

GREEN TECH THE SERIES COLUMN FOR OCTOBER 21, 2015
HEADLINE: WANT TO DROP YOUR COST OF HOT WATER?

The opening of our B&B/Spa was well attended and, while talking to some folks, questions on solar came up more often than I would have expected. A couple of recent clients have quizzed me on the subject, as well. In response, I noted that adding solar photovoltaic is a high cost investment and really only pays if you are staying in the home for many years. However, thermal solar is another consideration and one that I might consider at some point for our new venture as it has value. Recovery costs can, and often do, fall within the capital cost recovery of under ten years. More than reasonable for an energy recovery installation.

Practically every county in the world has caught on to this, including here at home. The issue is that we are not keeping up with the rest of the world in the development of "thermal solar systems." While the Chinese regularly make headlines with respect to their attempts to buy Alberta oil, in fact their country is by far the world leader in the use of thermal hot water. A recent study by the Australian government estimates that China produces over 60% of their hot water by thermal solar. Per capita, Canada is well down the list.

Most of the questions from guests and clients related to the benefits, cost of the system and longevity. In my previous home I had an EnerWorks thermal solar system for 4 years and it silently produces well over 50% of our hot water, annually. Built in Canada, this system was developed in conjunction with Queen's University some years ago. In the summer, I often shut the electric back-up tank off for weeks on end.

On average, heating hot water eats up close to 25% of a typical family's home energy bill. Thermal solar is not just for domestic hot water, however. these systems are adaptable to heat your swimming pool and your home, too, provided you have radiant in-floor heating or a force air handler with a hot water coil.

Let's stick with heating your hot water. You should first establish how much hot water you use. An average family of four will use

close to 300L a day. A home with small children will use more for washing, laundry etc. A senior couple will use about 40% of that amount. The next thing to evaluate is your current system. If you have an electric unit now, it may be time to rethink it, especially if it's older. In the city, natural gas is a no brainer; in the country, propane is similar in efficiency. Oil and electric just don't make the grade with respect to efficiency and longevity of the actual tank. Some years ago, I had an oil hot water tank; it lasted 9 years. My first electric tank barely made it to 14 years. I regularly see gas hot water tanks operating for 20 years. The new high efficiency models are just like new furnaces; very efficient.

Lastly, look at the various systems. While I like the EnerWorks equipment, there are numerous others available today. You should first understand the components. All systems have solar collectors and some kind of storage for the hot water; other than a pool, that is, which acts as its own storage tank. There are a number of different kinds of collectors, however two dominate the market. The most widely utilized are flat plate collectors that look like a large skylight. They are simply an insulated, weather proof box that contains a series of flow tubes sandwiched between a dark absorber plate and a glass cover. The other type of collector is called an evacuated-tube collector. More often seen in a commercial application, they can and should be used more often residentially. These tubes contain a glass outer tube and a metal absorber tube attached to a fin. This fin is covered in a coating that absorbs the sun light and also reduces heat loss. Air is removed or evacuated from the space between the glass tubes to form a vacuum, producing the heat effect.

The next part of the system is the storage tank. Most systems have two, the thermal tank and your present hot water tank. In our region, we see what is known as an indirect circulation system. A pump is located in the return line from the solar collector that, using a fluid called glycol, heats a coil inside the solar collection tank. This coil heats the water that is flowing from the house supply to the hot water lines in your home. In most cases, this water travels through your present tank first. The largest single advantage to solar hot water is that it works year round, even on a cloudy day.

One example I use when asked about a system is to look at the temperature differential. If you live in the country on a well, the average temperature of your water coming from the ground is around 45 degree Fahrenheit. Your solar system will raise this temperature, depending upon the time of year, some considerable amount. Even in the winter, your existing hot water tank has less work to do after receiving solar pre-heated water, since it only needs to heat a small portion of the actual hot water temperature you have set your system at.

The cost of these systems has leveled off over the past few years. An installed, single panel system suitable for a mature couple should be available for around \$4,000 to \$5,000. A multiple panel system will be needed for a larger family, but, even then, much over 4 panels is rare. The life span of a thermal system that is maintained should easily reach 20 years or better. One study I received recently showed that a commercial system costing close to \$15,000 would return an investment of nearly \$100,000 within 25 years.

The one suggestion I have is in an area that is often overlooked when operational costs are considered. Most systems have a controller that acts like the “brain” for the system; it tells the pump when to operate. These pumps require alternating current (AC) electricity. You may want to think about adding a small solar PV panel that will operate a DC pump, since it can be integrated into the actual DC system before it is converted to AC power.

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