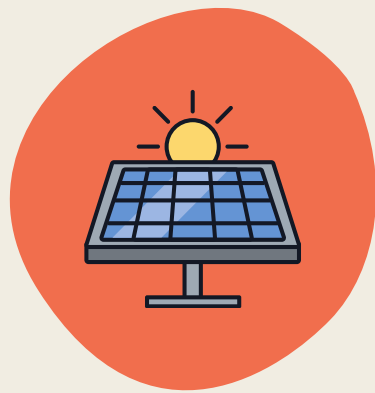


Solar Water Pool Heating

PROJECT BY: HELEN OBUNA

Solar Thermal

Solar thermal systems harness radiation from the sun to produce heat. Water flows in a continuous loop as the collectors transfer heat into the water.



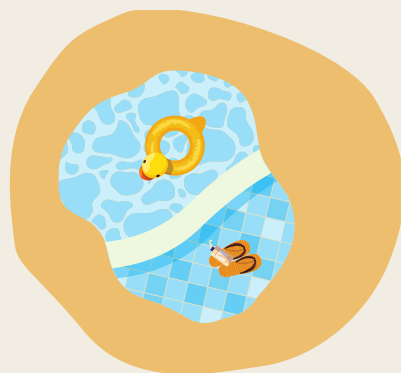
Solar Photovoltaic

Solar PV systems also harness radiation from the sun. Instead of directly producing heat, PV systems produce electricity. Generated electricity will then be used for heat production.

What's the Cost?

According to the National Renewable Energy Lab, mean installed costs for solar technology range from \$59-162 per square foot.

If Colorado State University were to use solar water heating for the Student Recreation Center, it would cost over five thousand dollars.



Which is Better?

Solar thermal conductors harvest 3x more thermal energy than solar PV. Depending on your needs, one solar system may be better than the other.

For pool water heating, it is best to combine the two systems together so that solar thermal can heat the pool and solar PV can work the filter and pump.

Technology

Solar Conductors

There are two types of solar conductors: glazed & unglazed.

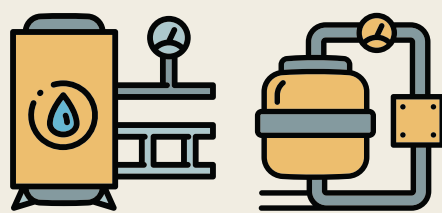
Glazed collector systems are made from copper tubing on an aluminum plate. The face of the collector has an iron tempered glass covering.

Unglazed collector systems do not have a glass covering. They are generally made from heavy duty rubber or plastic. Unglazed collectors are usually used for indoor pools during colder climates.

Water Filter & Pump

A water pump will circulate water through a water filter, then it goes to the collector (where it is continually heated throughout the day) and back into the pool.

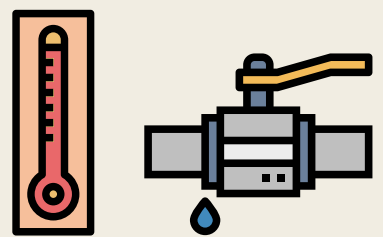
This process will repeat itself until the pool is filled with water or until the system shuts itself off.



Flow Control Valve

Some solar technology will have 1-3 flow control valves which are used to regulate the water that enters and leaves the conductors.

All while doing this, the flow control valve will measure the temperature of the conductors.



Student Recreation Center

Colorado State University can use solar PV/t systems for the Student Recreation Center located at the Fort Collins campus. The thermal system will be used to heat water in the swimming pool and generated electricity from the solar PV system can be used to run the pool's filter and pump. Solar PV/t systems could potentially be used for the locker room showers and sinks but that will require a few more parts. The goal is that once the systems are installed, we cut back on water usage and traditional water heating costs. Students who are enrolled at CSU will benefit from this because they have year-round access to the Student Recreation Center. Along with this, I am hoping that reduced costs at the recreation center will also reduce student fees.

COVID-19 Impact

The COVID-19 pandemic has caused an economic slowdown that impacted non-residential water usage by institutions and businesses. In Colorado, non-residential water usage has significantly decreased.

Did You Know?

Colorado State University has 21 solar arrays across its campuses. In the next few years, CSU will install 21 more solar arrays.

Colorado State University is the only institution in the world to receive the STARS Platinum rating three times and currently has the highest score in the United States.

The World's Water Demands

According to the United Nations, water use has increased by 1 percent every year since the 1980s.

Currently there are over 6 billion people experiencing high water stress and severe water scarcity.