings in Southern regions and up to 53% savings in the Northern regions.

<http://energy.gov/energysaver/articles/drain-water-heat-recovery>

Toilets

Before 1980, toilets consumed 26.7% of an average residential water usage. These toilets required 5.0 gallons of water per flush and were used widely within the commercial and residential industries and some are still in use today. Replacing just one of these older toilets with a high efficiency toilet (H.E.T.), which only uses 1.0 gallon with each flush can save 29,700 gallons of water a year.

Most commercial buildings use a flush-valve technology or a blowout type water closet. This is a very efficient

way to flush by using water pressure to clean the toilet instead of gravity water flow from the tank above the bowl. Flush valve technology has changed considerably over the last few years. One of the most notable innovations is the self-contained automatic flush control which senses the presence of the user and flushes automatically when they leave the fixture.

The dual flush toilet has the 'light waste' flush option which uses less than 1.0 gallon. This creates an opportunity for really big reductions in water use. It also has a 'heavy waste' flush. Obviously, the big savings will occur where urinals are not used for 'light waste'.

Waterless urinals

The Minnesota state plumbing code will begin allowing the installation of waterless urinals in the summer of 2011. They must comply with A. S.M. E. standard A112.19.19-2006. In addition, a water supplied fixture must be installed upstream of the non-water urinal. The water from the drain side of the fixture (e.g.:sink) must be plumbed to rinse the pipes leaving the urinal. The water distribution system must be designed to handle the additional load in case the non-water urinal is replaced with a urinal that requires water. Along with the savings in the cost of water to a building owner, one study in California suggested that 1/5 of the electricity in the state is consumed by processing and pumping water. Some studies suggest a 15,000- 45,000 gallon of water saved annually assuming a water using urinal is flushed 40-120 times a day.

There are two basic types of waterless urinals available today. They consist of a replaceable cartridge style and sealing liquid type. The cartridge style consists of plastic cartridge that mounts securely in the bottom of the bowl of the urinal and directs liquid waste from the bowl to flow through the cartridge that contains the sealing liquid. This liquid allows waste to flow through it and floats on top of the liquid waste preventing odor and sewer gas from affecting the space. The sealing liquid type uses the design of the fixture trap to function the same way without a cartridge. Liquid waste flows through a strainer slowing the liquid waste as it passes through the sealing liquid ensuring that the sealing liquid isn't washed away. Because the sealing liquid is less dense it will float on top of the liquid waste sealing out any odor or sewer gas. The manufactures are reporting up to 7000 uses of the cartridge style before replacement is needed. Both are recommended to have a daily wipe down cleaning and sealing liquid or cartridge replacement either weekly or monthly depending on the amount of use.

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