Solar Thermal Collector Energy Production

Solar Rating and Certification Corporation

In order to allow comparisons between different types of solar technologies, this document presents electrical-equivalent data on the energy production of solar water heating systems. The data establish basic "rules of thumb" regarding the energy production capabilities of this technology.

Peak Power

A typical residential solar water heating system (SWHS) for a family of four delivers 4 kilowatts of electrical equivalent thermal power when under full sun and when the temperature of the water in the storage tank is about the same as the air temperature. Such a system typically has about 64 square feet (6 square meters) of solar collector surface area and produces approximately the same peak power as 400 square feet (37 square meters) of photovoltaic panels.

Production Capacity

Ratings of collectors and systems, along with other information specific to the local area, can be used to calculate the specific reduction in a utility's peak demand. On average, for every SWHS that is installed, 0.5 kilowatts of peak demand is deferred from a utility's load.

Energy Production

Because peak performance occurs infrequently, a more realistic indication of solar thermal system performance is the rated daily energy output of the collectors or system. Using this method, a typical (SWHS) contributes 7 to 10 kilowatt-hours per day, depending on the solar resource and type of collector. Electric water heating for residential applications typically consumes about 12 kilowatt-hours per day, depending on ground water temperature. Annual, site-specific energy savings for domestic water heating systems are available at www.solar-rating.org for all systems certified by SRCC. Using this data, a typical SWHS produces about 3400 kilowatt-hours per year, depending on local conditions and type of collector.

Who is SRCC?

The Solar Rating and Certification Corporation (SRCC) is a non-profit organization, established in 1980, that administers national certification and rating programs for solar energy equipment. SRCC's thirteen-member volunteer board includes representatives from the solar energy industry, the public sector (state and local government), and general interests (utilities, research, building industry, etc). Additional information is available at the SRCC web site: www.solar-rating.org