



Between 2000-2009, residential natural gas rates increased by an average of about 5% per year. A typical household in San Francisco spends almost \$1,000 a year on gas. With existing federal tax credits and a state-wide solar water heating incentive program on the horizon, now is the time for San Franciscans to consider solar water heating. Solar water heating has been in use for more than a hundred years, and is by far the most widespread solar energy technology in use, with several million systems currently installed around the world. Solar water heating systems are several times more efficient than solar electric for harnessing energy from the sun.

The Technology

Solar water heating systems harness the sun's heat to pre-heat the water before it goes to your water heater, allowing it to use less conventional fuel (natural gas or electricity) to heat your water. Solar water-heating systems for domestic hot water include at least one "solar collector" that faces the sun to absorb its heat energy. Collectors can either heat water directly or heat a "working fluid" that's then used to heat the water indirectly through a heat exchanger. Propylene glycol is the most common working fluid and is an antifreeze solution. Unlike ethylene glycol (used in automobile radiators), propylene glycol is not toxic. In active solar water-heating systems, a pumping mechanism moves the heated water or fluid through the system. In passive solar water-heating systems, the water moves by natural convection.

In most urban applications, flat plate solar collectors are placed on the roof of a building and used to pre-heat water which is stored in a supplemental storage tank. The system's storage tank is usually provided by the existing conventional water heater, a new high-efficiency conventional water heater designed to integrate with solar collectors, or a supplemental tank that stores only solar-heated water. In most cases, solar water-heating systems work together with conventional gas or electric water-heating systems. The conventional systems provide backup heat and only operate as needed to ensure a reliable supply of heated water.

System Sizing

Typically, a single-family home in San Francisco requires 1-3 collectors, depending on the number of people in the household, and their hot water usage. Individual collectors come in several sizes, ranging from 25-40 ft² in area. Systems that include a supplemental storage tank for the solar heated water commonly use tanks that hold between 80-300 gallons of water. Solar water heating systems in San Francisco are capable of producing enough energy to provide approximately 50-80% of a typical household's annual water heating needs.

For more information please visit SFEnvironment.org or call (415) 355-3780.

SFEnvironment is a department of the City & County of San Francisco.

Cost¹

In San Francisco, a simple single collector system without an additional storage tank can cost as little as \$6,500, professionally installed. A small two-collector system (50-80 ft²), including additional storage, begins at around \$10,000. Depending on the size of the system, the price for a professionally installed residential system is typically \$150-\$200 per ft², with lower costs realized as system sizes increase. Contact a local professional [solar water heating installer](#)² if you're interested in obtaining a more accurate estimate for a system that meets your needs and reflects the specific design of your home.

Incentives

Currently, there is a 30% Federal [Renewable Energy Tax Credit](#)³ that can be taken for solar water heating systems installed through 2016.

The Solar Water Heating and Efficiency Act of 2007 (AB 1470) authorized the California Public Utilities Commission (CPUC) to develop a statewide Solar Hot Water incentive program pending the outcome of a pilot program conducted in San Diego. The law gives the CPUC authority to create a \$250 million program with the goal to install 200,000 solar water heating systems throughout California. The CPUC released the Staff Proposal for the new incentive program, CSI Thermal, on July 15, 2009. The proposed incentive amount for residential SWH systems is expected to be about \$1500 per system on average, although the exact incentive amount will be calculated based on the amount of energy produced by each system. The proposal is making its way through the comment and approval process with the expectation that the program will begin on January 1, 2010. The Staff Proposal includes a provision to make the rebates retroactive, so that SWH systems installed after July 15, 2009 will be eligible if the proposal is accepted. The CSI Thermal Staff Proposal can be found at: <http://docs.cpuc.ca.gov/efile/RULINGS/104403.pdf>

Benefits

Solar water heating provides a number of enticing economic and environmental benefits. In San Francisco, residential solar water heating could decrease citywide natural gas use by as much as 19 million therms per year, which would reduce the City's carbon emissions by about 116,000 metric tons. Solar water heating can help San Franciscans bring utility costs down, while at the same time providing new green jobs, addressing climate change and ensuring a secure, local, independent energy supply.

Find a Local Installer

Search for renewable energy installers in your area who can help determine an optimal SWH system and design for you at: <http://www.gosolarcalifornia.ca.gov/retailers/search-new.php>. Soliciting at least two to three bids from different solar installers is recommended. All installers should provide you with a free site visit and quote.

¹ Due to the many variables included in the costs for solar water heating systems, it is difficult to provide general price estimates; thus, these cost ranges are offered only as rough guidelines of what to expect if you choose to install one.

² <http://www.gosolarcalifornia.ca.gov/retailers/search-new.php>

³ http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=US37F&State=federal¤tpageid=1&ee=1&re=1