For information and resources about solar water heating systems ...

Ameco, “Solar Water Heating” at http://www.amecosolar.com/

Focus Solar: Solar Water Heaters at http://www.focus-solar.com/

U.S. Department of Energy Consumer Energy Information, “Residential Solar Heating Collectors” at http://www.eren.doe.gov/erec/factsheets/heat.html

Solar Energy Industries Association at http://www.seia.org/solar.html

Humboldt Energy Task Force

The Humboldt Energy Task Force (HETF) is a coalition of local government agencies working together to provide local energy conservation tools and solutions for Humboldt County. For more information please contact:

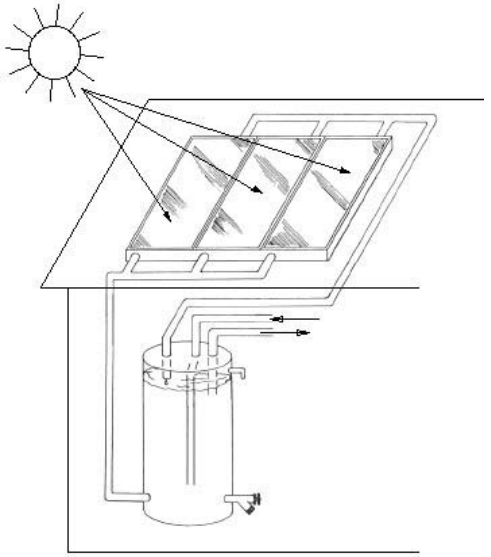
- City of Eureka (707) xxx xxxx
- City of Arcata (707) xxx xxxx
- Humboldt Co. (707) xxx xxxx

Humboldt Energy Task Force mailing info goes here…

FAST FACTS ABOUT

SOLAR WATER HEATERS

Energy Brief # 7



Humboldt Energy Task Force

INTRODUCTION

The sun can heat water to temperatures well above the boiling point, but the normal temperature for household use is only 125ºF. More than one million Americans use the sun to heat water for their homes. A solar water heater system is made up of collectors, a storage tank, pipes, and, possibly, an electric pump or two. Each system should be designed for the particular region and household.

SITING A SOLAR WATER HEATER IN HUMBOLDT COUNTY

A site is a good candidate for a solar water heating system if the following are true:

- The site has clear solar access between 9 a.m. and 3 p.m. throughout the year.
- The collector orientation will be within 15° of true south.
- The collector slope will be within 15° of our latitude of 41°N.

Consumers should adopt basic hot water conservation measures (lower the hot water temperature and use less) before investing in a solar water heating system.

TYPES OF SOLAR WATER HEATERS

In all solar water heating systems, a heat-transfer fluid absorbs heat from the sun as it circulates through a collector. This fluid then returns to a storage tank. The different types of solar water heaters arise from variations in the way in which the fluid is circulated and the method of freeze protection employed.

CIRCULATION

Active—An active solar water heating system uses a pump to circulate the heat-transfer fluid. An active system is more complex but also more efficient. The installed cost is $2000 to $4000. An active solar water heater can be classified as direct or indirect.

Direct—In a direct (or open-loop) system, household (potable) water circulates through the collectors and returns to the storage tank.

Indirect—In an indirect (or closed-loop) system, water, antifreeze, or another heat-transfer fluid circulates through the collectors and then to a heat exchanger. In the heat exchanger, heat is transferred from the fluid to household water stored in the tank.

Passive—A passive solar water heating system moves the heat-transfer fluid through the system without pumps. A passive system includes no electric components so it is generally more reliable but less efficient. Installed cost is $1000 to $3000. A passive solar water heater can be classified as a thermosiphon or integral collector-storage.

Thermosiphon—A thermosiphon system relies on natural convection to circulate water through the collectors and tank. The tank must be located above the collector in a thermosiphon system.

Integral Collector-Storage (ICS)—An ICS (batchheater or breadbox) consists of one or more storage tanks placed in an insulated box with a glazed side facing the sun.

FREEZE PROTECTION

Drainback—In a drainback system the heat-transfer fluid circulates through the collectors only when the outside temperature is high enough to provide for water heating. The collectors drain when the pump is turned off so no fluid remains in the collectors to freeze. A drainback system must include a heat exchanger.

Draindown—In a draindown system the collectors fill each day under the pressure of the city water supply. A trio of solenoid valves provides freeze protection by draining water from the collectors when the temperature falls. A draindown system does not require a heat exchanger.

Recirculation—In a recirculation system the pump will send warm water from the storage tank to the collectors when the temperature nears freezing. The pump will cycle repeatedly during a cold night to warm the collectors and prevent them from freezing.

What solar water heating system will work well in coastal Humboldt County?

An **active drainback system** that utilizes water as the heat-transfer fluid will work well in coastal Humboldt County. The water drains by gravity to the storage tank and heat exchanger when the pump turns off.

BENEFITS OF SOLAR WATER HEATERS

- Lower utility bills—A solar water heater will reduce the amount of fuel needed to heat water, thus lowering current utility bills. After the system has paid for itself in reduced utility bills, you will be cushioned from future fuel shortages and price increases.
- Reduced pollution—Solar water heating avoids the carbon dioxide, nitrogen oxides, sulfur dioxide, and the other air pollution and wastes created when your utility generates power or you burn fuel to heat your household water.
- Improved home resale value—The National Remodelers Association reports that adding a solar water heater to an existing home raises the value of the home by the entire cost of the system.