TIPS FOR SELECTING
A HOT WATER HEATER

Selecting the most efficient type and size of hot water heater for your home can be a daunting task. Many factors should be taken into consideration.

1. Energy type and cost
2. Type of water heater
3. Water needed and frequency of use
4. Installation, Location, Insulation

1. Energy Type and Cost

Water heaters are manufactured for most forms of energy, electric, propane, natural gas, fuel oil, wood, and heat pump. Water heaters are required to list an energy factor (EF) rating. Water heaters can be stand alone, or integrated into the homes heating and cooling systems. The attached chart shows examples of cost comparisons between different fuel and heater types. The water usage figures used on the comparison spreadsheet are 53 gallons per day, 19,345 annually (DOE estimates for an average family of 4). Energy cost must be converted to a per BTU cost to compare different fuel types.

2. Type of Water Heater

a. TANK/STORAGE TYPE

The most common type of water heater is a storage or tank type heater. These types of heaters use an insulated tank, typically 40 to 80 gallons. Water is heated by 2 heat elements, 3000 to 5000 watts each. The elements are thermostatically switched so only one element is on at a time. These types of heaters are often integrated with other heat sources using the typical tank heater as storage and or backup unit. Tank type units can also provide a limited amount of hot water (depending on water system type) during power outages.

These units are manufactured in a wide variety of shapes and sizes. Fiberglass tanks with bowl shaped bottoms are available that are built to minimize mineral build up associated with traditional steel flat bottom tanks. Fiberglass is more expensive but lasts much longer than steel tank units. Depending on mineral contents in the water fiberglass tanks may be well worth the extra money.

b. WHOLE HOME ON DEMAND

On demand water heaters are manufactured in many energy forms. Gas, fuel oil, and electric are the most common forms. Any time fuel (gas or oil) is burned, some of the BTU released in combustion is exhausted through the flue, resulting in a loss of energy, therefore EF ratings are lower. On demand heaters do not store heated water, except for the amount in the heating coils, typically less than 5 gallons. On demand heater specifications show a temp rise at a specified flow rate, therefore it is critical to know the flow needed and in-coming water temp to properly size the units. Manufacturer's web sites provide calculators for this purpose.

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Electric on demand heaters are not widely used because the average home electrical service is not sized to accommodate the added electrical load. It should be noted that this overload affects the Utility Transformer and wire, as well as the distribution center and wiring in the house. The cost of properly building or upgrading the existing electrical system usually makes whole home electric on demand water heaters cost prohibitive.

c. HYBRID OR HEAT PUMP

Hybrids use a combination of heat pump and storage type, and are by far the most efficient of the water heater types. They are also the most expensive. Heat pumps rely on heat transfer rather than actual heat production. Open air pumps remove heat from the air and transfer it to the water. The "used air" expelled from the pump is cold, so in the summer they can actually help with home cooling. However, during heating months the expelled air must be reheated by the home heating system thereby reducing the overall efficiency of the house. Hybrid heaters also utilize a standard tank type heater for storage and backup, so the demand charges for the backup elements apply if they are used.

3. Hot Water needed and Frequency of Use

There are several websites available to aid in figuring the amount of hot water a home needs. When replacing existing units, don't assume you need the same size. Due to advances in water saving appliances and low-flow faucets you may be able to purchase a smaller unit. Another consideration is the frequency of hot water usage. If the home is for an average family of four the Department of Energy Average (53 gal/day) is probably accurate. But if the hot water system is only used occasionally, or very little hot water is used, then a demand type heater (propane or fuel oil) becomes more cost effective.

4. Insulation, Location, Installation

The insulation on storage type water heater is the main contributing factor in the EF rating. Electric resistive heat is 100% efficient (no heat losses due to combustion). Generally the higher the EF rating the better insulated they are, and the less reheating of water occurs. A good rule of thumb is if the heater is hot or even warm to the touch more insulation is required. Caution should be exercised when installing insulating blankets. Electrical wiring can overheat and degrade if the blankets cover the wiring access panels.

Location within the home should also be a large factor considered. Heaters installed in cold areas of the house (unheated basement or crawl space) will require much more energy to heat and will reheat more often. A centrally located heater will contribute to heating the home. As water cools the heat escapes the heater. During heating seasons this will off-sets space heating cost. Conversely, during air conditioning season escaping heat will create more heat in the space you

are trying to cool. The best answer is to keep the water heater in a warm environment and keep the heat in the water.