How Does
A Solar Hot Water Heating System
Work?

1. **PANELS (called Solar Collector Panels)** are placed on the roof: The **PANELS** are comprised of —**1.) INSULATION** to prevent the collected solar energy (heat) from escaping from the panel; **2.) A COLLECTOR PLATE** with **tubing (collector pipes)** that hold water, and a **special coating** on the plate and tubing to better absorb the solar energy (heat) from inside the panel and transfer it to the water inside the collector pipes; **3.) GLAZING (Glass Cover)** to allow the energy (heat) from the sun to enter the panel and at the same time prevent it from reflecting back out; **4.) A COLLECTOR BOX FRAME** to enclose the collector plate, insulation and glazing, trapping the energy (heat) and protecting the internal components from the weather.

   Energy from the SUN passes through the glass cover (glazing) of the panel. That energy (heat) is trapped inside the collector box, just like when you go to the beach and close your car windows. When you return to your car latter,it is tens of degrees hotter than the outside air. This trapped energy (heat) in the panel is transferred to the water inside the collector pipes.

2. **SENSORS** placed to read the temperature of the water at the top of the panel and at the bottom of the storage tank will signal the CONTROL BOX that the water in the COLLECTORS is hotter than the water in the STORAGE TANK, which in turn signals the PUMP to turn on and to circulate the hot water in the panels down into the storage tank and the cooler water up to the panels to be heated.

3. **PUMP:** The Pump will circulate on and off all day long until the sun goes down or the water in the Panels is no longer hotter than the water in the Storage Tank. Every time the water in the Panels is about 9° to 18° hotter than the water in the Storage Tank , water is circulated between the Panels and the Storage Tank . At night the Pump stops running.

4. **CONTROLLER:** The controller checks Sensor readings, and calculates when the Pump turns on and when it shuts off.

How Does
A Solar Hot Water Heating System
Work?

5. **HOT WATER STORAGE TANK:** This tank is designed to store all the hot water your family will usually use within a 24 hour period. It is insulated very well to keep the water hot during the day and over night. That is why a Solar Storage Tank is much larger than the conventional electric or gas water heater. A conventional electric or gas water heater holds less water because it is designed to heat water instantly once the current supply of hot water is consumed. Therefore, the need for storage is limited. Depending on the size of your family, a typical 40 gallon electric water heater, will completely re-heat 40 gallons of water 2, 3 or more times in a day.

What if the sun doesn't shine or it is raining? Will I still have hot water?

1. Even on a cloudy day solar energy is still collected to heat the water. Just like getting a sunburn laying on the beach on a cloudy day. The amount of energy collected will depend ON how thick the cloud cover is. So even moderately cloudy days will save energy.

2. However, if it is raining during the entire day there will not be enough solar energy to heat the water.

3. **Electrical Back-up:** Just in case there is insufficient solar energy to heat enough water for all your daily needs, or you have guests that will use more HOT water than your system was designed to store, all solar systems have an electrical back-up so that you will never be without hot water. On average 90% of your hot water will be produced by the free energy of the sun, and only 10% of your hot water will be produced by electricity.

4. **Electrical Back-Up Timer:** For your convenience, an electrical timer, which is included with your system, can be set to go on one hour before you get up to use hot water in the morning, or one hour before you get home and use hot water. When you use the timer, if the water temperature in the storage tank is hotter than your thermostat setting, your back-up is not needed and will not turn on at the time you set. If the water temperature in the storage tank is lower than your storage tank thermostat setting when your timer is set to go on, then the water will be heated to your thermostat setting and shut off again.

THE

Hawaii State Energy Office

SAYS:

The

ELECTRIC HOT WATER HEATER

is *the most expensive*

energy-user

on your

home energy bill!

HECO

(Hawaiian Electric Co.)

estimates

a home's hot water heater

soaks up between

30% and 60%

of the home's

total electricity load!

BASED ON WHAT YOU NOW KNOW,

IF WE CAN PROVIDE YOU WITH A

SOLAR SYSTEM THAT WILL MEET 100%

OF YOUR EVERYDAY HOT WATER NEEDS —

AND GUARANTEE IT TO DO EXACTLY THAT —

ARE YOU INCLINED TO STAY

WITH THE CONVENTIONAL

ELECTRIC SYSTEM YOU NOW HAVE,

OR ASSUMING THE INSTALLATION COST

OF THE SOLAR SYSTEM IS AFFORDABLE,

AND DONE ON A BASIS WHERE IT NOT ONLY PAYS

FOR ITSELF, BUT ACTUALLY MAKES YOU MONEY,

WOULD YOU LIKE TO CONVERT

TO SOLAR ENERGY?