Solar domestic hot water systems

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There are two types of active solar water heating systems:

Solar water heating (SWH) is heating water by sunlight, using a solar thermal collector. A variety of configurations are available at varying cost to provide solutions in different climates and latitudes. SWHs are widely used for residential and some industrial applications.[1][2]

A Sun-facing collector heats a working fluid that passes into a storage system for later use. SWH are active (pumped) and passive (convection-driven). They use water only, or both water and a working fluid. They are heated directly or via light-concentrating mirrors. They operate independently or as hybrids with electric or gas heaters.[3] In large-scale installations, mirrors may concentrate sunlight into a smaller collector.[original research?]

As of 2017, global solar hot water (SHW) thermal capacity is 472 GW and the market is dominated by China, the United States and Turkey.[4] Barbados, Austria, Cyprus, Israel and Greece are the leading countries by capacity per person.[4]

Records of solar collectors in the United States date to before 1900,[5] involving a black-painted tank mounted on a roof. In 1896 Clarence Kemp of Baltimore enclosed a tank in a wooden box, thus creating the first "batch water heater" as they are known today. Frank Shuman built the world"s first solar thermal power station in Maadi, Egypt, using parabolic troughs to power a 45 to 52 kilowatts (60 to 70 horsepower) engine that pumped 23,000 litres (6,000 US gal) of water per minute from the Nile River to adjacent cotton fields.

Flat-plate collectors for solar water heating were used in Florida and Southern California in the 1920s. Interest grew in North America after 1960, but especially after the 1973 oil crisis.

Solar power is in use in Australia, Canada, China, Germany, India, Israel, Japan, Portugal, Romania, Spain, the United Kingdom and the United States.

Israel, Cyprus and Greece are the per capita leaders in the use of solar water heating systems supporting 30%-40% of homes.[6]

In 2005, Spain became the world"s first country to require the installation of photovoltaic electricity generation in new buildings, and the second (after Israel) to require the installation of solar water heating systems, in 2006.[12]

After 1960, systems were marketed in Japan.[5]

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Australia has a variety of national and state and regulations for solar thermal starting with MRET in 1997.[13][14][15]

Solar water heating systems are popular in China, where basic models start at around 1,500 yuan (US$235), around 80% less than in Western countries for a given collector size. At least 30 million Chinese households have one. The popularity is due to efficient evacuated tubes that allow the heaters to function even under gray skies and at temperatures well below freezing.[16]

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