

Solar thermal systems explained

People use solar thermal energy for many purposes, including heating water, air, and the interior of buildings and generating electricity. There are two general types of solar heating systems: passive systems and active systems.

Passive solar space heating is when the sun shines through the windows of a building and warms the interior. Building designs that optimize passive solar heating (in the northern hemisphere) usually have south-facing windows that allow the sun to shine onto solar heat-absorbing walls or floors in the building. Solar energy is absorbed by the building materials and heats the interior of buildings by natural radiation and convection. Window overhangs or shades block the sun from entering the windows during the summer to keep the building cool.

Active solar heating systems move heated fluid (air or liquid) into the interior of the building or to a heat storage system, where the heat is released when needed. Fans or pumps move the fluid through collectors to be heated, then to the interior of the building or heat storage system, and then back to the collector to be reheated. Active solar water heating systems usually have a tank for storing solar-heated water.

Solar energy systems that heat water or air in buildings usually have non-concentrating collectors, which means the area that intercepts solar radiation is the same as the area absorbing solar energy. Flat-plate collectors are the most common type of non-concentrating collectors for water and space heating in buildings and are used when temperatures lower than 200°F are sufficient.



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