



Ways to Control a Solar Water Heater

The traditional method of controlling a solar water heater is to use a differential temperature controller. This type of controller has one temperature sensor at the panel output and another at the point where water leaves the water heater or solar water tank. When the panel temperature sensor gets hotter than the water heater, the pump is turned on to circulate water through the panels.

A different, more modern approach is to use a small PV (solar electric) panel to power the pump. When sunshine hits the water heating panels, it will also hit the PV panel. The pump will run slowly if there is less sun, which also means less heat is collected. As the sunshine intensifies, the pumping power increases and the amount of heat being collected also increases.

The Heliatos System Method

Many of our customers are concerned that a PV-powered pump will start too early in the morning (before the water in the panels can be heated by the sun) and run too late into the evening (right before sunset). However, as long as your installation is properly insulated this will not be a problem. When the pump first starts, the sun is still low in the sky, so the pump runs very slowly. Water is slowly taken from the tank and moved to the heating panels. As long as the pipes are well insulated, very little heat from the water will be lost to the air. If the PV panel is producing electricity, the heating panel will heat the water. The amount of heat added during these low-light periods is still small, but the water cannot get cooler because it is insulated during circulation.

Of course, this process depends on the quality of the insulation, the air temperature, and the relative balance of the amount of electricity from the PV panel and heat from the heating panels. As long as all these factors are carefully balanced, neither the morning nor the evening can cause any heat loss. This is why our freeze-protected systems have a very different set of balance points than our standard systems—they have to operate in much colder climates.

Advantages of Heliatos Solar's Method

There are some distinct advantages to using the PV panel method over the controller. First and foremost is cost. While there are some very cheap controllers available, many do not operate as advertised. The PV method costs less. Second is a vast difference in reliability. Unless you get a very expensive high-



end controller, most controllers use thermistors as sensors. These deteriorate over time, resulting in inaccurate measurements and eventual failure. Finally, the most important disadvantage in using a controller with an independently powered pump is risk. If you have a hybrid system (one in which the solar water heater is connected to the water heater) and the controller or sensors fail so that the pump does not shut off at night, your next electric bill will be a very nasty shock. The system will use electricity or gas to heat the outside all night long. This vulnerability does not exist with a PV-powered system. It simply cannot ever run when there is no sun. If the pump is running, heat is being added in the panels, however little.