

Solar Thermal

For centuries people have used water heated by the sun and stored it for bathing, hand washing, cleaning clothes, heating homes etc.

A modern solar thermal system combines the most efficient techniques for capturing the sun's heat within a state of the art plumbing system. This produces cost effective hot water and **reduces the need for gas, propane or electricity to heat water.**

While gas, propane and electricity continue to go up in price, solar energy is free and can be harvested effectively in climates like ours—**The Pacific Northwest!** No inflation, no rate spikes, no surprises. With a solar system that combines highly-efficient collectors and components, even the smallest amount of solar radiation can be harvested effectively. The solar collectors Mitchell Mechanical installs are specifically designed for northern climates, and can produce enough solar energy to heat as much as 70% of the annual hot water requirements for an average family household or four (these systems can be sized larger for bigger families or commercial applications)! They are also ideal for heating pools and hot tubs.

During the summer months a high performance solar system can provide almost all the energy required to heat your domestic hot water, reducing your monthly fuel payment. In the transitional months, solar energy is generally best used to preheat domestic hot water which will also help lower your fuel bill. Solar collectors can also be used to supplement space heating in the cooler months.

Collecting the Sun

Solar thermal systems are really quite simple and mostly vary by the type of collector used to gather and store the sun's energy. **Flat plate** collectors are the simplest and most common type and work very well in the NW. A heat transfer fluid (like non-toxic glycol) is pumped through copper pipes which wind back and forth through the flat plate collector. These collectors are optimized and built covered in glass and are usually glazed to prevent heat from escaping. Often the pipes are painted black and bonded to the material of the flat plate collector to maximize heat absorption. They are very aesthetically pleasing and are designed to last 30-40 years.

More advanced systems, like **evacuated tube** collectors and **parabolic trough** collectors, can heat water even on very cold days and work very similarly to flat plates. The evacuated tube runs liquid through a manifold that is circulated to a solar hot water tank and back. The heat is transferred to domestic water and the colder fluid is pumped back up to the roof where it is heated again and this process repeats itself while there is sun. Evacuated tube systems work better in colder environments (E. Washington etc).

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Solar Photovoltaics (PV)

Solar Photovoltaics (PV for short) is the technology that converts the sun's energy into electricity. Solar panels convert the energy received from the sun into direct current (DC) and then an inverter changes the DC into

alternating current (AC) which is the form most appliances need to operate. The average NW family would need a fairly large solar array to get all of their electricity needs from solar PV. Most NW clients choose to have their solar PV system tie into the utility grid and subsidize their power usage. The term Net Metering is where you generate more electricity via your solar system than you use. In this case, the utility must pay you for the power you produce at the same rate they sell 'green' power to their customer base. The reality is that solar PV, even through tax incentives, is still not economical to size the system big enough to generate the average home's electricity needs AND sell back to the grid. WA state does have some interesting production based credits in place through 2014. Ask us about them.

In addition to the WA state incentives for solar PV, the Federal government also offers the same rebate structure that they offer for solar hot water. Mitchell Mechanical is proud to offer both solar hot water and solar PV systems to our customers.

The Debate: Solar Thermal vs. Solar PV

The majority of our great Pacific Northwest's electricity is generated by 'green' hydroelectric power. That electricity is currently relatively inexpensive. Unless you use electricity to heat your home—your electric bill likely pales in comparison to your gas or oil bill—especially in the winter. Much of your gas, oil or fuel bill is likely going toward heating your domestic hot water. A solar thermal system will reduce your heating bill (by heating your water) and has the added benefit of lowering CO2 output. Solar PV offsets electricity you would normally purchase from the utility. Both solar thermal and solar PV systems have incredible benefits. With the Federal rebate and WA state's production credits (assuming both credits get extended)—you can pay for your Solar PV system in 10-15 years (depending on scope). Solar hot water systems usually pay for themselves in 6-9 years (depending on fuel source).

1 big difference between solar thermal and solar PV is the carbon offset by burning LESS fossil fuel with the solar thermal system. Our 3 panel solar hot water system is equivalent to taking 1 small compact car off the road every year in respect to greenhouse producing CO2. Imagine the impact that can have over the lifetime of a system. Individually we can make a difference---together we can transition off of fossil fuels and make a meaningful impact our children will appreciate.