



Renewable Energy Solutions

Solar Thermal - Domestic Hot Water systems (DHWS)

2. Technical Information



One of the most energy intensive (and therefore costly) processes in any hotel is the heating of domestic hot water. With energy costs always increasing, it's no surprise that hotels are looking for new ways to reduce their energy consumption. Renewable energy technologies such as solar domestic hot water systems are a good solution that is becoming more cost effective as fuel prices rise and will help hotels stay competitive and profitable.



How does a solar domestic hot water heating system work?

Solar water heating systems use free heat from the sun to warm domestic hot water. An auxiliary heat, additional boiler or immersion heater, is then used to make the water hotter, or to provide hot water when solar radiation is not sufficient. The solar fraction is the percentage of a building's seasonal energy requirements that can be met by a solar energy device(s) or system(s). This fraction will be optimized through the sizing of the system so as to reach 50 %to 100% or even more to be used in other features like swimming pools.

What are the basic components of a solar hot water heating system?

Solar water heating systems include the solar thermal collectors and a hot water storage tank. An auxiliary heat source is used as a back-up of the solar energy. Either conventional or renewable energy sources can provide any backup needed and may already be part of the solar system.

The collector has the role of "collecting" radiant energy and converting it into heat. Two types of solar collectors are used for SME hotel applications: flat plate collectors and evacuated tube collectors (also called vacuum tubes). Typically vacuum tube collectors have better properties in the transition- and winter periods, but the investment costs are higher than for flat plate collectors.

Flat-plate collector: glazed flat-plate collectors are insulated, weatherproofed boxes that contain a dark absorber plate under a glass.

Evacuated-tube collectors: they feature parallel rows of transparent glass tubes. Each tube contains a glass outer tube and metal absorber tube attached to a fin. As solar radiation represents an intermittent energy source: the heat produced by the solar thermal collectors needs to be driven into a water storage tank to be used in any time.

There are two types of solar water heating systems: active, which have circulating pumps and controls, and passive, which don't: Active Solar Water Heating Systems these systems use pumps to drive the heat from the collectors to the hot water storage tank, and a heat exchanger which can be immersed (small size applications) or external (bigger applications). In areas with low risk of freezing, it's sometimes possible to have the potable water circulate directly through the collector, thus avoiding the commonly used closed primary circuit and the heat exchanger. Passive Solar Water Heating Systems: thermo syphon systems rely on the natural convection of warm water rising to circulate water through the collectors and to the tank (located above the collector). As water in the solar collector heats, it becomes lighter and rises naturally into the tank above. Meanwhile, the cooler water flows down the pipes to the bottom of the collector, enhancing the circulation. These systems are widely implemented in Mediterranean areas (very popular in Greece, Cyprus) where both the heat needs and risks of freezing are reduced.

Collective solar domestic hot water systems are being installed into multi-family houses, hotels, office buildings etc. These collective systems have a collector surface ranging from ten to several hundred square meters. Most larger systems used for collective solar thermal domestic hot water are designed as forced-circulation systems – using a pump, but multiple thermo syphon systems are also used where appropriate. Further information about collective solar thermal DHW can be found on the SOLARGE project's website. <http://www.solarge.org/>





RENEWABLE ENERGY

TIPS:

- Passive solar water heating systems are typically less expensive than active systems, but they're usually not as efficient. However, passive systems can be more reliable and may last longer.
- Solar water heating systems require a backup system for cloudy days and times of increased demand. Conventional storage water heaters usually provide backup and may already be part of the solar system.

Link with other solutions Solar Combi and Solar Combi Plus Systems

Solar domestic hot water technology is used both by the **solar combi systems** for space heating and the **solar combi+ systems** for space heating and cooling.

Swimming pools

The Solar domestic hot water technology can also be combined to the **swimming-pool heating**. The surplus heat produced in the warm season is sometimes used for heating the swimming pool.

BENEFITS FOR THE HOTEL



COST REDUCTION

- The sun doesn't send monthly bills!!!

Solar water heating is the most cost-effective use of solar energy in many climates. A solar hot water heating system will insulate your hotel from rising fossil fuel costs and protect you from fuel-price inflation over time since your hotel will not receive any more monthly energy bills for heating water.



STAFF INVOLVEMENT

Train your staff as guides to show guests the solar hot water heating system you have applied and explain them how it works, you can both attract more tourists and further involve your staff in order to get them feeling more responsible for their working place!



GUEST INVOLVEMENT

Install a demonstration diagram or display the solar energy production to show your guests how the sun is heating the water that is consumed in your hotel. By motivating your guests, they will also feel more responsible and involved in taking care of your hotel! Guests will value the fact that your hotel is environmentally conscious.

BENEFITS FOR THE ENVIRONMENT



CARBON EMISSIONS REDUCTION

The energy produced is clean and emission-free. Solar water systems do not require fuel and produce no waste.

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